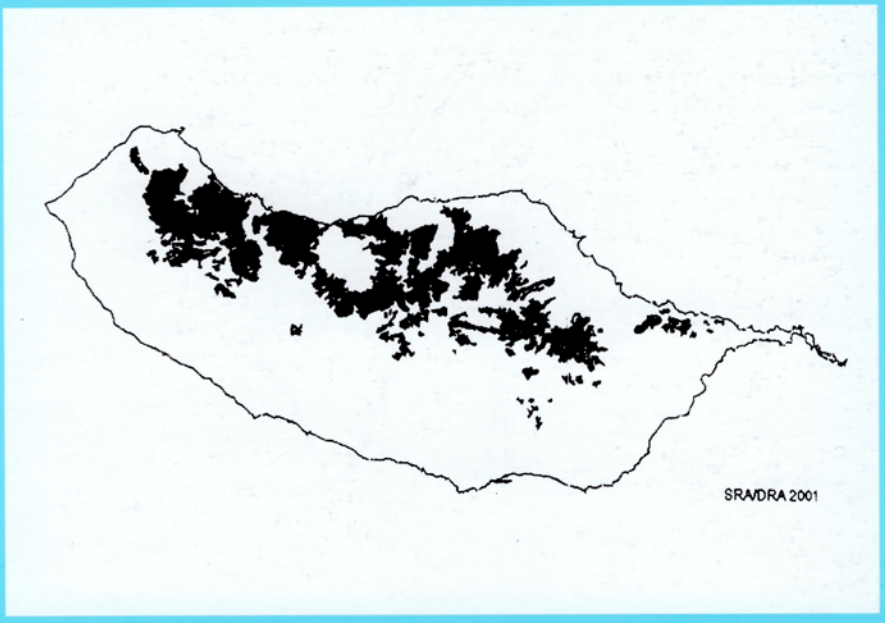
Dipterists Digest



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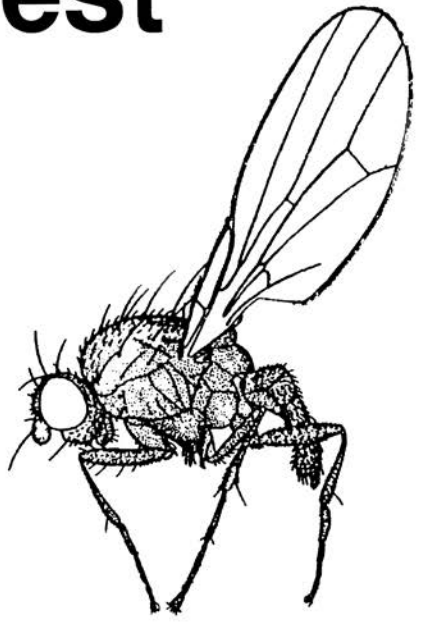

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Dipterists Digest

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Dipterists Digest is the journal of the **Dipterists Forum**. It is intended for amateur, semi-professional and professional field dipterists with interests in British and NW European flies. All notes and papers submitted to **Dipterists Digest** are refereed. The scope of **Dipterists Digest** is:

- the behaviour, ecology and natural history of flies;
- new and improved techniques (e.g. collecting, rearing etc.);
- the conservation of flies;
- provisional and interim reports from the Diptera Recording Schemes, including maps;
- records and assessments of rare or scarce species including those new to regions, countries etc.;
- local faunal accounts and field meeting results, especially if accompanied with good ecological or natural history interpretation;
- descriptions of species new to science;
- notes on identification including deletions or amendments to standard key works and checklists.

Articles may be of any length up to 3,000 words and must not have been accepted for publication elsewhere. Items exceeding this length may be serialised or printed in full, depending on competition for space. Articles should be written in clear and concise English and should preferably be typed double spaced on one side of A4 paper. **After acceptance all contributions should, wherever possible, also be supplied on 3.5" computer disc** in ASCII, Word or Word Perfect formats and accompanied by hard copy. (E-mail attachments are acceptable).

Style and format should follow articles published in the most recent issue. A short Summary (in the form of an Abstract) should be included at the beginning of each article and should be supplied with the article. References to journals should give the title of the journal in full. Scientific names should be underlined or, preferably, italicised. **If an article is to be supplied on disc, scientific names should always be italicised.** Authors of scientific names should be given in full (with parentheses if applicable) and nomenclature should follow the most recent check list, unless reflecting subsequent changes. Tables should be on separate sheets. Figures should be drawn in clear black ink, about 1.5 times their printed size and lettered clearly. Descriptions of new species should include a statement of the museum or institution in which type material is being deposited.

Authors will be provided with twenty separates of papers of two or more pages in length.

Articles and notes for publication should be sent to the Editor at the address given above. Enquiries about subscriptions and information about the **Dipterists Forum** should be addressed to the Membership Secretary, Mick Parker, 9 East Wyld Road, Weymouth, Dorset DT4 0RP, UK

Dipterists Digest 2004 **11**, 1-8

Small Diptera collected preferentially using a suction sampler

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Summary
A suction sampler was found to be far more effective than other more conventional sampling methods for several uncommon species of small, apparently secretive flies. Capture rates using different methods are compared. Notes are given on the habitats where some of these species were recorded.

Introduction

Suction samplers have a long history in entomological survey work (Southwood 1988). Early models were usually heavy and noisy so were not much used outside structured survey work. More recently, coleopterists and hemipterists have recommended them for use in general recording since they can collect abundantly species that were previously regarded as rare (e.g. Wright and Stewart 1992). Dipterists have been rather slower to make use of suction samplers since one of the attractions of fly collecting is that a net is by far the most versatile and satisfying collecting device. Also, earlier models were too violent for the more delicate Diptera and damaged them, but collected Coleoptera in good condition.

Suction samplers collect Diptera that are short-winged or do not fly easily, but more mobile species are more easily sampled by sweeping. This paper lists some species that may be preferentially collected by suction samplers so that the method can be used to assess their conservation status. The sampling method can then be utilised, as an additional method, to provide assessment of the conservation value of sites.

Methods

The sampler was a modified leaf collector sold to gardeners, and is the same as has been recommended by coleopterists. Its noisy two-stroke engine draws air through a wide tube (100mm diameter) and a net bag inserted into this tube collects the insects and debris. The device was run for about 2 minutes at each sample point, but for a shorter period where there was much leaf litter. The collecting bag usually contained about a litre of debris after this period. When the engine was stopped, the bag was quickly released and inverted into a polythene bag. The samples were stored in a deep freeze until processed. The collected material was passed through sieves with three mesh sizes (10mm, 5mm and 2mm), and the two finer fractions sorted under a low power microscope. Sorting was time-consuming and could take as long as an hour per sample. Ismay and Schulten (*pers. comm.*) suggest an alternative method. The sample is collected as above, but then placed in a conventional sweep net to confine the Diptera, which are then collected using a pooter. After a few minutes (longer in cold weather), species able to fly will cease to appear. The sample is then sieved through a c. 5mm sieve into a white tray. The short-winged Diptera and any other specimens required are pooted from the tray.

Collections were made during three surveys. At Moccas Park NNR, Herefordshire, sedges and other tall emergent vegetation were sampled beside the large and ancient Lawn Pool, and along ditches at an adjacent low-lying area (The Meres) recently acquired by English Nature (Harding and Wall 2000; Godfrey and Drake 2003). Tall ungrazed *Carex* species, *Phalaris arundinacea* and *Glyceria maxima* were sampled at three neutral wetlands along the River Nene, Northamptonshire:

Ashton Marsh, Wadenhoe Marsh and Achurch Meadow SSSI, and Snipe Bog nature reserve (a marsh, not a mire) (Drake 2002). The River Nene is a large lowland river with a broad floodplain at these sites. Dry chalk grassland in the vicinity of the A303 between Amesbury and Winterbourne Stoke, Wiltshire, was sampled at roadside verges and along nearby tracks. Grid references are given to the nearest 1 km square, but many samples were taken within each of these squares (Table 1). Ismay and Schulten (*pers. comm.*) point out that suction sampling produces useful additional results from deep fenland litter, tussocks of sedges and grasses in wet and dry habitats, but also from very short turf or other vegetation in dry habitats such as calcareous grassland, heaths, dry sandy grassland and coastal habitats (marram grass, saltmarsh and grazing marsh).

The total number of samples taken in all three surveys included 100 sweep net samples, 16 pitfall trap samples (each consisting of a line of 4 traps), two Malaise trap samples, one tussocking sample and 30 suction samples. The nature of the sweep-net samples varied between surveys from timed samples lasting 15 minutes to longer-lasting qualitative searches.

Results

Nearly 5000 records of Diptera included only 563 from suction samples (11%). Samples were taken at various times between 3 May and 18 August 2002, and suction samples were taken only between 15 and 27 July 2002.

Table 1. Diptera appearing frequently or only in suction samples in the three surveys. Values are the number of samples containing the species, out of the total given after each sampling method. Emboldened species are at least 3.5 times more frequent than expected in suction samples. Statuses of rare or notable species are from Falk (1991) and those for common and local species from Recorder 3.3 (Ball 1997), apart from the following indicated by superscripts: 1 - the author's experience, 2 – Clemons (1996), 3 – Ismay and Schulten (*pers. comm.*).

		status	suction (30)	pitfall (16)	tussocking (1)	sweep-netting	Malaise (2)	sites (listed below the table)
Hybotidae	***Stilpon nubilus* Collin**	local	5					9, 10, 13
Dolichopodidae	***Achalcus bimaculatus* Pollet**	local[1]	12	1		1		1, 2, 5, 6, 7
	Achalcus cinereus (Haliday in Walker)	local	3			3	2	1, 2, 3, 5, 7
	***Achalcus flavicollis* (Meigen)**	local	9		1		2	1, 2, 3, 5, 6
	***Achalcus vaillanti* Brunhes**	local[1]	10					5, 6, 7
	Medetera micacea Loew	local	2					10
Lonchopteridae	***Lonchoptera nitidifrons* Strobl**	Notable	5			1		1, 2, 6
	Lonchoptera scutellata Stein	Notable	4			4		2, 5, 6, 14
Tephritidae	***Dithryca guttularis* (Meigen)**	local[2]	5					10, 11, 13
Sciomyzidae	*Colobaea bifasciella* (Fallén)	Notable	2		1	1	1	1, 2, 5
	Colobaea distincta (Meigen)	Notable	2			1		5, 7
	Pteromicra angustipennis (Staeger)	local	9	6	1	5	2	1, 2, 3, 5, 6, 7
Opomyzidae	*Geomyza apicalis* (Meigen)	Notable	1					8

	***Geomyza balachowskyi* Mesnil**	common	10			2		2, 4, 5, 8, 10
	Geomyza breviseta Czerny	Notable	2					10, 11
	***Geomyza subnigra* Drake**	local	6					8, 10, 12, 13
	Geomyza tripunctata Fallén	common	11			7		2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13
	Geomyza venusta (Meigen)	Notable	2					10, 13
Stenomicridae	***Stenomicra cogani* Irwin**	RDB3	9		1	2		1, 2, 5, 6
	Stenomicra delicata (Collin)	RDB2	1					6
Anthomyzidae	***Anagnota bicolor* (Meigen)**	Notable	13		1	1		1, 2, 5, 6
	Anthomyza collini Andersson	common	2			7		2, 6, 7, 13
	Anthomyza dissors Collin	local[1]	1					7
	Anthomyza neglecta Collin	common	16	1	1	12		1, 2, 5, 6, 7
	***Stiphrosoma cingulatum* (Haliday)**	local	12			3		5, 6, 7, 11, 13
	Stiphrosoma sabulosum (Haliday)	local[1]	3					8, 10, 11
Ephydridae	*Discomyza incurva* (Fallén)	local[1]	2			1		9, 12
	Philotelma nigripenne (Meigen)	local[1]	1					5
	***Philygria picta* (Fallén)**	local[1]	7					9, 10, 12, 13
	Philygria semialata (Collin)	RDBK	2					9
	***Philygria* (other species)**	local[1]	5			1		9, 11, 12
	Psilopa nitidula (Fallén)	common	5			3		3, 8, 9, 10, 13
	Trimerina madizans (Fallén)	local	3					5, 6, 10
Chloropidae	*Elachiptera brevipennis* (Meigen)	local[3]	4	3		3		2, 5, 6, 7
	***Elachiptera diastema* Collin**	common	7			2		2, 8, 10, 11, 13
	Elachiptera tuberculifera (Corti)	common[3]	2			4		2, 3, 5
	Elachiptera austriaca Duda	Notable	8	3		4		1, 5, 6, 7

Sites: 1 - Lawn Pool SO3442; 2 - The Meres SO3442; 3 - Moccas Park seepages (west) SO3342; 4 - Moccas Park seepages (east) SO3441; 5 - Ashton Marsh TL0587; 6 - Wadenhoe TL0083; 7 - Snipe Bog TL0489; 8 - Winterbourne Stoke SU0741; 9 - Longbarrow Cross Roads SU0941; 10 - Stonehenge Down SU1141; 11 - Stonehenge Bottom SU1342; 12 - West Amesbury SU1441; 13 - Countess SU1442; 14 - Amesbury SU1542

Thirty-seven species in the three surveys were found in suction samples but usually clearly less frequent or absent in catches made using other methods (Table 1). This is not an exhaustive list and concentrates on small species that are not often found during casual collecting using sweep-netting, since nearly all of them are moderately secretive, living within dense tussocks and tali stems. They include both long-winged species able to fly and short-winged species unable to fly. About a third of the species are currently defined as nationally rare or scarce, and many are 'local'. If species were caught with equal facility using all sampling methods, the approximate ratio of the samples taken

using the suction sampler to those taken by sweep-netting (ignoring other methods for the moment) would be at least 1:3.33 that is the ratio of the number of samples taken using the two methods. The ratios for many species in Table 1 are quite the opposite (about 3.5 times more likely to occur in suction samples than sweep-net samples), and these may be regarded as being preferentially collected by suction sampling. They are emboldened in the table, although species with only three or fewer occurrences have not been included in this set since the data are relatively sparse and were not collected with a view to making the present analysis, but nevertheless this gives fourteen species (about one third of an already-preselected list) that are very likely to be well under-recorded by sweep-netting.

To illustrate how suction sampling preferentially collects apparently less common species, seven common members of some families are included in Table 1. If the arbitrary ratio of 1:3.5 is taken as an indication of being preferentially collected by suction sampling, only two of the common species (*Elachiptera diastema* and *Geomyza balachowskyi*) fall above this threshold (i.e. are preferentially collected by suction sampling), whereas 22 of the 31 local or rare species fall above the threshold. This provides weak and somewhat selective evidence that some uncommon species are poorly collected by sweep-netting, most probably because of their secretive behaviour. It appears likely, therefore, that the perception of the rarity of some of them is a result of under-recording due to dipterists' predilection for sweep-netting. This conclusion is meant in no way to diminish the efforts by the Nature Conservancy Council and Joint Nature Conservation Committee in allocating rarity statuses, which prove invaluable in site assessment (e.g. Falk 1991 and others in preparation). It is understood that Falk and Ismay (in preparation) will include records from suction sampling when redrafted before publication.

Two other reasons for the apparent rarity of some of these species are their small size and our lack of understanding of their preferred microhabitat. The largest nationally scarce species in Table 1 is probably *Lonchoptera nitidifrons*, with a body length of 3 mm, and the smallest are probably *Stenomicra* and *Philygria* at 1.5 mm. The smaller species have also been awarded the rarest status. These small flies are not the most conspicuous individuals in a sweep net haul, although when sorted from a suction sample under low magnification they are far more obvious. When allocating status, account can be taken of under-recording due to the small size of some insects, but this allowance is limited if the preferred micro-habitat is unknown. Rotheray and MacGowan (1990) showed that the status of even such a large fly as *Callicera rufa* Schummel (Syrphidae) had to be revised downwards once its preferred habitat was found. The following notes may contribute to our understanding of the habitat requirements of some of the small species that were particularly frequent in suction samples.

Anagnota bicolor (Anthomyzidae). This attractive little fly was found across Ashton Marsh (at eight points) and Wadenhoe Marsh in dense and almost pure stands of *Glyceria maxima* or *Carex acutiformis*, all with a dense thatch of leaf litter on wet to dryish soils (although all of Ashton Marsh was under c. 10cm of water in February of the year of sampling). At Moccas Park it was in tall mixed emergents and in *Juncus effusus* tussocks at the margin of Lawn Pool, and in the tall dense mixed emergents, mainly *Carex riparia*, *Phalaris*, *Filipendula ulmaria* and *Sparganium erectum*, along most of the ditches of The Meres. It was frequent at one location at each of these sites. There was almost no *Phragmites* at these sites, so there cannot be any direct association with this plant as tentatively suggested by Falk and Ismay (in preparation)

Anthomyza dissors (Anthomyzidae). A single male was recorded from Snipe Bog in tall mixed and tussocky monocotyledons (mainly *Glyceria maxima*, *Carex elata* and *Phalaris arundinacea*) in an area that is probably flooded in winter by the adjacent River Nene.

Discomyza incurva (Ephydridae). There are several published records of this conspicuous fly which resembles drosophilids of the genus *Stegana* and the chloropid *Camarota curvipennis* (Latreille) in having bent dark wings that give these species a beetle-like appearance (Allen 1969, 1992). The genus *Discomyza* is of further interest in being a carrion-feeder in large snails (Anon 1989; de Courcy Williams 1989; Disney 1969). In the present surveys, it was found at three places near Stonehenge, in rank chalk grass verges ranging from botanically rather dull to herb-rich. Clearly such calcareous sites should be rich in mollusc prey.

Elachiptera austriaca (Chloropidae). At Ashton Marsh, *E. austriaca* was one of the most frequent flies, being found in nearly half the samples in summer and in several in February 2002. It was also present but less abundantly at Snipe Bog and Wadenhoe Marsh. These samples were all from tall monocotyledon stands dominated by either *Glyceria maxima* or *Carex acutiformis*. Several individuals were also found at The Meres at a ditch with tall *Carex riparia*, *Phalaris* and *Sparganium erectum*. Ismay (1976, as *uniseta*) suggested an association with reed or tussocks of grasses or sedges.

Geomyza apicalis, *G. breviseta*, *G. subnigra* and *G. venusta* (Opomyzidae). Restricted areas of chalk grass verges and tracks near Stonehenge and Winterbourne Stoke supported these nationally scarce or local species, with remarkable overlap in their occurrence. They were nearly all on some of the botanically more diverse patches of grassland. The occurrence of *G. breviseta* and *G. venusta* in this survey supports the view that they are strongly associated with calcareous grassland in Britain (Drake 1993). *Geomyza apicalis* is perhaps more often associated with wetlands although it has also been found on calcareous grassland at Devil's Ditch, Cambridgeshire (Falk and Ismay in preparation), and *G. subnigra* has been recorded on a wide range of grassland types.

Philygria picta (Ephydridae). The records were clustered along verges and nearby patches of chalk grassland 300m either side of Stonehenge itself. All the grass was unmanaged, or perhaps occasionally mown during highway maintenance. It was mostly botanically rather dull. The species seems to be uncommon although widespread in Britain, with records from Dumbartonshire (Malloch 1908) to Kent (Shakespeare Cliff, TR3039, 5.vi.1986, C. M. Drake). It has a wide distribution in the Palaearctic and Nearctic regions (Mathis and Zatwarnicki 1995) and is found in a wide range of habitats from saltmarsh to wet meadows (Barnby and Resh 1984; Pešková 1978). The Wiltshire records indicate that it also lives in dry calcareous grassland.

Philygria semialata (Ephydridae). Two samples containing this tiny fly were close together on chalk grassland not far from Stonehenge, one in rank and botanically dull grass on a road verge and the other nearby on tussocky sheep-grazed pasture on a palaeolithic long barrow. There are very few records. The type locality is Cumnor, Berkshire where the specimen was first discovered by sand martin burrows in a gravel pit (Collin 1913). There are three localities in Norfolk: the Stanford Battle Area, on calcareous to neutral short grass (TL89, 1988) (Withers 1989), Brettenham Heath NNR, collected in pitfall traps on calcareous grassland (1983, coll. A. G. Irwin), Cranwich Heath, Norfolk, collected in pitfall traps (TL7794, 31.v.1998, D. J. Mann, det. J. Ismay). A specimen was collected using a D-Vac sampler on limestone grassland at Bredon Hill, Worcestershire, (17.vii.1987, coll. D. A. Sheppard, det. C. M. Drake). These sites are all dry grassland and many of them are calcareous. It has been recorded abroad in Germany, Hungary, Switzerland and Italy but the habitats are not known (Mathis and Zatwarnicki 1995).

Stenomicra cogani (Stenomicridae). This tiny pale fly was found at Moccas Park in low numbers around Lawn Pool within tussocks of *Carex paniculata* and dense *C. elata*, and at a nearby ephemeral pond with dense *C. rostrata*. In the drainage ditches of The Meres within 100m of these sites, the fly was in dense tall mixed emergents that included *Carex riparia* and *Phalaris*. It was frequent at Ashton Marsh among tall annually flooded *Carex acutiformis*, either as pure stands or mixed with other species such as *Glyceria maxima* and *Phalaris arundinacea*. Several were found in a pure stand of dense *Glyceria maxima*. As the site is ungrazed and subject to natural flooding events, a large thatch of leaf litter has accumulated under the growing plants, although the soil below is mineral and not at all peaty. The fly was present in much smaller numbers at Wadenhoe Marsh upstream of Ashton, in tall *Carex acutiformis* and *Glyceria maxima* swamp. Several other records are from *Carex paniculata* tussocks, a plant not present at Ashton Marsh and not at all evident at Wadenhoe Marsh. The important habitat feature for *Stenomicra* may therefore be a dense thatch of litter rather than any specific plant.

Stenomicra delicata (Stenomicridae). A single female was caught together with *S. cogani* at Wadenhoe Marsh in the same tall *Carex acutiformis* and *Glyceria maxima* swamp over somewhat peaty soil close to the river. This is probably the first instance of both British *Stenomicra* species being found at the same site. Falk and Ismay (in preparation) list ten sites in south-east England from Hampshire to Norfolk and including a marsh near Kettering in Northamptonshire at a distance of about 12 km from Wadenhoe.

Stiphrosoma cingulatum (Anthomyzidae). The fly was moderately widespread and sometimes frequent in samples from all three sites along the River Nene, all dominated by tall *Glyceria maxima* or *Carex acutiformis*. It was also found at three sites of rather undistinguished chalk grass verge just east of Stonehenge. These occurrences on dry grassland at distances of 200-1300m from the nearest wetland suggest that *S. cingulatum* is not confined to wetlands, even though this is probably its preferred habitat.

Trimerina madizans (Ephydridae). This species has been reported mainly from wetland habitats where its larvae feed on spiders' eggs (Foote 1984; Scheiring and Foote 1973). There are few published records for Britain and it is probably rather uncommon. Malloch (1908) recorded it from a site in Dumbartonshire and Godfrey (1994) pooted it from tussocks of *Carex paniculata* at a site in Leicestershire. In the present surveys, it was recorded from a monoculture stand of tall *Carex acutiformis* at Ashton Marsh (15.vii.2002), from tall *Carex acutiformis* and *Glyceria maxima* riverside swamp at Wadenhoe Marsh (16.vii.2002) and from dry sheep-grazed chalk grassland on a long barrow near Stonehenge (24.vii.2002) (together with *Philygria* species). This last record is contrary to the previously published information on the species' preference for wet habitats, although Pešková (1978) found it in both dryish to waterlogged grazed meadows.

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gave permission to quote his records of *Philygria semialata*. Finally, I thank Peter Chandler and the referees John Ismay and Barbara Schulten for helpful additions to the paper.

References

Allen, A.A. 1969. Two uncommon flies in West Kent. *Entomologist's Record and Journal of Variation* **81,** 307.

Allen, A.A. 1992. Some notable Diptera from Oxleas Wood SSSI, Shooters Hill, N. W. Kent. *Entomologist's Record and Journal of Variation* **104,** 265-271 and 297-302.

Anon 1989. Another snail parasite. *Norfolk Natterjack* No. **27,** 1989, 5.

Ball, S.G. 1997. *Recorder, an environmental recording package for local record centres.* English Nature, Peterborough.

Barnby, M.A. and Resh, V.H. 1984. Distribution and seasonal abundance of brine flies (Diptera: Ephydridae) in a San Francisco Bay salt marsh. *Pan-Pacific Entomologist* **60,** 37-46.

Clemons, L. 1996. A provisional atlas of the Tephritidae (Diptera) of Britain and Ireland. *British Tephritidae Newsletter* No. **6.** Dipterists Forum.

Collin, J.E. 1913. *Parydroptera discomyzina* and *Philygria semialata*: new Palaearctic Ephydridae (Diptera). *The Entomologist* **46,** 1-3.

de Courcy Williams, M. 1989. A list of Irish Ephydridae (Diptera) based on the Haliday Collection in the National Museum of Ireland. *Irish Naturalists' Journal* **23,** 6-11.

Disney, R.H.L. 1969. A note on *Discomyza similis* Lamb (Diptera, Ephydridae) and other flies reared from dead snails in Cameroon. *Entomologist's monthly Magazine* **105,** 250-251.

Drake, C.M. 1993. A review of the British Opomyzidae (Diptera). *British Journal of Entomology and Natural History* **6,** 159-176.

Drake, C.M. 2002. *A survey of the invertebrates of Ashton Marsh, Snipe Bog and Wadenhoe Marsh, Northamptonshire*. Unpublished report to English Nature, Peterborough.

Falk, S.J. 1991. A review of the scarce and threatened flies of Great Britain (Part 1). *Research and Survey in nature conservation* No. 39. Nature Conservancy Council, Peterborough.

Falk, S.J. and Ismay, J.W. (in preparation). *A review of the scarce and threatened flies of Great Britain. Acalyptratae.* Joint Nature Conservation Committee, Peterborough.

Foote, B.A. 1984. Biology of *Trimerina madizans*, a predator of spider eggs (Diptera, Ephydridae). *Proceedings of the Entomological Society of Washington* **86,** 486-492.

Godfrey, A. 1994. Some rare Acalyptrate Diptera taken in recent years. *British Journal of Entomology and Natural History* **7,** 85-88.

Godfrey, A. and Drake, C.M. 2003. *Diptera survey of Moccas Park NNR, Herefordshire.* Unpublished report to English Nature, Ledbury.

Ismay, J. 1976. The status and microhabitat of *Elachiptera uniseta* Collin (Dipt., Chloropidae). *Entomologist's monthly Magazine* **111,** 101-103.

Harding, P.T. and Wall, T. (Ed.) 2000. *Moccas: an English deer park*. English Nature, Peterborough. 348 pp.

Malloch, J.R. 1908. Diptera in Dumbartonshire in 1907. *Entomologist's monthly Magazine* **44,** 137-138.

Mathis, W.M. and Zatwarnicki, T. 1995. World catalogue of shore flies (Diptera: Ephydridae). *Memoirs of Entomology, International* **4,** 1-423.

Pešková, H. 1978. Ephydridae (Diptera) from different meadow communities. *Dipterologica bohemoslovaca (Bratislava)* **1,** 205-228.

Rotheray, G.E. and MacGowan, I. 1990. Re-evaluation of the status of *Callicera rufa* Schummel

(Dipt., Syrphidae) in the British Isles. *Entomologist* **109,** 35-42.
Scheiring J.F. and Foote, B.A. 1973. Habitat distribution of the shore flies of northeastern Ohio (Diptera: Ephydridae). *Ohio Journal of Science* **73,** 152-164.
Southwood, T.R.E. 1988. *Ecological Methods, With Particular Reference to the Study of Insect Populations.* 2nd edition. Methuen. London. 548 pp.
Withers, P. 1989. Some interesting Diptera collected in pitfall traps in Norfolk Breckland. *Dipterists Digest* (*First Series*) **2,** 7.
Wright, A.F. and Stewart, A.J.A. 1992. A study of the efficacy of a new inexpensive type of suction apparatus in quantitative sampling of grassland invertebrate populations. *British Ecological Society Bulletin* **23,** 116-120.

***Rhingia rostrata* (Linnaeus) (Diptera, Syrphidae) in Hampshire** – On 9.vi.1997, during a visit to Ashford Hangers (SU735265) at Steep, near Petersfield, I caught a single female *Rhingia rostrata* (Linnaeus, 1758). The following year, I took a further single female on 17.viii.1998 at the southern edge of the New Forest in Roydon Woods (SU318012), a Hampshire Wildlife Trust reserve near Brockenhurst. Both specimens were visiting the flowers of thistles (*Cirsium* sp.) and are deposited in the collections of Hampshire County Council Museums & Archives Service (HCCMS).

During the research necessary for the preparation of a *Provisional checklist for the Hoverflies (Diptera: Syrphidae) of Hampshire, UK* (Palmer, C. J. 2003. *Hampshire Museum Papers* **28**. Winchester: Hampshire County Council Museums & Archives Service.), it became clear that these appear to be the first substantiated records for the species in Watsonian vice-counties 12 (North Hampshire) and 11 (South Hampshire) respectively.

In a report titled *'Uncommon and rare hoverflies from the 1986 BENHS Annual Exhibition'* (1988. *Hoverfly Newsletter* **7**, 11) it was claimed that I.R. Hudson exhibited recent specimens of *R. rostrata* from Oxenbourne Down and Botley Wood in South Hampshire. This is in error since these records actually refer to *Xanthandrus comtus* (Harris) (1987. 1986 Annual Exhibition: Diptera. *Proceedings and Transactions of the British entomological and natural history Society* **20**, 57-60). No specimens of *R. rostrata* are currently to be found in the I.R. Hudson collection nor is there any mention of the species in his diaries. Both the collection and diaries from this period are cared for by HCCMS. In addition, he has no recollection of ever having taken the species in Hampshire during the 1980s (I. R. Hudson *pers. comm.*).

To find *R. rostrata* at Ashford Hangers was not particularly surprising since the species has a relatively long history of occurrence from adjacent parts of Surrey (Morris, R.K.A. 1998. *Hoverflies of Surrey*. Surrey Wildlife Trust.). Indeed, there is another more recent record for *R. rostrata* in North Hampshire to confirm this view, close to the Surrey border at Bentley Station Meadow during 2000 by J. Denton (2001. *Dipterists Digest (Second Series)* **8**, 27-30). However, to find the species for the first time in the much-visited New Forest was most unexpected and a significant extension to the distribution illustrated by S.G. Ball and R.K.A. Morris (2000. *Provisional atlas of British hoverflies (Diptera, Syrphidae).* Biological Records Centre, Huntingdon.).

I would like to thank the Hampshire Wildlife Trust for funding the survey work at Roydon Woods through the Life 2 Project – **CHRIS PALMER**, Hampshire County Council Museums & Archives Service, Chilcomb House, Chilcomb Lane, Winchester, Hants SO23 8RD

***Idioptera linnei* Oosterbroek, 1992 (Diptera, Limoniidae), new to Wales during 2003** – During a site visit to Fenn's, Whixall and Bettisfield Mosses NNR on 10 May 2003 the RDB1 cranefly *Idioptera linnei* Oosterbroek (Limoniidae) was of particular note. Fenn's, Whixall and Bettisfield Mosses NNR is a part of the extensive lowland raised mire system that straddles the English / Welsh border just south of Whitchurch in Shropshire. It is part of the Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses SSSI, is a Ramsar site and a candidate Special Area of Conservation (cSAC). English Nature (EN) and The Countryside Council for Wales (CCW) have jointly managed 575 hectares of the central mosses since 1991, rehabilitating them as growing mire after many years of both piecemeal and commercial peat cutting.

This was not the first site record of the species for the NNR. A specimen in the Liverpool Museum collection, obtained in 1938 by Harry Britten, is the earliest known record and is labelled "Whixall Moss, Salop". More recently John Kramer identified the species upon the Shropshire side of the reserve on 24.viii.1999 from an area known as 'the small holders' triangle' (Section 24). It was therefore of interest to me that the species was more widespread upon the NNR than at first thought, and its flight period was perhaps longer than suggested by S.J. Falk (1991. A review of the scarce and threatened flies of Great Britain (Part 1). *Research and survey in nature conservation* **39,** 1-194. Nature Conservancy Council, Peterborough).

Fortunately I live local to the NNR and this enabled me to return regularly and search for the insect within other areas of the site. The following day (11.v.2003) I returned with my camera and the resultant image accompanies this text (Fig. 1). Further visits were undertaken and records were noted upon three further dates and locations upon the site. Identifications could be made in the field once a voucher specimen had been taken and identified using Alan Stubbs' test key to the subfamily Limnophilinae (1997. Cranefly Recording Scheme. A test key to the subfamily Limnophilinae. 17 pp., circulated with Bulletin of the Dipterists Forum No. 43). The striking wing pattern and the femoral character were used to distinguish it from *I. pulchella* (Meigen).

On 7.vi.2003 I transferred my searches onto the Welsh side of the NNR (Wrexham County Borough, V.C. 50), as all records had hitherto come from Shropshire (V.C. 40) and after much searching located a single adult male. Adrian Fowles of CCW later confirmed the species as new to Wales. No further sightings were made in Wales; however, regular sightings were noted in V.C. 40 until 4.vii.2003. It should be noted that the nationally scarce cranefly *I. pulchella* was also recorded at the same sites as *I. linnei* on both sides of the border.

Sightings of *Idioptera linnei* were adjacent to, or over, small *Sphagnum*-filled pools that were sheltered by *Betula pendula* or *Salix* species scrub, or mature *Calluna vulgaris* on peat baulks. These pools were formed in abandoned old peat cuttings fed with rainwater or groundwater in the form of iron springs.

Old abandoned peat cuttings are a feature within the Shropshire side of the site, compared to the Wrexham side, where peat cuttings result from more modern commercial practices. Therefore it may be that the cranefly is more likely to be found in greater numbers on the Shropshire side of the reserve.

The author would like to thank Dr. Joan Daniels, site manager at Fenn's, Whixall and Bettisfield Mosses NNR, for allowing access and permissions relevant to this account, Adrian Fowles for providing status information within Wales and Dr. Steve Judd for access to the Liverpool Museum (NMGM) collections – **PETER BOARDMAN,** 7 High Street, Weston Rhyn, Shropshire, SY10 7RP

Flowers of *Thalia dealbata* J. Fraser (Marantaceae), a death trap for flies (Diptera) and some other insects (Hymenoptera, Lepidoptera) –

Thalia dealbata J. Fraser is a herbaceous perennial plant that originates from south east USA. Although it is sometimes described in gardening books as being frost-tender, it usually survives the winter in gardens if it is planted in pond margins with its crown under the water. It flowers in late July-August when it produces spikes of small violet flowers with a whitish waxy farina on stems up to 1.5m (5ft) tall.

During the first week of August 2001 I noticed that the flower heads of this plant at RHS Garden, Wisley, Surrey had many insects on them. Closer examination showed that the flies and other insects were being held fast by their mouthparts. Many had died while others struggled in vain to get free. S. Finney and R.H.L. Disney (2002. Hoverflies (Dipt., Syrphidae) entrapped by flowers of an exotic plant (Marantaceae). *Entomologist's monthly Magazine* **138,** 18) noticed a similar phenomenon in 2001 on a *Thalia dealbata* plant being grown in a greenhouse. On that occasion only the hoverfly *Episyrphus balteatus* (De Geer) was recorded as trapped in the flowers.

The insects trapped by the flowers on plants growing in outdoor ponds at RHS Garden, Wisley were:-

Diptera: Syrphidae – *Episyrphus balteatus* (De Geer), *Scaeva pyrastri* (Linnaeus), *Eupeodes corollae* (Fabricius), *E. luniger* (Meigen), *Syrphus torvus* Osten-Sacken.
Diptera: Muscidae – *Musca autumnalis* De Geer, *Muscina levida* (Harris), *Phaonia subventa* (Harris), *Eudasyphora cyanella* (Meigen)
Diptera: Sarcophagidae – *Sarcophaga variegata* (Scopoli)
Diptera: Calliphoridae – *Calliphora vicina* Robineau-Desvoidy, *Lucilia* species
Lepidoptera: Pyralidae – *Phycita roborella* (Denis & Schiffermüller)
Lepidoptera: Noctuidae – *Mesapamea secalis* sensu lato
Hymenoptera: Halictidae – *Lasioglossum albipes* (Fabricius)

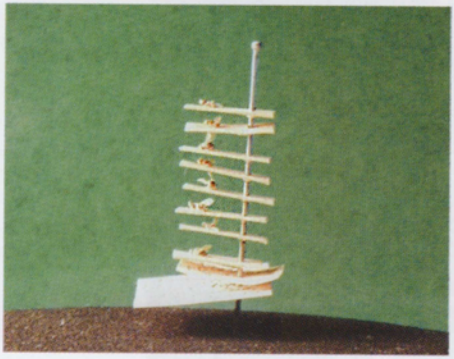
The most frequently trapped insect at Wisley Garden was the common hoverfly *Episyrphus balteatus* (Fig.1). This insect was extremely abundant in the area at that time and could be seen visiting the flowers of a wide range of plants.

Why *Thalia dealbata* flowers should grip the mouthparts of flies and other insects so tightly that they cannot escape is not easily explained. When this plant flowered in 2002 and 2003 there was no repetition of the fly-catching behaviour. This suggests that it is not the physical structure of the flower that captures insects. It may be that certain weather conditions will, in some years, produce a particularly glutinous nectar that acts like super-glue when probed by an insect's proboscis.

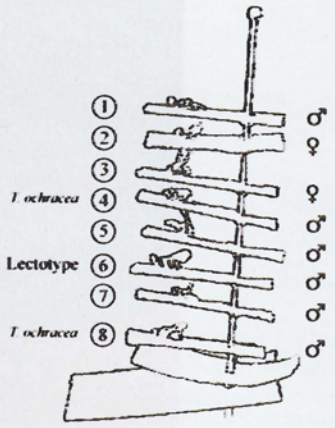
I would like to thank David Baldock for identifying the bee trapped by the flower – **A.J. HALSTEAD,** RHS Garden, Wisley, Woking, Surrey, GU23 6QB

Plate opposite illustrates two preceding notes:
(above) *Idioptera linnei* Oosterbroek, 1992 (Diptera, Limoniidae), new to Wales during 2003: Fig. 1, *Idioptera linnei* male at Fenn's, Whixall and Bettisfield Mosses NNR on 10 May 2003.

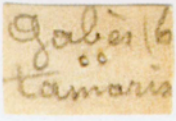
(below) Flowers of *Thalia dealbata* J. Fraser (Marantaceae), a death trap for flies: Fig. 1, Flowers of *Thalia dealbata* with dead flies, mostly *Episyrphus balteatus* (De Geer), attached.

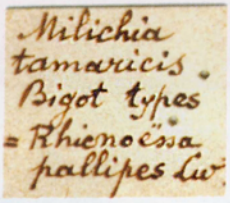


1



2





LECTOTYPUS
Milichia tamaricis Bigot, 1888
= *Tethina tamaricis* (Bigot,1888) n. comb.
♂ with abdomen stored in glycerol (6th specimen from above)
L. Munari & A. C. Pont des. 2003

3

PARALECTOTYPI
Milichia tamaricis Bigot, 1888 ♂♀
= *Tethina tamaricis* (Bigot,1888) n. comb.
[1st, 2nd, 3rd, 5th, 7th spns from above, identical with *T. flavigenis* (Hendel, 1934)], [4th and 8th spns from above, identical with *T. ochracea* (Hendel, 1913)]
L. Munari & A. C. Pont des. 2003

Dipterists Digest 2004 **11**, 11-15

The identity of *Milichia tamaricis* Bigot, 1888 (Diptera, Tethinidae)

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Summary
The rediscovery of the type-series of *Milichia tamaricis* Bigot, 1888, is reported. It proves to be the same as *Tethina flavigenis* (Hendel, 1934), but is to be treated as a *nomen oblitum* and therefore as a junior synonym of Hendel's name.

Introduction

In 1888, the prolific but erratic French dipterist J.-M.-F. Bigot (1818-1893) published a report on the Diptera collected in Tunisia by the coleopterist Valéry Mayet (1839-1909). The list of captures was followed by the descriptions of ten new species, which are listed further below. The fate of this material has never been known. It was not in Bigot's personal collection, which was purchased by the English dipterist G.H. Verrall in 1893 and is now divided between the Oxford University Museum of Natural History (Oxford) and the Natural History Museum (London); nor was it found in the Muséum National d'Histoire Naturelle (Paris). A footnote in Bigot's original report (1888: 5) suggests that it may well have remained in the private collection of Valéry Mayet: "Le numéro d'ordre placé entre parenthèses à la suite d'un nom de localité est celui que portent les échantillons dans la collection de M. Valéry Mayet". However, in the course of researches into Bigot's entire dipterological *oeuvre* (Pont, Evenhuis and Chainey in preparation), some of this Tunisian material has been found in the Institut Royal des Sciences Naturelles de Belgique (IRSNB), where it was located in the collection of the dipterist J. Villeneuve (1868-1944). Villeneuve was already very active dipterologically by the beginning of the 20th century, and it seems probable that he purchased or was given the Diptera from Valéry Mayet's collection. Interestingly, Hennig (1938: 7) reported that he had seen Becker's personal copy of his Palaearctic Catalogue (Becker 1905), in the library of the Deutsches Entomologisches Institut (Eberswalde, Germany), in which Becker had written a note against one of these Tunisian species, *Milichia? tamaricis*: "*tamaricis* Bigot = *Rhicnoessa pallipes* Lw. sec. typ. (collectio Villeneuve)". This synonymy, completely impossible to deduce from the description, indicates that Becker saw the type-series for himself in Villeneuve's collection at some time after 1905.

Fig. 1. Multiple mount of the syntype series of *Milichia tamaricis* Bigot.

Fig. 2. Legend (numbers in open circles) for the outlined figure of the multiple mount: [6] Lectotype ♂ of *Milichia tamaricis* Bigot; [1-3, 5, 7] Paralectotypes ♂♂♀♀ of *Milichia tamaricis* Bigot, identical with *Tethina flavigenis;* [4, 8] Paralectotypes ♂♂ of *Milichia tamaricis* Bigot, identical with *Tethina ochracea.*

Fig. 3. Original labels of the syntype series of *Milichia tamaricis*.

According to present knowledge, therefore, the ten species of Tunisian Diptera described by Bigot can be listed as follows, with their current family placement and with the location of the surviving type-material:

elegans (*?Cerdistus*), Asilidae. Holotype in IRSNB.
fascifrons (*Nemestrina*), Nemestrinidae. Syntypes not found.
incerta (*Gonia*), Tachinidae. Holotype in IRSNB.
laevis (*Cyllenia*), Bombyliidae. Holotype not found.
limbatus (*Oncodes*), Acroceridae. Holotype in IRSNB.
mayeti (*Exoprosopa*), Bombyliidae. Syntypes 2 ex. in IRSNB.
pruinosa (*?Gitona*), Drosophilidae. Syntypes not found.
rufinus (*Culex*), Culicidae. Syntypes not found.
tamaricis (*?Milichia*), ?Odiniidae/Tethinidae. Syntypes not found.
varians (*Saropogon*), Asilidae. Syntypes not found.

The present contribution concerns the rediscovery of the syntypes of *Milichia? tamaricis*, and discusses the identity of these syntypes and of the name *tamaricis*.

Results and discussion

In the course of his study of European Tethinidae, LM was sent material for study from the Diptera collection of the Institut National de la Recherche Agronomique (Montpellier, France) (INRA-ENSA), and was surprised to find a mount with several specimens gummed to card (see Fig. 1) and labelled as the types of *Milichia tamaricis*. Correspondence with ACP confirmed that no other material of *tamaricis* was known to exist and that this mount did indeed comprise the type-series of *tamaricis*.

There is no documentation to explain how these Bigot syntypes came to be in the Diptera collection of INRA-ENSA, but information from Michel Martinez of that Institute suggests the following possibility: the tachinid specialist Louis-Paul Mesnil (1905-1986) worked closely with Villeneuve, who regarded him as his successor as the lead-worker on Old World Tachinidae. He was based for a number of years in the agricultural entomology laboratory of INRA-Versailles, close to Rambouillet where Villeneuve lived and worked as a medical practitioner. Villeneuve died in 1944, and it seems most likely that some boxes of Diptera came to Mesnil while his main collection went to IRSNB in Brussels. Shortly after the end of World War II, Mesnil left France for Switzerland and took his Tachinidae with him, but most probably left the other Diptera that no longer interested him in INRA-Versailles. In 1993, the entire INRA-Versailles collection was moved to Montpellier where the Diptera collection now contains not only a substantial amount of Villeneuve material from Versailles but also the collection of Henri Sicard, a local Montpellier dipterist who had contacts with Villeneuve and whose collection also contains Villeneuve material.

In this paper, we report on the newly-discovered material of *tamaricis*, discuss the identity of the eight syntype specimens on this multiple mount, and designate a lectotype for the name *tamaricis*.

***Milichia*? *tamaricis* Bigot**

Milichia? *tamaricis* Bigot, 1888: 10.

Odinia tamaricis. - Becker, 1905: 240 [generic combination; Palaearctic Catalogue]. - Hennig, 1938: 7 [suggested synonymy with *Tethina pallipes* (Loew) (by Becker)]. - Krivosheina, 1984: 262 [Palaearctic Catalogue, doubtful species of Odiniidae, genus *Odinia*].

Bigot described this species from an unspecified number of both sexes, "Gabès, juin; abondant sur les *Tamarix*. (N. 255 et 257.)" (Tunisia, 1884, collector Valéry Mayet).

The syntype-series is detailed below. It consists of eight specimens, each glued to a card slip and mounted together on a single pin (Fig. 1). The series consists of two species of Tethinidae, and the specimen here designated as lectotype is the sixth specimen from the top of the mount. The lecto- and paralectotype label data are quoted without interpretation; a slash (/) indicates the end of a line of print or handwriting, and two slashes (//) signify another label. Supplementary or qualifying information is given in square brackets.

A male of *Milichia tamaricis* Bigot, which is the sixth specimen from the top of the syntype mount, is here designated as lectotype in order to fix the identity of the name *tamaricis*. The following labels are present on the mount (Fig. 3): "[TUNISIA] Gabès (6 [June] / *Tamarix* [sepia label handwritten in pencil] // *Milichia* / *tamaricis* / Bigot types / = *Rhicnoëssa* / *pallipes* Lw [the same in ink, in Villeneuve's handwriting] // LECTOTYPUS / *Milichia tamaricis* Bigot, 1888 / = *Tethina tamaricis* (Bigot, 1888) n. comb. / ♂ with abdomen stored in glycerol (6th / specimen from above) / L. Munari & A.C. Pont des. 2003 [printed white label with double red frame] // PARALECTOTYPI / *Milichia tamaricis* Bigot, 1888 ♂♀ / = *Tethina tamaricis* (Bigot, 1888) n. comb. / [1st, 2nd, 3rd, 5th, 7th spns from above, / identical with *T. flavigenis* (Hendel, 1934)]; / [4th and 8th spns from above, identical with *T.* / *ochracea* (Hendel, 1913)] / L. Munari & A.C. Pont des. 2003 [same kind of label]".

The lectotype is glued to a rectangular slip of card, and is in poor condition (right wing missing, mesonotum mostly collapsed with some setae missing or misdirected, ptilinal sac not reabsorbed); the abdomen is dissected, stored in glycerol in a small plastic tube, and pinned below all the specimens forming the multiple mount. This mount, still including the lectotype which has not been removed and remounted, is deposited in the Diptera collection of the Institut National de la Recherche Agronomique, Montpellier, France (INRA-ENSA).

In spite of its poor condition, this male was selected for lectotype designation because it was the only male among the syntypes having the postabdominal segments free from glue: the abdomen could therefore be removed and dissected without damaging the delicate genitalic structures which, in the other males, were partly or wholly embedded in the hardened old glue. Examination of the male terminalia was absolutely necessary in order to make a reliable taxonomic identification of the species.

As regards the question mark placed immediately after the generic name *Milichia* in the original description, Bigot states: "*Pour des motifs analogues à ceux que nous avons exposés à propos de l'espèce précédente* [*Gitona? pruinosa* Bigot], *nous ne pouvons rapporter celle-ci au genre Milichia.*". These "*motifs analogues*" refer to the doubtful generic placement of some species "*dans la classification des Muscides inférieures, classification qui laisse encore infiniment trop à désirer!*" (Bigot 1888). Bigot was certainly unfamiliar with tethinids, as his taxonomic knowledge of this group of flies was somewhat vague and incomplete, as was indeed the case with most nineteenth century dipterists dealing with acalyptrate flies.

The species *tamaricis* has not been recognised since Bigot's description. Most recently, it has been listed as an unrecognised species of Odiniidae or possibly of Tethinidae (Krivosheina 1984: 262).

Careful examination of the syntype series shows that this multiple mount consists of two species, *Tethina flavigenis* (Hendel, 1934) and *Tethina ochracea* (Hendel, 1913) (Fig. 2; see the caption for further details). The lectotype belongs to *Tethina flavigenis*, and the name *tamaricis* is therefore a senior synonym of *flavigenis*. According to ICZN §23.9.1, prevailing usage must be maintained when two

conditions are met: the senior synonym has not been used as a valid name after 1899, and the junior synonym has been used in at least 25 works published by at least 10 authors in the immediately preceding 50 years and encompassing a span of not less than 10 years. The name *tamaricis* almost fulfils the first part of this article, as it has been mentioned in two Catalogues, but the name *flavigenis* does not fulfil the second part.

The name *tamaricis* has been mentioned, and only as a name, in catalogues of Palaearctic Diptera (Becker 1905; Krivosheina 1984). The name *flavigenis* has been mentioned in 20 papers published by 16 authors over the last 50 years. Even so, as "usage" is such an ambiguous and ill-defined term, several of these 20 citations hardly count as usage. A taxonomic description or illustration is obviously "usage", but apparently mention in a Catalogue is not "usage". But is the mention of a name in a check list, a faunistic list or in a type-catalogue also "usage"? Or even appearance in an electronic website? There are many "grey" areas involved in this.

ICZN §23.9.3 states that if the conditions of §23.9.1 are not met but an author nevertheless considers that the use of an older synonym would threaten stability and so wishes to maintain use of the younger synonym, then the matter must be referred to the Commission for a ruling under the plenary powers. Such a course has been recommended to us. However, it is our view that there can be very few Diptera that have been mentioned in at least 25 works published by at least 10 authors in the last 50 years and encompassing a span of not less than 10 years. It is likely that only species of some medical, veterinary or agricultural importance would fulfil these criteria, and at least 100,000 Diptera names would fail to meet them. It seems to us unnecessary to involve the Commission in every decision concerning little-known species of no known practical importance - in fact, a waste of a taxonomist's time to prepare a case and a waste of the commissioners' time to consider it - and so we are proposing formally to treat the name *tamaricis* as a *nomen oblitum* and the name *flavigenis* as a *nomen protectum*. The synonymy can be stated as follows:

Genus *Tethina* Haliday, 1838

flavigenis Hendel, 1934: 47 (♂♀; *Rhicnoessa*). Type-locality: "Algeciras, Andalusien" [Spain]. Distribution: Palaearctic: Bulgaria, Denmark, England, France, Germany, Greece, Italy, Netherlands, Romania, Spain, Tunisia. **Nomen protectum**.

tamaricis Bigot, 1888: 10 (♂♀; *Milichia*?). Type-locality: "Gabès, juin; abondant sur les *Tamarix*" [Tunisia]. **Nomen oblitum et synonymum novum.**

Acknowledgements

We are very grateful to Mr M. Martinez (INRA-ENSA, Montpellier, France) for allowing us to study the material discussed in this paper and for information on how these Bigot types may have come to the INRA-ENSA collection; to Prof A. Minelli (University of Padua, Italy) and Dr N.L. Evenhuis (B.P. Bishop Museum, Honolulu, Hawai'i) for discussing problems with *nomina oblita* and *nomina protecta*; and to Mr E. Munari (University of Padua, Italy) for his valuable assistance in processing the digital images reproduced in this article.

References

Becker, T. 1905. Agromyzinae. Pp. 240-260. **In** Becker, T., Bezzi, M., Kertész, K. and Stein, P. (Eds) *Katalog der paläarktischen Dipteren.* **4,** 327 pp. Budapest.

Bigot, J.-M.-F. 1888. Énumération des diptères recueillis en Tunisie dans la mission de 1884 par M.

Valéry Mayet, membre de la Mission de l'Exploration Scientifique de la Tunisie, et description des espèces nouvelles. **In** *Exploration Scientifique de la Tunisie. Zoologie*. 11 pp. Imprimerie National, Paris.

Hendel, F. 1934. Revision der Tethiniden (Dipt. Muscid. acal.). *Tijdschrift voor Entomologie* **77**, 37-54.

Hennig, W. 1938. 60b. Family Odiniidae. **In** Lindner, E. (Ed.), *Die Fliegen der palaearktischen Region* **6**(1), 1-11. Schweizerbart, Stuttgart.

International Commission on Zoological Nomenclature. 1999. *International Code of Zoological Nomenclature*. Fourth Edition. xxix + 306 pp. The International Trust for Zoological Nomenclature, London.

Krivosheina, N.P. 1984. Family Odiniidae. Pp. 260-262. **In** Soós, Á., & Papp, L. (Eds) *Catalogue of Palaearctic Diptera. 9. Micropezidae-Agromyzidae*. 460 pp. Elsevier, Amsterdam, & Akadémiai Kiadó, Budapest.

Pont, A.C., Evenhuis, N.L. and Chainey, J.E. (in preparation). The Diptera described by J.-M.-F. Bigot.

A second British record of *Chaetopleurophora bohemanni* (Becker, 1901) (Diptera, Phoridae) – While searching for Diptera at Leigh Woods, Somerset (ST5573) on 30 March 2004 I swept a large phorid from the bole of a substantial oak *Quercus* tree. The female specimen readily keyed to *Chaetopleurophora bohemanni* (Becker) in the key by R.H.L Disney (1983. Scuttle flies Diptera. Phoridae (except *Megaselia*) *Handbooks for the Identification of British Insects*. **10,** 6) and Dr Henry Disney has kindly confirmed this identification.

The only previously known British specimen, also a female, was reared from a dead snail, *Cochlodina laminata* (Montagu), collected at Coombe Hill, Wendover, Buckinghamshire in 1962 by Dr J.B. Hall (Disney, R.H.L 1980. *Chaetopleurophora bohemanni* (Becker) (Diptera: Phoridae) added to the British List. *Entomologist's Gazette* **31,** 245). The Leigh Woods specimen has been deposited in the Cambridge University Museum – **DAVID GIBBS,** 6 Stephen Street, Redfield, Bristol BS5 9DY, davidjgibbs@aol.com

***Eudorylas ruralis* (Meigen, 1824) (Diptera, Pipunculidae) rediscovered** – This species was first recorded in Britain at Blackboys, Sussex on 15 July 1876 by G.H. Verrall and then not again until a small number of specimens were taken in the New Forest, Hampshire between 29 August and 9 September 1901 by D. Sharp. It then disappeared for over 100 years, so was classified as Endangered (RDB1) by S.J. Falk (1991. A review of the scarce and threatened flies of Great Britain (Part 1). *Research and Survey in nature conservation* No. 39. Nature Conservancy Council, Peterborough). This status has been revised to Data Deficient by S.J. Falk and P.J. Chandler. (in preparation. *A review of the scarce and threatened flies of Great Britain; Nematocera and Aschiza not covered by Falk (1991)*. Joint Nature Conservation Committee, Peterborough), because of the relatively low level of recording of this family.

Recently I was given a sample of Pipunculidae from a Malaise trap run by Graham Collins at Headley Warren, Leatherhead, Surrey from 1 September to 4 October 2002. Amongst a large number of common species was a single male of *Eudorylas ruralis* (Meigen). Headley Warren is chalk downland with some birch *Betula* and hazel *Corylus* scrub, the Malaise trap being sited on a south-facing slope. I am very grateful to Graham Collins for the passing the Malaise sample to me and to Christian Kehlmaier for help in confirming the identity of the specimen of *E. ruralis* – **DAVID GIBBS,** 6 Stephen Street, Redfield, Bristol, BS5 9DY, davidjgibbs@aol.com

Tephritis praecox (Loew) (Diptera, Tephritidae) established in Britain –

During 2002 and 2003 my father Mr Alfred W. Jones recorded several specimens of an unusual tephritid in a Malaise trap in his garden in Newhaven, East Sussex (TQ455021). He identified them using the key by White (1988. Tephritid flies. Diptera: Tephritidae. *Handbooks for the Identification of British Insects* 10(5a)) as *Tephritis praecox* (Loew), a species thought to be a very rare vagrant in Britain, or, if it ever was established here, now extinct. To date five specimens of *T. praecox* have been recorded in the Malaise trap: 1♂ 22.vii.2002, 1♀ 20.ix.2002, 1♂ 1.viii.2003, 1♀ 12.vi.2004, 1♀ 15.vi.2004 (data of last two specimens added in proof).

Examination of the World Diptera collections at the Natural History Museum, London, confirmed that the specimens were identical to the large series of *T. praecox* from Mediterranean localities. One specimen was also sent to Dr Bernhard Merz (Geneva), who kindly examined it and agreed with our diagnosis of the insect.

Tephritis praecox keys out relatively well in the keys of I.M. White (*op. cit.*) and B. Merz (1994. Diptera: Tephritidae. *Insecta Helvetica* 10.). The important distinguishing features are the reticulate markings of the wing extending beyond the cu*p* extension across into cells a_2 and a_1+cua_2 (the anal lobe), and only two pale spots in cell r_1 between veins C and R_{2+3} rather than three.

There are no British rearing records for *T. praecox*, but it has been reared from *Calendula arvensis* in Israel (White *op. cit.*) and *Calendula* species elsewhere (B. Merz *pers. comm.*). The garden in Newhaven has many plants of *Calendula officinalis*, the common garden marigold, and it is probably in the heads of these that the fly is developing.

T. praecox is obviously on the edge of its European range in Britain. Previously it was known only from two old records of single specimens from coastal sites and presumed to be vagrants. J.E. Collin (1937. *Trypeta vectensis* sp. n. and other new or little known British species of Trypetidae (Diptera). *Entomologist's Record and Journal of Variation* **49,** 1-7) recorded a female that he collected at Aldeburgh, Suffolk, 19.ix.1907, which was the first published record in Britain. White (*op. cit.*) also referred to Hampshire but the record was from Mudeford, now in Dorset, according to S.J. Falk (1991. A review of the scarce and threatened flies of Great Britain (Part 1). *Research and Survey in nature conservation* No. 39. Nature Conservancy Council, Peterborough).

The centre of its European distribution is the Mediterranean, and it is known from the Canary Islands to Afghanistan, but it has recently spread to Austria and Switzerland (B. Merz *pers. comm.*). Its arrival in Britain is, perhaps, to have been expected. The establishment of what appears to be a colony of *T. praecox* in Newhaven is probably connected to the very mild winters the area has enjoyed over the last 10 to 15 years. The garden, steeply south-facing, at the foot of the chalk South Downs, has been virtually frost-free over this period.

Apart from having a more comfortable climate for a warmth-loving Mediterranean insect to become established and survive (*Tephritis* species overwinter as adults), the growing pattern of the *Calendula* has also changed during this time. Where previously the plants died off each winter, growing from seed again the following year and flowering in late summer and early autumn, most plants now survive the winter. Consequently, the previous year's mature plants start to flower again in April and at the same time new seedlings, which sprouted in late autumn are already well advanced. Previously horticultural instructions suggested that marigold seeds were sown in March. The flowering time of Newhaven's marigolds now extends from about April right through until at least the following January. This would give the fly a much greater window of opportunity to lay its eggs in the flowers and for the development of the next generation to succeed.

I thank Ian White and Bernhard Merz for help in confirming this identification and for additional information on this species – **RICHARD A. JONES,** 135 Friern Road East Dulwich, London SE22 0AZ, bugmanjones@hotmail.com

Dipterists Digest 2004 **11**, 17-18

Dipterists Day Exhibits 2003 - compiled by Editor from exhibitors' notes

Again only those exhibits, which did not also appear at the Exhibition of the British Entomological and Natural History Society, are included here; details of the exhibits by D.J. Gibbs, S. Miles and A.E. Stubbs will be included in the BENHS Exhibition Report.

BLAND, K. (1) Fifteen species of Anthomyiidae and Scathophagidae reared from leaf-mines in various plants from Scotland, exhibited with their puparia: **Scathophagidae:** *Parallelomma paridis* Hering ex *Paris quadrifolia*; *P. vittatum* (Meigen) ex *Listera ovata*. **Anthomyiidae:** *Botanophila depressa* (Stein) ex *Suaeda maritima*; *Chirosia betuleti* (Ringdahl) ex various ferns; *C. histricina* (Rondani) ex *Pteridium aquilinum*; *Delia echinata* (Séguy) ex *Cerastium fontanum*; *Pegomya bicolor* (Wiedemann) ex *Rumex obtusifolius*, *R. crispus* and *R. acetosa*; *P. betae* (Curtis) ex *Silene maritima* and *Atriplex glabriuscula*; *P. flavifrons* (Walker) ex *Silene dioica* and *Stellaria media*; *P. haemorrhoum* (Zetterstedt) ex *Oxyria digyna* and *Rumex acetosa*; *P. hyoscyami* (Panzer) ex *Spinacia oleracea* and *Chenopodium urbicum*; *P. nigrisquama* (Stein) ex *Solidago virgaurea*; *P. setaria* (Meigen) ex *Polygonum baldschuanicum*; *P. solennis* (Meigen) ex *Rumex acetosella*, *R. acetosa* and *R. obtusifolius*; *P. steini* Hendel ex *Saussurea alpina*, *Cirsium vulgare* and *C. heterophyllum*; *P. versicolor* (Meigen) ex *Rumex longifolius*.

(2) A selection of dipteran leaf-mines of various families (Agromyzidae, Anthomyiidae, Scathophagidae and Tephritidae) was also displayed.

BOARDMAN, P. *Idioptera linnei* Oosterbroek (Limoniidae) new to Wales; full details are given in the article in the present issue.

CROSSLEY, R. Some noteworthy Yorkshire flies collected in 2003: *Oxycera dives* Loew (Stratiomyidae), Sandscale SSSI, with the comment that it is widespread in northern parts of Yorkshire and now known from more than ten sites in the county; *Didea fasciata* Macquart (Syrphidae), Sandscale SSSI, known from fewer than ten localities in Yorkshire; *Physocephala nigra* (De Geer) (Conopidae), from the North York Moors, with *P. rufipes* (Fabricius) exhibited for comparison; *Thecophora fulvipes* (Robineau-Desvoidy) (Conopidae), new to Yorkshire from a streamside marsh at Lullington Dale on the chalk wolds of N.E. Yorkshire.

ROTHERAY, G. (1) A drawer of reared Lonchaeidae, mostly from Scotland, supplementing the workshop by Iain MacGowan, who is preparing a Royal Entomological Society handbook on this family. The following notes supported the exhibit: Lance flies (Lonchaeidae) belonging primarily to the genus, *Lonchaea*, are common woodland flies breeding in dead wood. Many species have been reared by the Malloch Society over the past 10 years, several for the first time including species new to science and species new to Britain. Combining larval, puparial and adult data, species-level recognition and identification problems have begun to be solved (summary of findings at: www.malloch.society.org.uk and see MacGowan and Rotheray 2000. *Dipterists Digest* (*Second Series*) **7**, 37-49). Puparia can be identified to species and since puparia remain behind in the breeding site after the adult has emerged, collection and identification of puparia is a convenient way to record lonchaeid species.

(2) A drawer of reared Clusiidae, mostly from Scotland, supported by the following comments: clusiids were encountered frequently during Malloch Society work on saproxylic Diptera. All but two of the ten British species have been reared. As with lonchaeids, much new data have been obtained of distribution, breeding sites, early stages and biology. Puparial stages are as useful

as they are in lonchaeids for species-level identification. Larvae have very unusual head-skeletons, which are reduced and barely sclerotised. The functional morphology of the clusiid head skeleton is under study. One of the species we have yet to rear is *Clusiodes geomyzinus* (Fallén), which is confined to Scotland. Adults are only known from one site and it appears to have become very rare over the past 30 years and is perhaps the most endangered clusiid in Britain. Attempts to rear this species continue but in the meantime, our results are being prepared for publication.

(3) A drawer of new species of *Copestylum* (Diptera, Syrphidae) reared from the neotropics. During the past six years Geoff Hancock, Graham Rotheray and collaborators have visited Costa Rica, Ecuador, Mexico and Trinidad to search for and rear hoverflies. They concentrated on the saprophagous genus, *Copestylum*, because it is one of the most species-rich lineages of hoverflies. Over 80 species have been reared, many for the first time. The drawer contained a sample of the 50+ new species in *Copestylum* that have been obtained. They were reared from a vast range of specialised breeding sites from sap runs to decaying bromeliads and fallen cacti. The project is on-going but in 2004 they will concentrate on writing up the results and describing some of these new species.

WHITTINGTON, A. A selection of Afrotropical Platystomatidae of the subfamily Plastotephritinae. This comprised 44 specimens representing 24 African and 2 Oriental species, including 17 paratypes from recent revisionary work. This work was published as: Whittington, A.E. 2003. Taxonomic Revision of the Afrotropical Plastotephritinae (Diptera; Platystomatidae). *Studia Dipterologica Supplement* **12,** 300pp.

A remarkable abundance of *Phasia hemiptera* (Fabricius, 1794) (Diptera, Tachinidae) in 2003 – *Phasia hemiptera* (Fabricius) is such a readily recognisable and unusual species that I generally note its occurrence when I encounter it. Prior to 2003, I noted it on nine occasions whilst surveying in Surrey between 1985 and 1997, usually as singletons, but occasionally in numbers, for example at Box Hill ♂♂♀♀ (TQ177518, 14.viii.1987). In 2003, surveys of woodlands and quarries in the vicinity of Stamford (South Lincolnshire) revealed *P. hemiptera* on eight separate occasions, suggesting that 2003 was a particularly good year. Unlike previous years, when adults have been noted between May and August, all records in 2003 were confined to a period of just nine days between 24 July and 3 August.

Both sexes of *P. hemiptera* are flower visitors and have been noted at rowan *Sorbus aucuparia* (Mare Hill SU932399, 1.v.1994), wild parsnip *Pastinaca sativa* (♀ Redhill TQ281482, 6.viii.1994), upright hedge-parsley *Torilis japonica* (♂ Wakerley Great Wood, SP9598, 2.viii.2003) and wild carrot *Daucus carota* (Ketton Quarry SK978051, 2.viii.2003).

I also noted *Phasia obesa* (Fabricius, 1794) on two occasions: a female at Wakerley Great Wood (SP9598, 2.viii.2003) and three males at Ketton Quarry (SK978051, 2.viii.2003). The examples from Ketton were a sub-sample from numerous individuals found amongst scentless mayweed *Tripleurospermum inodorum* in a recently disturbed corner of the floor of this abandoned limestone quarry. The relationship between this species and the mayweed is unclear, but it seems likely that flower visiting was the primary activity at the time of capture – **ROGER K.A. MORRIS,** 7 Vine Street, Stamford, Lincs PE9 1QE

Dipterists Digest 2004 **11**, 19-23

Some Craneflies (Diptera, Tipulidae, Pediciidae and Limoniidae) from the Greek Pelopponese

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Summary
The results of fieldwork in the area around Archaea Pheneos (Korinthia Province, Lat.37° 46' N. Long. 22° 21'E) carried out from 17 to 29 April 2003, are reported. The area includes a newly-constructed reservoir, Lake Doxis, which is fed by small streams, and surrounded by wooded mountain slopes. Two genera and six species are new for the Greek fauna.

Introduction

The construction of Lake Doxis, at the head of a wooded limestone valley on the eastern side of the Aroanian mountain range, was completed in1996. It lies at an altitude of about 875m, being 1.2 km long, and with a mean width of about 0.6 km. At least five mountain streams (brooks) flow into Lake Doxis from the surrounding hills, although more may flow temporarily at times of maximum precipitation and/or snow-melt. The largest of these is Erymanthios Brook, which enters at the western end. No information is available on the rates and periods of flow of these brooks, but the water from the calcareous sand will be unpolluted, quite rich in minerals, and well oxygenated.

The winter prior to this study had been unusually long and cold. There were still, at the end of April, large snowfields on the mountain summits. This melting frozen groundwater and snow, together with rain, caused a rapid and plentiful flow in most of the streams throughout the period of the visit. The exception to this was the Meadow Brook, which had ceased to flow by the end of April, leaving a chain of pools inhabited by *Salamandra* larvae. A single stream, the River Doxis, flows out eastward from a large pool at the base of the dam.

Meteorological data from Tripoli (652m altitude) indicates that a mean annual precipitation of about 80cm falls in the source zone, chiefly from September to the end of May. From June to September rainfall is low, and the temperature may reach 30° C.

The rocks of the district (Higgins and Higgins 1997, Jacobshagen 1986) have formed a light sandy calcareous soil, which drains and warms rapidly. One outcrop of Mesozoic limestone was observed above the western end of the lake and a thick sandy alluvial deposit is visible surrounding most of the lake.

The tree canopy around the lake is provided by pine *Pinus*, fir *Abies* and spruce *Picea* trees, and near some stream margins, by old plane *Platanus* trees. The shrub layer contains young spruce , and an evergreen oak (*Quercus coccifera*), and the herb layer has *Cyclamen*, *Anemone blanda*, and occasionally *Ruscus*. In damper places there is a good growth of a variety of mosses.

Bernhard Mannheims (Mannheims 1954) has described the history of collecting in Greece, from 1862. Mannheims himself collected craneflies in Greece on a number of occasions and in 1952 returned with specimens from sites on the Peloponnese, though not from the Lake Doxis Valley. He recorded that most of the early species were found from 20 April, in the wooded mountains of the Peloponnese. Since Mannheims did this work, very little seems to have been published on the craneflies of Greece.

Materials and Methods

The survey reported here was carried out from 17 to 29 April, 2003. Samples of adult craneflies were taken by sweeping from the vegetation using a 40cm diameter sweep-net and pooter, and placed in numbered containers. Site details were recorded simultaneously, using a hand-held tape-recorder. Collecting was carried out on seven days, i.e. 17, 19, 20, 24, 26, 28 and 29 April, 2003. Voucher specimens were carded, numbered, and pinned in a store-box for transport. The more interesting specimens have been deposited in the Natural History Museum, Cromwell Road, London, SW7 5BD.

The reservoir lies about 1 km north of the village of Archaea Pheneos, the northern part of which is known locally as Kalivia. It is about 25 km due south of the northern coastal town of Paralia Planou, and situated on the very western edge of the Province of Korinthia.

The following references were used for identification purposes: Edwards (1938), Geiger (1986), Lackschewitz (1940a and 1940b), Mannheims (1951 and 1959), Mendl (1973, 1974 and *pers. comm.*), Oosterbroek (1979), de Jong (1994) and Stubbs (1996, 1997, 1998, and 2001).

Results and discussion

Twenty-six species of craneflies were recorded in the Lake Doxis area. These are listed in Table 1, which also serves as a checklist of the species found.

Four of the species have yet to be identified. These include females of *Tipula, Tricyphona* and *Molophilus*, and males of a *Dicranota* species. Savchenko *et al.* (1992) gave no records of the genera *Dicranota* (*Paradicranota*), and *Tricyphona* from Greece. They also did not record presence of the following species: *Phylidorea ferruginea* (Meigen), *Ormosia hederae* (Curtis), *Dicranomyia mitis* (Meigen), *Dicranomyia modesta* (Meigen) and *Limonia macrostigma* (Schummel).

The local, possibly endemic, Greek species recorded from the area are:
Tipula (*Lunatipula*) *pelidne* Mannheims, 1965
Phyllolabis lindneri Mannheims, 1959
Phyllolabis nielseni Mannheims, 1959

The southern European species are:
Nephrotoma croceiventris lindneri (Mannheims, 1951)
Tipula (Acutipula) balcanica Vermoolen, 1983
Tipula (*Tipula*) *orientalis* Lackschewitz, 1930
Pedicia zernyi (Lackschewitz, 1940)
Limonia pannonica (Kowarz, 1868)

The remaining species are pan-European.

Of the more local species recorded *Dicranomyia (Glochina) sericata* (Meigen) is found in calcareous damp woodland, as far north as England (Stubbs 1998). *Nephrotoma croceiventris lindneri* Mannheims is, in the Netherlands, restricted to wet sandy areas (Oosterbroek 1979). Both of these habitats are provided by the geology of the Lake Doxis Valley.

Species recorded in this study which have aquatic, predatory larvae are:
Pedicia occulta (Meigen)
Pedicia zernyi (Lackschewitz)
Dicranota species A
Dicranota subtilis Loew

These species were found by the Meadow Brook and by the Monastery Brook. This indicates that these streams, at least, contain sufficient water for sufficient time for these species to complete their life cycle each year. A number of marshland species inhabit the Lake Doxis margin, and their presence indicates the existence in the valley of marshy areas before the construction of Lake Doxis.

	Stream Margin	Stream Inlet	Lake Margin	Damp Copse	Grassy Verge	Dry Hillside
Species List						
TIPULIDAE						
Nephrotoma appendiculata (Pierre, 1919)	2				c	
N. croceiventris ssp. *lindneri* (Mannheims, 1951)		4				
Tipula (Acutipula) balcanica Vermoolen, 1983*						
Tipula (Acutipula) vittata Meigen, 1804	1					
Tipula (Tipula) orientalis Lackschewitz, 1930	2		24			
Tipula (Yamatotipula) lateralis Meigen, 1804	8	3	29			
Tipula (Lunatipula) pelidne Mannheims, 1965						1
Tipula species A†						
PEDICIIDAE						
Pedicia occulta (Meigen, 1830)	16	1				
Pedicia zernyi (Lackschewitz, 1940)	1					
Dicranota subtilis Loew, 1871	2					
Dicranota species A	2	1				
Tricyphona species A‡						
LIMONIIDAE						
Phylidorea ferruginea (Meigen, 1818)			2			
Phyllolabis lindneri Mannheims, 1959	7					
Phyllolabis nielseni Mannheims, 1959					1	
Molophilus species A	2					
Molophilus propinquus (Egger, 1863)			1			
Ormosia hederae (Curtis, 1835)			2		1	
Dicranomyia chorea (Meigen, 1818)	2					
Dicranomyia mitis (Meigen, 1830)	2				1	
Dicranomyia modesta (Meigen, 1818)					2	
Dicranomyia sericata (Meigen, 1830)			1	1		
Limonia macrostigma (Schummel, 1829)	2				6	
Limonia nubeculosa Meigen, 1804					1	
Limonia pannonica (Kowarz, 1868)				3		

Table 1. Biotopes where species were found.
c = common
***Tipula balcanica* was from a marsh some 6 km south-west of Archaea Pheneos.**
†*Tipula* species A (female) was taken from the wall of a house in the village of Archaea Pheneos.
‡*Tricyphona* species A (female) was taken from a flooded field margin, by the river Doxis.

At present, they also have sufficient water to complete their life cycle, but it will be interesting to see if these species survive if much of the water is used each year for summer irrigation.

The samples were taken early in the season and the nights and mornings were cold. Snow was on the mountain-tops and cold air flowed into the valleys each day after sunset. The species recorded in this report were the first to emerge in the year, and there are certainly many more species which remain to be recorded, that emerge in the middle and at the end of the season.

Six species were recorded from the standing water of the Lake Doxis margin. Only *Phylidorea ferruginea* (Meigen) was found there and nowhere else, and these specimens were found where the lake margin sloped gently, and was shaded by trees.

Fifteen species were recorded from the flowing water (lotic) habitats of the brooks, river margins, and the points where flowing water enters the Lake. Ten of these species were found nowhere else.

Acknowledgements

I would like to thank Christiane Scholl, of the Anhalt University of Applied Science, Bernburg, Germany, for practical help, and in providing some specimens and information about the study site.

References

Edwards, F.W. 1938. British Short-palped Craneflies. Taxonomy of Adults. *Transactions of the Society for British Entomology* **5**, 1-168.

Geiger, W. 1986. Insecta Helvetica, Fauna 8, Diptera Limoniidae 1: Limoniinae. Imprimerie Centrale, Neuchâtel.

Higgins, M. and Higgins, R. 1997. A Geological Companion to Greece and the Aegean. Duckworth.

Jacobshagen, V. 1986. *Geologie von Griechenland*. Gebr. Borntträger, Berlin.

Jong, H. de 1994. The phylogeny of the *Tipula* (*Acutipula*) *maxima* species group, with notes on its distribution (Diptera: Tipulidae). *Entomologica Scandinavica* **24,** 433-457.

Lackschewitz, P. 1940a. Die palaearktischen Rhamphidiinen und Eriopterinen des Wiener Naturhistorischen Museums. *Annalen des Naturhistorischen Museums in Wien* **50,** 11-67.

Lackschewitz, P. 1940b. Die palaearktischen Limnophilinen, Anisomerinen und Pediciinen des Wiener Naturhistorischen Museums. *Annalen des Naturhistorischen Museums in Wien* **50**, 68-122.

Mannheims, B. 1951. Tipulidae. **In** Lindner, E. (Ed.): Die Fliegen der Palaearktischen Region **3,** 15 (5)1.

Mannheims, B. 1954. Die Tipuliden (Diptera) Griechenlands. *Bonner zoologische Beiträge Sonderband 1954* **1,** 149-182.

Mannheims, B. 1959. Die europaischen *Phyllolabis*-Arten (Diptera, Limoniidae). *Bonner zoologische Beiträge* **10,** 149-156.

Mendl, H. 1973. Drei neue Eriopterini aus dem Allgäu (Diptera, Tipulidae). *Nachrichtenblatt der Bayerischen Entomologen* **22**, 65-74.

Mendl, H. 1974. Zum problem der sudlichen gelben *Crunobia*-Arten. *Fragmenta Entomologica, Roma* **10,** 25-37.

Oosterbroek, P. 1979. The western palaearctic species of *Nephrotoma* Meigen, 1803 (Diptera, Tipulidae) part 2. *Beaufortia* **28,** 57-111.

Savchenko, E.N., Oosterbroek, P. and Starý, J. 1992. Family Limoniidae. **In** Soós, A. and Papp, L. (Eds). *Catalogue of Palaearctic Diptera*, Vol. **1,** 183-369. Hungarian Natural History Museum.

Smith, K.G.V. 1989. An Introduction to the Immature Stages of British Flies. *Handbooks for the identification of British Insects* **10** (14), 1-280. Royal Entomological Society, London.
Stubbs, A.E. 1992. Provisional Atlas of the long-palped craneflies (Diptera: Tipulinae) of Britain and Ireland. NERC Institute of Terrestrial Ecology. Huntingdon.
Stubbs, A.E. 1996. Cranefly Recording Scheme. Test Keys for the Identification of British *Tipula*. 32pp (circulated with *Bulletin of the Dipterists Forum* No.41).
Stubbs, A.E. 1997. Cranefly Recording Scheme. Test Keys for the Identification of British Limnophilinae. 17pp (circulated with *Bulletin of the Dipterists Forum* No.43).
Stubbs, A.E. 1998. Cranefly Recording Scheme. Test Keys for the Identification of British Limoniinae. 30pp (circulated with *Bulletin of the Dipterists Forum* No.45).
Stubbs, A.E. 2001 Cranefly Recording Scheme. Test Keys for the Identification of British Chioneinae. Part I, 27pp; Part 2, 17pp. (circulated with the *Bulletin of the Dipterists Forum* Nos.51 and 52).

Maps used:

(1) Peloponnese Hiking Map WKGR2. 1:50,000 (No date given). Published by Freytag and Bernt, Vienna.
(2) Greece. 1: 500,000 (No date given). Published by Road Editions, Athens.
[Lake Doxis is not marked on these maps, since the survey work was done prior to its construction.]

(3) Achaia. 1: 100,000 (No date given). Published by Road Editions, Athens.
[This more recent map shows the position of the newly built reservoir.]

Oviposition by *Chrysotoxum cautum* (Harris, 1776) (Diptera, Syrphidae) – *Chrysotoxum cautum* (Harris, 1776) is a large black and yellow wasp mimic recorded from southern Britain south of a line from the Severn to the Humber. The species has been seen ovipositing on large sedges within clumps of trees on heathland (Stubbs, A.E and Falk, S.J. 2002. *British Hoverflies*. BENHS, London). S.G. Ball and R.K.A. Morris (2000. *Provisional atlas of British Hoverflies (Diptera, Syrphidae)*. Biological Records Centre, Huntingdon) note that 'the larva of this species remains unknown, but it is thought to be associated with ants, perhaps feeding on ant-attended root aphids'.

On 12.vi.2004 I visited a small, scrubby site at the foot of Bedminster Down in Bristol (ST5769), where previously I had seen several individuals of *C. cautum*. During the afternoon I observed a female *C. cautum* investigating the vegetation along the edge of a patch of bramble (*Rubus* species). Preference seemed to be given to the softer ruderal plants, with the fly alighting on stems of grasses and bedstraw (*Galium* species) growing up through the brambles at between 30-60cm above the ground. On landing, the female extended her ovipositor and touched the surface of the stem several times over the course of about 5 seconds. In some instances eggs were then laid, in others the fly moved on to another nearby stem and repeated the investigation process. The eggs are in the form of a rounded cylinder, approximately 3mm long by 1mm wide and white in colour – **MATTHEW N. SMITH,** 24 Allnatt Avenue, Winnersh, Berks, RG41 5AU

***Odinia rossi* MacGowan & Rotheray, 2004, a new name for *Odinia betulae* MacGowan & Rotheray, 2002 (Diptera, Odiniidae)** – Since we described *Odinia betulae* as a new species (2002. A new species of *Odinia* (Diptera, Odiniidae) from Scotland. *Dipterists Digest* (*Second Series*) **9,** 67-69) it has come to our notice that this name had previously been applied to a North American species. The earlier use of this name was by C.W. Sabrosky (1959. Flies of the genus *Odinia* in the Western Hemisphere (Diptera: Odiniidae). *Proceedings of the United States National Museum* **109,** 223-236). This was an inadvertent oversight as, during the earlier stages of our study of the new Scottish species, the paper by Sabrosky had been consulted to confirm that it did not correspond to any of the included species. We here propose the replacement name *Odinia rossi* MacGowan & Rotheray, 2004 = *Odinia betulae* MacGowan & Rotheray, 2002, preoccupied by *Odinia betulae* Sabrosky, 1959. The name is genitive and refers to the county where the species was found – **IAIN MACGOWAN,** Scottish Natural Heritage, Battleby, Redgorton, Perth PH1 3EW and **GRAHAM E. ROTHERAY,** National Museums of Scotland, Chambers Street, Edinburgh EH1 1JF

The Forest Fly *Hippobosca equina* Linnaeus, 1758 (Diptera, Hippoboscidae) in North Hampshire – Adult flies of *Hippobosca equina* Linnaeus have been present at Bartley Heath (SU7253) in North Hampshire since at least 1999. The site is managed by Hampshire Wildlife Trust, who reintroduced grazing, using ponies originating from the New Forest. It is highly likely that the flies arrived with their hosts and have continued to thrive. The ponies congregate around the car park, where the flies have but a short flight to alight on unfortunate human visitors, often causing much consternation! – **JONTY DENTON,** Kingsmead, Wield Road, Medstead, Hampshire, GU34 5NJ, JontyDenton@aol.com

***Wiedemannia lota* Walker (Diptera, Empididae) in Denbighshire** – On 28 April.2003, I swept a male of this distinctive empid from a shingle bar beside the River Clywedog at Pentre Maelor, Wrexham (SJ366484). According to S.J Falk and R. Crossley (in preparation. *A review of the scarce and threatened flies of Great Britain. Empidoidea.* Joint Nature Conservation Committee, Peterborough) this is a Nationally Scarce species that is widely distributed in Britain with records from four English counties, two Welsh counties and Shetland. They refer to there being only six post-1960 records from across the known range. Adrian Plant (*pers. comm.*) is aware of 7 post-1980 records (V.C. 32, 42, 63, 64 and 112), but with no additional counties to those listed by Falk and Crossley.

In Wales, Falk and Crossley (*op. cit.*) recorded it from Glamorgan and Breconshire, so this would appear to be the first record for Denbighshire (V.C. 50). They speculated that it may be under-recorded because of the difficulty of capturing adults, which have been found amongst wet moss on emergent boulders but also observed skimming rapidly over the surface of a river, close to the bank (McLean, I.F.G. 1980. *Wiedemannia* (*Chamaedipsia*) *lota* Walker (Diptera: Empididae) from Northamptonshire. *Entomologist's Record and Journal of Variation* **92,** 191-192) – **JONTY DENTON,** Kingsmead, Wield Road, Medstead, Hampshire, GU34 5NJ, JontyDenton@aol.com

Dipterists Digest 2004 **11**, 25-32

New species of Palaearctic Lonchaeidae (Diptera)

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Summary
Examination of Lonchaeidae in the collections of several European museums has resulted in the identification of one new species of *Earomyia* (*E. netherlandica* **sp. n.**) from the Netherlands and British Isles and three new species of *Lonchaea* (*L. absenta* **sp. n.**, *L. germanica* **sp. n.** and *L. tibialis* **sp. n.**) from central Europe, Germany and Tunisia. The new species are described and their relationship to other species discussed.

Introduction

The Palaearctic fauna of Lonchaeidae consists of approximately 100 species of medium sized mostly black flies. Taxonomically they are rather similar and in many cases confirmation of species identity depends on dissection and examination of the male genitalia. As a result there are specimens in museum collections that belong to undescribed species; this paper introduces four such species.

Earomyia netherlandica sp. n.

Description:

Holotype male. Head. Eyes bare, lunule bare, subvibrissal hairs extending anteriorly along mouth edge in a single row of about nine hairs. Face with a silvery tomentum. Antennae small, first flagellomere about as long as it is deep, entirely black. Arista almost twice the length of first flagellomere and slightly pubescent, the hairs about as long as the width of the arista. Frons covered with rather long, sparse hairs, the longest, just above the lunule, almost as long as the orbital bristle. Frons wide, at level of antennal sockets approximately 25% the width of the head. No hairs on the orbital plate above the orbital bristle.

Thorax. One stigmatical bristle. Katepisternum with 5-6 stronger hairs and bristles along its upper margin, the most posterior of these being clearly the strongest, no hairs posterior to this strong bristle. On the anterior portion of the katepisternum, below the row of strong hairs on the upper margin, there are 6-8 finer hairs; these hairs long, almost 75% length of the strong bristle. Anepisternum with two strong anterior bristles and with six very long posterior bristles. Disc of thorax with rather long black hairs, these at least half as long as the orbital bristle. One strong and one rather weak prescutellar acrostichal bristles; three obvious dorsocentrals, size of these decreasing anteriorly. Scutellum with disc bare. Scutellar margin with one hair between apical bristles, this one third the length of the bristle (one apical bristle is missing). Between apical and lateral scutellar bristles there are three long hairs on each side. No hairs anterior to these lateral bristles. **Wing** membrane slightly yellow, veins all yellow, intercostal section only just over 1x length of crossvein ta. Squamae light brown with a darker margin, squamal fringe dark. **Legs.** All metatarsi clear yellow, on front legs second tarsomere only indistinctly yellow at base, on mid legs second tarsomere with greater extent of yellow and on hind legs almost entirely yellow.

Male genitalia (Fig. 1: 1, 2, 3). Epandrium slightly wider than it is high with a rounded projection posteroventrally, which bears long hairs. Cerci large, seen in lateral view rather club shaped apically with long hairs at apex. In posterior view with apex concave. Surstyli extending ventrally from the shell of the epandrium as a large rounded lobe, this bearing a group of long hairs at

the apex of the lobe, also a smaller group of hairs present anteriorly. Aedeagus with a large basal portion and a rather angular tube like upper section. Basal attachment spatulate in posterior view.

Female. In general as in male but with shorter hairing. **Head.** Frons very wide, at level of antennal sockets approximately 40% the width of the head. Hairs on frons long with two lines of reclinate bristles centrally. Ovipositor (Fig. 1: 4, 5) with apical segment rather squared at the tip, three pairs of hairs laterally, the longest being the apical pair, one pair of hairs dorsally at the base, these less than half the length of the segment.

Body length 4.0mm to 4.5mm.

Holotype ♂, Netherlands, W. Havengeb, Amsterdam, 12.v.1984, leg. H. de Jong, deposited in National Museums of Scotland, Edinburgh.

Other material: 1 ♀, **Netherlands,** Ruigoord, 1.v.1997, leg. H. de Jong; 1 ♀, **British Isles,** England, Huntingdonshire, Paxton Pits, 11.v.1993, leg. J.H. Cole.

Affinities

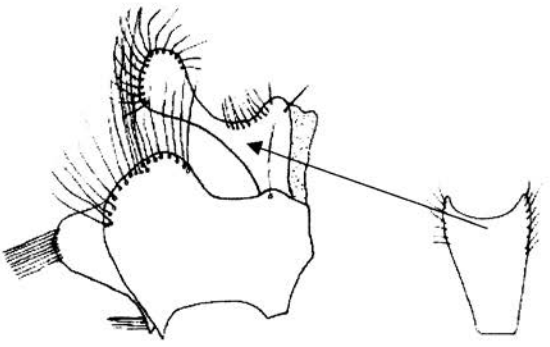
In terms of the characters of their male genitalia the European *Earomyia* fall into two main groups.

In the first group the epandrium is characteristically sickle-shaped and possesses a comb of long, strong hairs at its apex. The cerci are relatively small and are partly enclosed within the shell of the epandrium. The aedeagus is often rather insignificant and the surstyli extend beyond the epandrium as lobe-like projections. These species include *E. albifacies* Czerny, 1934, *E. caudicula* Morge, 1959, *E. grusia* Morge, 1959, *E. impossibile* Morge, 1959, *E. adriatica* (Becker, 1895) and *E. schistopyga* Collin, 1953. In terms of the known larval ecology most of these species seem to develop within the cones of coniferous trees or in seed heads of other plants.

E. netherlandica belongs to a second group of species which includes *E. virilis* Collin, 1953 and *E. viridana* (Meigen, 1826), in which the epandrium is square or rectangular in shape, similar to the shape found in the genus *Lonchaea*. The cerci are well developed and extend clearly beyond the epandrium, the apical comb of strong hairs is absent and the aedeagus is obvious and large.

In terms of overall morphology, with its relatively large size, very broad frons, and partly haired katepisternum *E. netherlandica* superficially resembles the south-east European *E. adriatica* Morge. It is, however, easily distinguished from *E. adriatica* by the structure of the male genitalia and the characters of the female ovipositor. The male of *E. adriatica* belongs to the group with sickle-shaped epandrium, as outlined above, whilst in contrast the epandrium of *E. netherlandica* is generally rectangular. In female *E. adriatica* the apical segment of the ovipositor has an acute tip and there are a considerable number of hairs present ventrally; *E. netherlandica* specimens have a squared tip to the apical segment of the ovipositor with only some 4 hairs present laterally and none ventrally.

Fig. 1. *Earomyia netherlandica* sp. n. 1, lateral view of male epandrium and associated structures; 2, posterior view of cerci; 3, aedeagus; 4, female ovipositor, dorsal view; 5, female ovipositor, lateral view.



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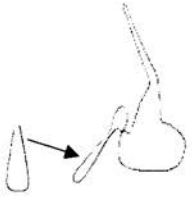

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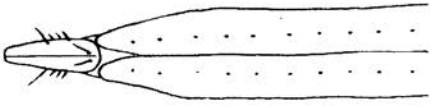

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Lonchaea absenta **sp. n.**

Description:

Holotype male. Head. Eyes bare, lunule with approximately eight hairs, orbital and ocellar bristles missing in this specimen, on the left orbital plate one hair and the base of a second present, on the right orbital plate the base of one hair is visible. Subvibrissal hairs extending anteriorly along mouth edge in a single row of about five hairs; palpi of normal size. First flagellomere about two and a half times longer than deep, just reaching the mouth edge, flat on dorsal surface and slightly convex on ventral surface; tip rounded, all black apart from an orange area on the internal surface on the basal fifth, this colour absent on dorsal edge but extending slightly along ventral surface of the segment. Arista yellow basally, bearing fine hairs, these not exceeding the width of the arista. Frons with hairs in anterior part short, none more than half the length of the orbital bristle, hairs on the upper part are missing due to damage.

Thorax. Hairs on thoracic dorsum short, not more than half the length of the orbital bristle; notopleural depression bare, anepisternum with one to two stronger bristles anteriorly but these only slightly stronger than the other hairs, posteriorly with four stronger bristles, these as strong and as long as the notopleural bristles. Katepisternum with a single strong bristle, no hairs posterior to this bristle. One propleural and one stigmatical bristle. Anepimeron bare. Scutellum bare on dorsal surface, no hairs visible between apical pair of scutellar bristles (although this may be due to damage) two between apical and lateral bristles on right side and one on left side, no hairs present anterior to lateral bristles. **Wing** with intercostal section approximately twice the length of crossvein ta. Squamae pale with darkened edges, squamal hairs dark (but beginning to fade in this old specimen), all of a similar length. **Legs** with pale tarsi although in this rather faded specimen it is not possible to determine the extent of the pale coloration.

Abdomen with first sternite bare.

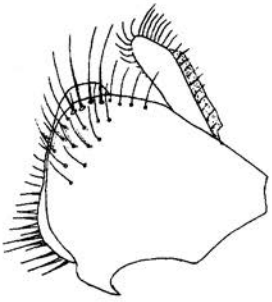
Male genitalia (Fig. 2: 1, 2). The epandrium is slightly wider than it is high, with a hook anteriorly, posteroventral portion bearing long hairs. Cerci rather small and simple with hairs at the apex. Surstyli extending beyond shell of epandrium and forming a rather square process posteroventrally also visible ventrally, bearing a row of strong bristles. Aedeagus with basal portion large and square shaped, apical portion extending to about three quarters the height of basal portion with angular bend half way along, not fully separated from the basal portion.

Female unknown.

Holotype ♂. **Serbia** ? The specimen has two labels on the pin: upper label - Novi Horvath; with on underside the date (18)97.vii.8; lower label - *Lonchaea laticornis* Meigen det. G. Morge ex. 2550. Specimen in the collections of the Deutsches Entomologisches Institut, Eberswalde.

Comments. The specimen is over 100 years old and does have some slight fading and damage.

Fig. 2. 1, *Lonchaea absenta* sp. n., lateral view of male epandrium and associated structures; 2, aedeagus; 3, *Lonchaea germanica* sp. n., epandrium etc.; 4, aedeagus; 5, *Lonchaea tibialis* sp. n., epandrium etc.; 6, aedeagus.



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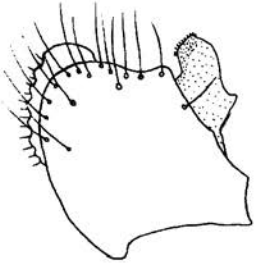

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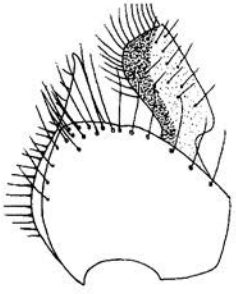

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Affinities. With bare eyes, subvibrissal hairs in a single row anteriorly along the mouth edge, dark squamal fringes, long first flagellomere and tarsi partly pale this species lies close to the *L. mallochi* MacGowan and Rotheray, 2000 group of species. Its external characters are similar to species within that group but it is distinguished from them by the presence of hairs on the orbital plates. In order to confirm identification dissection of the male genitalia is recommended when the distinguishing characters of this species become evident. The aedeagus in particular with its large square basal portion and angular apical portion is distinctive.

***Lonchaea germanica* sp. n.**

Description:

Holotype male. Head. Eyes bare, subvibrissal hairs extending anteriorly along mouth edge in a row of about 10 hairs, this row partly in a single row, partly in multiple rows. Palpi well haired, one strong bristle at the tip and with long hairs along outside edge, these hairs longer than the width of the palp. Frons densely covered in long black hairs, these mostly about three quarters the length of the orbital bristle. Orbital plates with one hair above orbital bristle, this hair long, more than half as long as orbital bristle. Ocellar bristles as long as orbital and vertical bristles with about six long strong hairs on the ocellar triangle. Lunule with six hairs. First flagellomere about one and a half times as long as deep, not reaching the mouth edge, parallel sided with a rounded tip, entirely black. Arista slightly longer than first flagellomere, thickened at base with very short hairing.

Thorax. Thoracic dorsum covered in long dark hairs, these all as long as the orbital bristle. Scutellar disc covered in long hairs, most of them as long as the lateral scutellar bristles and extending over all the scutellar disc. On the edge of the scutellum there are hairs anterior to the lateral bristles. Apical bristles crossed at tip. Notopleural depression with one or two hairs in the upper part. One propleural and about 12 stigmatical bristles, these all equally long and strong, as long as the propleural. Anepisternum covered in long hairs with four stronger bristles on the posterior margin, no strong bristles set on anterior margin. Katepisternum with numerous long hairs anteriorly and dorsally, several hairs behind the single strong bristle. Anepimeron bare. **Wing** with intercostal section long, three times the length of the crossvein ta. Squamae dusky with darkened edge, squamal hairs dark, all of a similar length. **Legs** all black apart from the metatarsus which is yellow, a fringe of golden hairs ventrally on metatarsus, second and third tarsomeres of front leg and same segments of hind leg.

Male genitalia (Fig. 2: 3, 4). Epandrium slightly higher than broad, cut away rather sharply at posterodorsal angle, rather sparsely haired, these hairs being mainly confined to the posteroventral corner. Surstyli projecting beyond epandrium posteroventrally, the edge of the surstyli scalloped on ventral face, posteriorly with a rather blunt, rounded apex. Cerci rather small, emerging from posterodorsal angle of the epandrium, without any obvious hairing and almost completely lacking sclerotisation. Aedeagus two-segmented, the basal portion with a broad basal part, the apical section sinuous but also rather broad basally.

Female unknown.

Holotype ♂, **Germany,** bearing two labels, inscribed "Schirmer; Bukow, 4.(19)05" and "hirticeps Z. F. Hendel det." (in the Natural History Museum, Vienna).

Affinities

With the combination of bare eyes, the partially multiple row of subvibrissal bristles, the multiple stigmatical bristles and the well-haired scutellar disc with hairs anterior to the lateral bristles this species has close affinities with the *L. patens* Collin, 1953 group within the genus *Lonchaea*. The presence of hairs on the orbital plate and multiple stigmaticals are characters shared by both *L. vagans* Kovalev, 1978 and *L. patens* Collin. In *L. germanica*, however, the number of stigmaticals is much greater than in *L. vagans* (usually about 4) and in *L. patens* (usually about 7). The male genitalia are also distinct from these other species. In *L. patens* and *L. vagans* the cerci are large, being almost the same size as the epandrium whereas in *L. germanica* the cerci are relatively small. The aedeagus in *L. patens* and *L. vagans* is two-segmented, the apical section being at least as long as the basal section but rather slender and only slightly sinuous. In *L. germanica* the apical section of the aedeagus is broad based and distinctly sinuous.

***Lonchaea tibialis* sp. n.**

Description:

Holotype male. Head. Eyes bare; frons narrow, narrowing from ocellar area down to the antennal sockets where it is only about half the width of an eye. Frons covered in rather sparse and short black hairs, the longest of these being only about half the length of the ocellar bristle. Orbital plate bare, and frons above line of insertion of orbital bristles with no hairs where it extends narrowly between the orbital and ocellar plates. Lunule with about eight hairs. Subvibrissal hairs widely spread on the jowls with only three on each side extending anteriorly as a single row along the mouth margin. All of face and frons with a slight grey dusting, although slightly orange between antennal sockets. First flagellomere very long and narrow almost like a *Silba* species, extending down over mouth edge, three times as long as deep, depth less than the width of the frons above antennal sockets, all black apart from orange coloration basally which extends along ventral surface for almost half its length. Arista yellow and thickened basally, this colour contrasting with the black of the first flagellomere and with the apical two thirds of the arista with short hairs about as long as width of arista.

Thorax. Disc covered with black hairs, those on the anterior portion half as long as orbital bristle, getting longer posteriorly. Notopleural depression bare. Prosternum bare, one propleural and one stigmatical bristle. Anepisternum with five to six strong bristles posteriorly, two to three anteriorly. Anepimeron bare. Katepisternum with one strong bristle, a single hair posterior to this on the right side, this area bare on the left side. Scutellum bare on the disc, three hairs between lateral and apical bristles on one side, two on the other, one hair between apical bristles, all these hairs about half the length of the bristles. Femora and tibiae black apart from front tibiae which have a yellow area ventrally extending from the apex along about one third the length of the tibia. Tarsi all yellow apart from slight dusky coloration on segments four and five. Front femur with a row of 10-11 strong bristles posteroventrally. Metatarsus and second tarsomere of fore and hind legs with a ventral brush of golden hairs. **Wing** slightly brownish tinged all over, pterostigmal section short, only about one and a half times as long as crossvein ta. Squamae with darkened margins and a fringe of dark hairs, all of these hairs of similar length.

Abdomen with first sternite bare.

Male genitalia (Fig. 2: 5, 6). Epandrium slightly wider than high with relatively few strong bristles which are situated in a spaced-out row along the posterior margin, in a group at the posteroventral corner and part way along the ventral margin. Surstylus ventrally with long, strong bristles on the inside surface which are obvious in lateral view, these extending as finer hairs on to

the posteroventral projection. The posteroventral projection large and triangular in shape, its height above the epandrium about half the depth of the epandrium. Cerci rectangular in shape, inner and apical margins with long recurved hairs, inner half more heavily chitinised, more membranous outer portion also with long hairs Aedeagus two-segmented, apical section sinuous but very broad basally, basal section rather elongate and narrow.

Female unknown.

Holotype ♂, **Tunisia**, 21 km east of Tabarka, 7-13.v.1988, leg. Zoological Museum, Copenhagen expedition; deposited in Zoological Museum, Copenhagen, Denmark.

Affinities. With bare eyes, one stigmatical bristle, dark squamal fringes, yellow tarsi and two-segmented aedeagus this species shows affinities with the *L. mallochi* group present in western Europe. It does, however, differ from this group in having such a relatively narrow frons and a very long first flagellomere which extends down over the mouth edge. With a large triangular posteroventral process of the surstyli this species is most similar to *L. mallochi* but the shape of the aedeagus is different. The yellow coloration present ventrally on the apex of the fore tibia is also a distinctive feature and apparently does not occur in any other Palaearctic *Lonchaea* apart from *L. krivosheinae* Kovalev, 1973, *L. fugax* Becker, 1895 and *L. palposa* Zetterstedt, 1847.

Acknowledgements.
I am grateful to the European Union - Access to Research Infrastructure Action of the Human Potential Programme for supporting the visit to the Zoological Museum, Copenhagen, and to Jonathan Cole, England; Ruth Contreras-Lichtenberg, Vienna; Rudolf Meier, Copenhagen and J. Ziegler, Eberswalde for the loan of specimens

References

Collin, J.E. 1953. A revision of the British (and notes on other) species of Lonchaeidae (Diptera). *Transactions of the Society for British Entomology* **11,** 181-207.

Hackman, W. 1956. The Lonchaeidae (Dipt.) of Eastern Fennoscandia. *Notulae Entomologicae* **36**, 89-115.

Kovalev, V.G. 1978. New and little-known species of Lonchaeidae (Diptera). *Entomologicheskoe Obozrenie* **57**, 188-199.

Kovalev, V.G. 1981. On European species of the group *Lonchaea peregrina* (Diptera, Lonchaeidae). *Zoologicheskii Zhurnal* **60**, 221-228.

MacGowan I. and Rotheray G.E. 2000. New species, additions and possible deletions to the British *Lonchaea* Fallén (Diptera, Lonchaeidae). *Dipterists Digest (Second Series)* **7**, 37 - 49

Morge, G. 1959. Monographie der palaearktischen Lonchaeidae (Diptera). *Beiträge zur Entomologie* **9**, 1-92, 323-371, 909-945.

Morge, G. 1963. Die Lonchaeidae und Pallopteridae Österreichs und der angrenzenden Gebiete. 1. Teil. Die Lonchaeidae. *Naturkundliches Jahrbuch der Stadt Linz* **9**, 123-312.

Dipterists Digest 2004 **11**, 33-40

New records of Cecidomyiidae (Diptera) in Britain

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Summary
Eight genera and sixteen species of Cecidomyiidae are recorded for the first time in Britain, mostly from water/light trap catches taken in the author's garden. One species, *Bremia tristis* Felt, is a Nearctic species not previously recorded in the Palaearctic and another, *Epidiplosis filifera* (Nijveldt) has only been recorded as a predator on scale insects in Israel. *Colomyia appendiculata* Kieffer is recorded for the first time since its original description in 1901. The new synonymy *Coquillettomyia dentata* Felt, 1908 = *C. caricis* (Möhn), **syn. n.** is proposed

Introduction

Chandler (1998), in the checklist of British Diptera, listed 620 species of British Cecidomyiidae, which indicates that this is one of the largest families of British Diptera in number of species. Despite this large total, the addition of genera and species new to Britain is relatively easy, indicating the diversity of the family and the extent to which it has been neglected. The reasons for this neglect are usually attributed to small size and difficulties of slide preparation and identification. There are certainly difficulties, not least the inadequacy of much of the early taxonomic literature, but with adequate resources and commitment they can be overcome.

The Holarctic species of the subfamily Lestremiinae have been thoroughly revised by Jaschhof (1998) and the European Porricondylinae were revised by Panelius (1965), but that still leaves the largest subfamily, the Cecidomyiinae, unrevised. This is the subfamily that shows greatest biological diversity. More than three hundred and fifty gall-inducing species are included in *British Plant Galls* (Redfern *et al.* 2002) but the subfamily also contains many other phytophagous species that do not induce galls, as well as mycophagous and zoophagous groups, mostly with unclear phylogenies. Gagné (1994), in the context of his studies of the Neotropical gall midges, provided a useful introduction to the family, including many generic synopses, and Skuhravá (1997) provided an introduction and illustrated keys to genera in her contribution to the *Manual of Palaearctic Diptera*. Gagné (2004) has also published a world catalogue of Cecidomyiidae that contains full bibliographic references to the original descriptions of genera and species listed here and is also the basis of the classification used and the source of general information on supertribes and genera.

The following notes and records are mainly from my own recent studies and most of the interesting new discoveries of genera and species new to Britain have been made in my garden, especially by light-trapping during the summer months. Dr R.J. Gagné confirmed my identifications of the Nearctic species. Dr F.D. Bennett provided material and information on cecidomyiids that he has collected in the Isle of Man, which have been the subject of a separate paper (Harris and Bennett 2003). Three other species new to Britain have been recorded in other recent publications and are briefly noted below. New British records of genera and/or species in this paper are marked with an asterisk *. Voucher specimens supporting these new records will be deposited in the Natural History Museum, London [BMNH] and some specimens have already been deposited in the US National Museum, Washington [USNM], as indicated in the text.

PORRICONDYLINAE

COLOMYIA Kieffer, 1892*
This genus currently contains five species, mostly from Europe but with one recorded in Java (Gagné 2004). The sole British species, *Colomyia hordei* Barnes, was designated type-species of the monotypic genus *Stackelbergiella* by Marikovskij (1958), leaving the genus *Colomyia* unrepresented in Britain.

Colomyia appendiculata Kieffer, 1901*
Kieffer (1901a) included illustrations of the metatarsus and the terminal female abdominal segments of this species in his monograph of the cecidomyiids of Europe and Algeria; later that year (Kieffer 1901b), he published a very brief description based on a single female caught on a window in France at Bitche, Moselle. He noted that the ovipositor cerci have small cylindrical pubescent appendages, about three times as long as wide, and recorded that he had not previously seen such appendages. There seem to have been no additional records of this species since that date until I reared a short series from larvae feeding on an encrusting fungus on dead wood in my garden. Panelius (1965), in his revision of the European Porricondylinae, listed this species and noted that 'It is at present impossible to know to which genus *appendiculata* belongs, but the peculiar structure of the ovipositor together with the spine on tarsus 1 and the wing venation should make identification possible when new material is obtained'. That prediction has proved correct. The genitalia of the single reared male lack sclerotised parameres and this indicates that the species is best retained in *Colomyia*. Additional males have been caught in trap catches at the same location and the genitalia are identical.
Surrey, Ripley [TQ039549], larvae collected 6.vi.2000 from encrusting fungus on dead wood, adults emerged 30.vi – 11.vii.2000, 3 larvae, 4♀, 1♂; water/light trap, 1♂, 10-11.viii.2003 (K.M. Harris).

CECIDOMYIINAE

Brachineuridi
Gagné (2004) recognised this as a small, cosmopolitan supertribe of only 49 species. Known larvae and adults are mostly associated with insect and spider remains and rotting wood.

RHIZOMYIA Kieffer, 1898*
This genus is Holarctic and Oriental, currently with 22 included species.

Rhizomyia detrita Mamaev, 1967*
A European species recorded only from Russia. The following British records are based on specimens in BMNH identified by Dr Hans Meyer:
Norfolk, Foxley Wood, reared from larvae on rotten tree stump, v-vi.1980, 2♂ (R.E. Evans); Norfolk, Welborne, from cocoons on dead wood, vi.1981, 1♂ (R.E. Evans); Surrey, Abinger [TQ110470], adults on cobwebs on rotten tree, 29.vi.1964, 4♂ (K.M. Harris); Epping Forest, ex moss, 4.v.1971, 1♂ (S. Trifourkis).

Rhizomyia selecta Mamaev, 1967*
A second European species, also recorded only from Russia, is represented in BMNH by the following series identified by Dr Hans Meyer:
Newcastle-on-Tyne, trap catch, 25.vi.1976, 3♂ (N. French).

Cecidomyiidi

Gagné (2004), in his world catalogue of Cecidomyiidae, has tentatively divided the supertribe Cecidomyiidi into 10 tribes, but with a residue of more than 100 genera unassigned. Here the genera are listed in alphabetical order.

ASPHONDYLIA Loew, 1850

This large, cosmopolitan genus contains more than 250 species worldwide. Larvae induce galls on stems, buds, flowers or fruits of a wide range of plants in association with symbiotic fungi. Successive generations of some species alternate between a range of different host plants.

Asphondylia pilosa Kieffer, 1898

This species was treated as a junior synonym of *Asphondylia sarothamni* (Loew) by Skuhravá (1986) in the Catalogue of Palaearctic Diptera but, following the recent discovery of its distinctive galls at Dunsfold in Surrey, the species was resurrected from synonymy (Harris 2002). Galls have now been recorded at two additional localities:

Essex, Colchester, Fingringhoe Wick Nature Reserve [TM0419], vii.2003 (M. Chinery). Suffolk, Brandon Country Park [TL7885], 3.vi.2003 (B. Hancy and M. Chinery).

BREMIA Rondani, 1860*

This genus is based on a European species, *Cecidomyia* (*Diplosis*) *decorata* Loew. Skuhravá (1986) listed six Palaearctic species. Gagné (1994) noted that the genus is cosmopolitan with 17 described and at least 20 undescribed species. With the exception of an African species whose larvae prey on dragonfly eggs (Harris 1981), larval biology of the genus is unknown.

Bremia ciliata Kieffer, 1904*

Originally described from France and later recorded from the former USSR.

Glamorgan, Pengam [ST148978], on spider webbing, 29.vi.1975 (K.M. Harris), 1♂, slide 17966 (BMNH). Surrey, Ripley [TQ039549], water/light trap, 1♂, 1-3.ix.2002, (K.M. Harris).

Bremia tristis Felt, 1914*

A North American species not previously recorded in the Palaearctic. Biology unknown.

Surrey, Ripley [TQ039549], water/light trap, 24-27.vii and 11-12.viii.2000 (K.M. Harris), 4♂ (one in USNM, compared with type specimen by R.J. Gagné). Glamorgan, Pengam [ST148978], on spider web lines, 29.vi.1978 (K.M. Harris), 2♂, slides 17967 and 17968 (BMNH). Surrey, Abinger [TQ110470], on spider webbing, 2.vii.1978 (K.M. Harris), 3♂, slides 18702, 18703 and 18719 (BMNH).

Bremia longipes (Kieffer, 1901)*

Originally described from France and with no subsequent records. R.J. Gagné has compared one British specimen with specimens given by Kieffer to Felt.

Surrey, Ripley [TQ039549], water/light trap, 2♂ (one in USNM), 20-22.vi.2000 (K.M. Harris).

COQUILLETTOMYIA Felt, 1908

A North American species, *Coquillettomyia lobata* (Felt) [see below] is the type-species of this cosmopolitan genus. Gagné (1994) stated that there are 22 described species worldwide and many additional undescribed species and that, according to Möhn, larvae are free-living in decaying plant matter or among fungus. Mamaev (1973) reviewed the Palaearctic species, which were listed by

Skuhravá (1986) in the Catalogue of Palaearctic Diptera. Interpretation of the structure of the aedeagus requires great care as the appearance of this three-dimensional structure varies appreciably according to the angle of view and can also be considerably distorted by compression during slide preparation and as a result of subsequent shrinkage of mountant.

Coquillettomyia dentata Felt, 1908 [= *C. caricis* (Möhn), **new synonymy**] *
Both nominal species have been recorded from various European countries by Skuhravá (1986). The structure of the male genitalia is complex and is considered diagnostic for this species, which was originally described from North America.
Surrey, Ripley [TQ039549], water/light trap, 4♂ (one in USNM), 25-27.vii and 11-12.viii.2000, 2♂, 26-30.vii.2001 and 25.viii.2001, (K.M. Harris). Scotland, Dundee, SHRI Invergowrie [NO367310], in emergence trap, 1♂, slide 18532, 15.x.1977, 1♂, slide 18526 (J.A.T. Woodford) (BMNH).

Coquillettomyia lobata (Felt, 1907)
This North American species has been previously recorded from mainland Europe (Netherlands, Germany and the former USSR), and from the Isle of Man, but its biology is unknown.
Scotland, Dundee, Scottish Horticultural Research Institute, Invergowrie, Dundee [NO367310], water trap, 2♂, 5-8.ix.1975 (J.A.T. Woodford). Surrey, Ripley [TQ039549], water/light trap, 8♂ (one in USNM), 20-22.vi, 23-27.07, 11-12.viii.2000, 26-30.vii.2001 (K.M. Harris).

Coquillettomyia nigricornis Mamaev, 1973*
Described from Russia (Kursk Province) and previously known only from the holotype male.
Surrey, Ripley [TQ039549], 1♂, water/light trap, 24-25.vii.2000 (K.M. Harris).

EPIDIPLOSIS Felt, 1908*
This genus currently contains six species that are mostly known from single caught males occurring at widespread localities in the Holarctic.

Epidiplosis filifera (Nijveldt, 1965)*
This species was previously known only from Israel where its larvae are predators on scale insects. The capture of *E. filifera* specimens in Surrey in three successive years indicates that it is probably a native predator on scale insects rather than a casual introduction.
Surrey, Ripley [TQ039549], water/light trap, 1♂, 24-25.vii.2000, 1♂, 25.viii.2001, 1♂, 29-30.viii.2002, 1♂, 18-19.vii.2003, 1♂, 23-24.viii.2003 (K.M. Harris).

HYPERDIPLOSIS Felt, 1908*
A North American species, *Hyperdiplosis lobata* (Felt) [see below], is the type-species of this genus, which currently contains eleven species, only two of which have been recorded in the Palaearctic Region.

Hyperdiplosis bryanti (Felt, 1913)*
Described from the USA and also recorded from Germany (Meyer 1984).
Surrey, Ripley [TQ039549], water/light trap, 3♂, 26-30.vii.2001 (K.M. Harris).

Hyperdiplosis lobata (Felt, 1907)*

Originally described from the USA and later recorded from Germany by Meyer (1984) who reported 194 individuals from trap catches, obtained during ecological studies of salt marshes in north-west Germany.
Surrey, Ripley [TQ029549], water/light trap, 1♂, 09-12.08.1998, 6♂ (one in USNM), 20-22.vi.2000, 2♂, 26-30.vii.2001, 1♂, 29-30.viii.2002 (K.M. Harris).

KARSHOMYIA. Felt, 1908*
Based on a North American type-species, this genus contains at least ten Palaearctic species, none of which has been previously recorded in the British Isles.

Karshomyia caulicola (Coquillett, 1895)*
Meyer (1984) recorded 1,070 specimens of this species from traps operated in north-west Germany but the species was not included in the *Catalogue of Palaearctic Diptera* (Skuhravá 1986), as this had a cut off date of 1982 for included taxa.
Surrey, Ripley [TQ029549], water/light trap, 1♂, slide 20083, 24-25.vii.2000 (in USNM), 2♂, 26-30.vii.2001, 1♂, 24-26.viii.2003 (K.M. Harris). Lincolnshire, Spalding, reared from oil poppy stems, 4♂, (slides 10491-10494), viii-ix.1955 (P.W. Carden) (BMNH).

Karshomyia ramosa (Kieffer, 1904)*
Kieffer described this species from France, based on a male caught on oak wood, and it was subsequently recorded from the former USSR (as *K. elegans* Mamaev). Identifications of the following material in BMNH are based on the complex and distinctive male genitalia.
Hertfordshire, Harpenden, Rothamsted Experimental Station, Broadbalk [TL1213], reared from wheat ears, 1♂, slide 9398, 12.vi.1953, 3♂, slides 10872-10874, 19-27.vi.1955 (H.F. Barnes). Ireland, no locality, reared from wheat ears, 2♂, slides 9832, 9833, 26.v-19.vi.1952 (J. Carroll).

MAMAEVIA Skuhravá, 1967
This Palaearctic genus contains two species with distinctive male genitalia in which the aedeagus bears two pairs of strongly sclerotised, backwardly directed hooks.

Mamaevia vysineki Skuhravá, 1967
This species was originally described from the Czech Republic and was subsequently recorded from Germany, Latvia and Poland, and from the Isle of Man (Harris and Bennett 2003).
Surrey, Ripley [TQ039549], light/water trap, 1♂, 9-12.viii.1998, 1♂, 23.vii.2000, 1♂, 26-30.vii.2001 (K.M. Harris).

TESSARADIPLOSIS Baylac, 1988*
This monotypic genus was erected by Baylac (1988) to accommodate a species that was described by Perris in 1885 and was known only from the type series of two males and three females.

Tessaradiplosis entomophila (Perris, 1855)*
Perris described this species from an infestation of mites (*Acarus* species) on dried and pinned insects in France. The larvae were presumably feeding on the mites.
Surrey, Ripley [TQ039549], water/light trap, 1♂, 25.08.2001, 1♂, 18-19.07.2003, 1♂, 10-11.08.2003 (K.M. Harris).

Lasiopteridi
Gagné (2004) included nine tribes in this supertribe but many genera are unassigned.

CONIOPHORA Nijveldt, 1959*
A small Palaearctic genus containing only five species.

Coniophora graminicola Nijveldt, 1959*
Type-species of the genus, described from adults reared from *Phalaris arundinacea* in the Netherlands. Represented in BMNH by two specimens:
Manchester, Didsbury, ex *Phalaris arundinacea*, 1982, 1♂ 1♀ (A.K. Abbass).

Coniophora autumnalis (Mamaev, 1961)*
Originally described in *Procystiphora* by Mamaev from specimens caught in large numbers in a forest in the Voronezh Region of the former USSR. Gagné (1975) transferred the species from *Procystiphora* to *Dasineura*. Mamaev and Przhiboro (2001) reassigned it to *Coniophora*.

Nijveldt (1973) reared the species from larvae found in flower buds of *Ulmus minor minor* [= *U. carpinifolia*] in the Netherlands and noted that Barnes (1951) had recorded the species [then unnamed], from England. Examination of a series of reference slides of larvae and reared adults in the Barnes Collection at BMNH provides the following records:
West Yorkshire, Wakefield, Button Park, from flower buds of wych elm (*Ulmus glabra*), 20.ii.1939 (J.C.F. Fryer), iii.1940 (J.C.S. Ellis). Hertfordshire, Rothamsted Lodge, from elm flower buds, 9.iii and 13.iii.1951 (H.F. Barnes). Bedfordshire, Bedford, from elm flower buds, 6.x.1951 (H.F. Barnes).

GEOCRYPTA Kieffer, 1913
This Palaearctic genus currently contains six phytophagous species, three of which induce galls on *Galium*, including the common and widespread *Geocrypta galii*.

Geocrypta rostriformis Fedotova, 1997
Until recently this species was known only from Kazakhstan but has now been recorded from Scotland and northern England (Harris 2003b).

JANETIELLA Kieffer, 1898
This Holarctic genus, based on the European species *J. thymi* (Kieffer), currently contains a diverse assemblage of 28 species, all of which are probably phytophagous.

Janetiella siskiyou Felt, 1917
Chandler (1998) placed this species on the British list on the basis of a passing reference from the Swedish literature. It is a North American species that was accidentally introduced into Europe before 1931, presumably with seed of its host (*Chamaecyparis lawsoniana*). It is well established in southern England and has been collected in the following areas:
Surrey, Royal Horticultural Society's Garden, Wisley [TQ064578] and in my neighbour's garden at Ripley [TQ039549]. Hampshire, Alice Holt, near Farnham [SU808434]; Minstead, near Lyndhurst, in the New Forest [SU310105]. East Anglia [R. Hancy *pers. comm.* 1999].

Janetiella frankumi Harris, 2003
Galls of this species on burnet rose, *Rosa pimpinellifolia* were first recorded from Scotland in 1886 but the gall midge species that induces them has only recently been reared and described (Harris

2003a). The bright red stem galls are quite conspicuous during the summer months and must have been often overlooked. The species has been recorded around the coasts of Wales and Scotland, from Carmarthenshire to Ayrshire and also inland at Cressbrookdale, Derbyshire.

Acknowledgements

I am particularly indebted to Dr R.J. Gagné, USDA Systematic Entomology Laboratory, Washington, USA for advice and for confirmation of my identifications of the Nearctic species and to Dr F.D. Bennett for material and information on cecidomyiids that he has collected in the Isle of Man.

References

Barnes, H.F. 1951. *Gall midges of economic importance. Vol. V: Gall midges of Trees*. 270 pp., Crosby Lockwood, London.

Baylac, M. 1988. Description de *Tessaradiplosis* genre nouveau pour *Cecidomyia entomophila* Perris [Diptera, Cecidomyiidae]. *Revue Française d'Entomologie (N.S.)* **10,** 31-35.

Chandler, P.J. 1998. (Ed) Checklists of Insects of the British Isles (New Series). Part 1: Diptera (Incorporating a List of Irish Diptera). *Handbooks for the Identification of British Insects* **12** (1), xx + 234 pp. Royal Entomological Society, London.

Gagné, R.J. 1975. A review of the Nearctic genera of Oligotrophidi with piercing ovipositors (Diptera: Cecidomyiidae). *Entomological News* **86,** 5-12.

Gagné, R.J. 1994. *The Gall Midges of the Neotropical Region.* Cornell University Press. xv + 352 pp.

Gagné, R.J. 2004. A Catalog of the Cecidomyiidae (Diptera) of the World. *Memoirs of the Entomological Society of Washington* **25,** 1-408.

Harris, K.M. 1981. *Bremia legrandi*, sp. n. [Diptera, Cecidomyiidae], a predator on eggs of a dragonfly, *Malgasssophlebia aequatoris* Legrand [Odonata, Libellulidae] in Gabon. *Revue Française d'Entomologie (N.S.)* **3,** 27-30.

Harris, K.M. 2002. The gall midge *Asphondylia pilosa* Kieffer (Diptera, Cecidomyiidae) on *Cytisus scoparius* (L.) Link in Europe and North America. *Cecidology* **17**(2), 94-98.

Harris, K.M. 2003a. A new species of gall midge, *Janetiella frankumi*, inducing stem galls on burnet rose (*Rosa pimpinellifolia*). *Cecidology* **18**(2), 51-55.

Harris, K.M. 2003b. The gall midge *Geocrypta rostriformis* Fedotova in Scotland and northern England. *Cecidology* **18**(2), 57-59.

Harris, K.M. and Bennett, F.D. 2003. Records of gall midges (Dipt.: Cecidomyiidae) from the Isle of Man. *Entomologist's Record and Journal of Variation* **115,** 109-115.

Jaschhof, M. 1998. Revision der "Lestremiinae" (Diptera, Cecidomyiidae) der Holarktis. *Studia Dipterologica Supplement* **4,** 1-552.

Kieffer, J.J. 1901a. Monographie des cécidomyides d'Europe et d'Algérie. *Annales de la Société Entomologique de France* **69,** 181-384, pls. 15-24.

Kieffer, J.J. 1901b. Suite à la Synopse des Cécidomyies d'Europe et d'Algérie. *Bulletin de la Société d'Histoire Naturelle de Metz* **21,** 9-43.

Mamaev, B.M. 1973. Revision of the Palaearctic species of the genus *Coquillettomyia* Felt (Diptera, Cecidomyiidae). *Vestnik Zoologii* **1973**(2), 47-52. [in Russian]

Mamaev, B.M. and Przhiboro, A.A. 2001. A new species of the gall midge genus *Coniophora* from Pskov Province of Russia (Diptera: Cecidomyiidae). *Zoosystematica Rossica* **9,** 235-236. [in Russian]

Marikovskij, P.I. 1958. New gall midge species (Diptera, Itonidiidae) from the sub-mountainous

plain of Trans-Ili and Kirghiz Alatau. *Zoologeskiĭ Zhurnal* **37,** 1842-1853. [in Russian]
Meyer, H. 1984. Experimentell-ökologische-Untersuchungen an Gallmücken (Cecidomyiidae-Diptera) in Salzwiesenberiechen Nordwestdeutschlands. *Faunistisch-Okologische Mitteilungen Supplement* **5,** 1-124.
Nijveldt, W. 1973. Nieuwe galmuggen voor de Nederlandse fauna (VI). *Entomologische Berichten* **33,** 97-100.
Panelius, S. 1965. A revision of the European gall midges of the subfamily Porricondylinae (Diptera: Itonididae). *Acta Zoologica Fennica* **113,** 1-157.
Redfern, M., Shirley, P. and Bloxham, M. 2002. British plant galls. Identification of galls on plants and fungi. *Field Studies* **10,** 207-531.
Skuhravá, M. 1986. Family Cecidomyiidae. **In** Soós, A. and L. Papp (Eds). *Catalogue of the Palaearctic Diptera: Sciaridae – Cecidomyiidae* **4,** 72-297. Akadémiai Kiadó, Budapest.
Skuhravá, M. 1997. Family Cecidomyiidae. Pp. 71-204. **In** Papp, L. and B. Darvas (Eds). *Contributions to a Manual of Palaearctic Diptera (with special reference to flies of economic importance). Vol. 2: Nematocera and Lower Brachycera.* Science Herald, Budapest.

Coccopsilis Harris, 2004, a new name for the preoccupied generic name *Coccopsis* de Meijere, 1901 (Diptera, Cecidomyiidae) –

In the British checklist (Chandler, P.J. (Ed) 1998. Checklists of Insects of the British Isles (New Series). Part 1: Diptera (Incorporating a List of Irish Diptera). *Handbooks for the Identification of British Insects* **12**(1), xx + 234 pp. Royal Entomological Society, London) *Coccopsis* de Meijere, 1901 was listed as a junior synonym of *Holoneurus* Kieffer, 1895. It was also indicated as being preoccupied. However, B.M. Mamaev (2001. The tribe Holoneurini in the Palaearctic (Diptera, Cecidomyiidae). *All-Russian Institute of Continuous Education in Forestry, Pushkino* 17, 1-11) resurrected *Coccopsis* from synonymy and treated it as a valid genus, including the British species *marginata* de Meijere, 1901 which was described in *Coccopsis*. The genus belongs to the tribe Holoneurini of the subfamily Porricondylinae.

R.J. Gagné (2004. A Catalog of the Cecidomyiidae (Diptera) of the World. *Memoirs of the Entomological Society of Washington* **25,** 1-408) accepted the recognition of *Coccopsis* as a genus distinct from *Holoneurus* but overlooked that it was preoccupied in Aves by *Coccopsis* Reichenbach, 1850. This has been discussed with Ray Gagné and he has confirmed that the name is preoccupied. At his request a new name is proposed here: *Coccopsilis* Harris, new name for *Coccopsis* de Meijere, 1901, preoccupied. The type-species thus becomes *Coccopsilis marginata* (de Meijere, 1901), new combination – **KEITH M. HARRIS,** 81 Linden Way, Ripley, Woking, Surrey, GU23 6LP

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Corrections and changes to the Diptera Checklist (11) - Editor

It is intended to publish here any corrections to the text of the latest Diptera checklist (publication date was 13 November 1998; the final 'cut-off' date for included information was 17 June 1998) and to draw attention to any subsequent changes. All readers are therefore asked to inform me of any errors or changes and I would like to thank all those who have already brought these to my attention. Zoological Record for 2003 has been consulted and consequent changes are given here.

In the notes below where names of genera and species are given as in the Checklist, authorship is not stated here. Changes are listed under families; names new to the British Isles list are given in bold type. The notes below refer to deletion of 1 species, the loss of 3 names due to synonymy and addition of 22 species, resulting in a new total of 6796 species.

Keith Harris is responsible for the section reporting changes resulting from the World Catalogue of Cecidomyiidae.

Correction to Supplement (3)

Agromyzidae. *Agromyza idaeiana* (Hardy, 1853 – *Calyptomyza*); parentheses added to author.

Changes

Mycetophilidae. A. POLEVOI and K. HEDMARK (2004. New species of the genus *Boletina* Winnertz (Diptera: Mycetophilidae) from Fennoscandia. *Entomologica Fennica* **15,** 23-33) have indicated that *Boletina nigrofusca* of the British list is a misidentification and that the Scottish records relate to a species newly described from Russia (Karelia) and Finland:
Boletina ***kivachiana*** Polevoi & Hedmark, 2004 = *nigrofusca*: Edwards, 1925, misident..

Sciaridae. It should have been mentioned in the previous supplement that *Leptosciarella subspinulosa* should be deleted from the British checklist as well as the Irish list, its synonymy with *L. pilosa* having been confirmed (F. Menzel *pers. comm.*).

Cecidomyiidae. The following species was deleted from the British list by K.M. HARRIS (2003. Fruit galls on *Rumex obtusifolius* L. induced by *Contarinia rumicis* (Loew) (Diptera, Cecidomyiidae). *Cecidology* **18,** 23-27): *Contarinia scutati*

The following additions result from the paper by K.M. HARRIS in the present issue:
COLOMYIA Kieffer, 1892 (in Porricondylinae, Asynaptini)
Colomyia ***appendiculata*** Kieffer, 1901
BREMIA Rondani, 1860 (in Cecidomyiinae, Cecidomyiidi, Asphondyliini)
Bremia ***ciliata*** Kieffer, 1904
Bremia ***longipes*** (Kieffer, 1901 – *Dicrodiplosis*)
Bremia ***tristis*** Felt, 1914
Coquilletomyia ***dentata*** Felt, 1908 = *caricis* (Möhn, 1955 – *Picrodilposis*)
Coquilletomyia ***nigricornis*** Mamaev, 1973

EPIDIPLOSIS Felt, 1908 = GERSONOMYIA Nijveldt, 1965 (in Cecidomyiinae, Cecidomyiidi, Cecidomyiini)
Epidiplosia ***filifera*** (Nijveldt, 1965 – *Gersonomyia*)
HYPERDIPLOSIS Felt, 1908 (in Cecidomyiinae, Cecidomyiidi, Cecidomyiini)
Hyperdiplosis ***bryanti*** (Felt, 1913 – *Coquilletomyia*)
Hyperdiplosis ***lobata*** (Felt, 1907 – *Coquilletomyia*)
KARSHOMYIA Felt, 1908 (in Cecidomyiinae, Cecidomyiidi, Cecidomyiini)
Karshomyia ***caulicola*** (Coquillett, 1895 – *Diplosis*)
Karshomyia ***ramosa*** (Kieffer, 1909 – *Bremia*)
TESSARADIPLOSIS Baylac, 1988 (in Cecidomyiinae, Cecidomyiidi, Cecidomyiini)
Tessaradiplosis ***entomophila*** (Perris, 1855 – *Cecidomyia*)
RHIZOMYIA Kieffer, 1898 (in Cecidomyiinae, Brachineuridi, Rhizomyiini)
Rhizomyia ***detrita*** Mamaev, 1967
Rhizomyia ***selecta*** Mamaev, 1967
CONIOPHORA Nijveldt, 1959 (in Cecidomyiinae, Lasiopteridi, Dasineurini))
Coniophora ***graminicola*** Nijveldt, 1959
Coniophora ***autumnalis*** (Mamaev, 1961 – *Procystiphora*)

The following change results from a note by K.M. HARRIS in the present issue:
COCCOPSILIS Harris, 2004 = COCCOPSIS de Meijere, 1901 resurrected from synonymy in *Holoneurus* (Porricondylinae, Holoneurini)
Coccopsilis marginata (de Meijere, 1901 – *Coccopsis*), from *Holoneurus*.

A Catalog of the Cecidomyiidae (Diptera) of the World (R.J. GAGNÉ. 2004. *Memoirs of the Entomological Society of Washington* **25,** 1-408) supports the following amendments to the British checklist. Bold type indicates new additions and corrections. The tribal groupings outlined by Gagné are used here but of necessity he left many genera unplaced, indicating the great need for further taxonomic research on this major family of Diptera. For reasons stated in his introductory comments on taxonomic considerations (*loc. cit.* p. 9) Gagné has reversed two changes in the British checklist proposed under Article 23.9 of the 4th Edition of the International Code of Zoological Nomenclature by K.P. BLAND (2000. *Dipterists Digest* (*Second Series*) **7,** 9-14). His reasons for doing this are noted under the two species affected, *Macrodiplosis roboris* and *Dasineura rosae*.

Lestremiinae
MONARDIA Kieffer, 1895
M. JASCHHOF (1998. *Studia dipterologica* – Supplement 4) transferred TRICHOPTEROMYIA Williston, 1896 and XYLOPRIONA Kieffer, 1913 to MONARDIA as subgenera. MONARDIA (subgenus MONARDIA) now includes *antennata* (Winnertz), *magna* Edwards, *monilicornis* (Zetterstedt), *obsoleta* Edwards, *stirpium* Kieffer and *ulmaria* Edwards; MONARDIA (subgenus TRICHOPTEROMYIA) includes *modesta* Williston, 1896 and MONARDIA (subgenus XYLOPRIONA) includes *atra* and *toxicodendri*.

Porricondylinae
Dicerurini
The transfer of *Tetraneuromyia ramosa* to PARATETRANEUROMYIA Spungis, 1987 has been noted previously, but not its synonymy with *P. nobilis*:

Paratetraneuromyia ***nobilis*** (Felt, 1913 - *Asynapta*) = *ramosa* (Panelius, 1965).

Holoneurini (ex Porricondylini)
CASSIDOIDES Mamaev, 1960 resurrected from synonymy in *Holoneurus*.
Cassidoides pini Mamaev, 1960 (from *Holoneurus*).

Porricondylini
Porricondyla ***albiceps*** (Walker 1856 – *Cecidomyia*) transferred from *nomina dubia* by S. PANELIUS (1965. *Acta zoologica fennica* **113**, p. 36)
Porricondyla ***lata*** Mamaev, 1965, resurrected from synonymy under *dilatata* Felt. Occurrence of *P. lata* in England is based on three males in the BMNH examined by S. PANELIUS (1965. *loc. cit.*, p. 48).

Cecidomyiinae
Cecidomyiidi
Supertribe Asphondyliidi is reduced to tribe Asphondyliini in Cecidomyiidi.
Blastodiplosis cocciferae is transferred to *Phyllodiplosis*.
Contarinia ***barbichei*** Kieffer, 1890 – justified emendation by Kieffer, 1898.
Contarinia ***craccae*** (Loew, 1850 – *Cecidomyia*) = *Contarinia craccae* Kieffer, 1897 – new synonymy.
Contarinia ***pisi*** (Loew, 1850 – *Cecidomyia*) = *Contarinia pisi* Winnertz, 1854 – new synonymy.
Contarinia solani (Rübsaamen, **1892**) – amended date.
Contarinia ***verna*** (Curtis, 1827) – new combination from *nomina dubia*. Curtis' original illustration shows that this species belongs in *Contarinia*.
GEODIPLOSIS synonymised in RESSELIELLA and *G. ranunculi* transferred; for convenience it is regarded as synonymous with *Lestodiplosis ranunculi*, already included in *Resseliella* in the checklist, although Kieffer described the latter (on the same page) as a predator of *Geodiplosis ranunculi*.
Hadrobremia longiventris (Kieffer, **1901**) – amended date.
Lestodiplosis ***frirenii*** (Kieffer, 1888) – correct original spelling.
Loewiola serratulae **(Kieffer, 1905)** – authorship attributed to Kieffer in Goury & Guignon, 1905.
Macrodiplosis ***pustularis*** (Bremi, 1847) – new combination, = *Macrodiplosis dryobia* (F. Löw, 1877) – new synonymy.
Macrodiplosis ***roboris*** (Hardy, 1854 – *Cecidomyia*) = *Macrodiplosis volvens* (Kieffer, 1895) – reversal of designation of *roboris* Hardy as a *nomen oblitum* by K.P. BLAND (2000. *loc. cit.*) as he did not show that the conditions of Article 23.9.2 were met.
Mycodiplosis ***inimica*** (Fitch, 1861 – *Cecidomyia*) = *Mycodiplosis plasmoparae* Rübsaamen, 1906, = *Isodiplosis deutera* Milne, 1960.
PHYLLODIPLOSIS Kieffer, 1912
Phyllodiplosis cocciferae (Tavares, 1901) – transferred from BLASTODIPLOSIS.
Delete PLEMELIELLA: the only British species, *betulicola*, has been transferred to RESSELIELLA.
RESSELIELLA Seitner, 1906 = GEODIPLOSIS Kieffer, 1909 – new synonymy.
Resseliella betulicola (Kieffer, 1889 – *Diplosis*) – new combination.
Resseliella ranunculi (Kieffer, 1909 – *Geodiplosis*) – new combination, = *Resseliella ranunculi* (Kieffer, 1909 – *Lestodiplosis*) – new synonymy.

Lasiopteridi

Lasiopterini
Hybolasioptera ***fasciata*** (Kieffer, 1904 – *Lasioptera*) = *Cecidomyia cerealis* of Lindeman, 1881 – misidentification of *Cecidomyia cerealis* Fitch, 1845.
Lasioptera francoisi (Kieffer, **1902**) – amended date.

Ledomyini
LAUTHIA Kieffer, 1912
Lauthia cardui (Kieffer, 1904) = *Ledomyia cardui* Kieffer, 1904 – new combination.

Oligotrophini
This tribe is now restricted to genera associated with galls on Cupressaceae (especially *Juniperinus*), including *Arceuthomyia* (which is doubtfully British), *Oligotrophus* and *Schmidtiella* (which is probably a junior synonym of *Oligotrophus*).

Dasineurini (ex Oligotrophini)
Gagné included the following British genera in this tribe: *Arnoldiola, Bayeriola, Bremiola, Coniophora, Dasineura, Fabomyia, Geocrypta, Gephyraulus, Giraudiella, Hartigiola, Jaapiella, Janetiella, Kaltenbachiola, Lathyromyza, Macrolabis, Neomikiella, Rabdophaga, Rondaniola, Spurgia, Wachtliella* and *Zygiobia* and noted how little basis there is for separating some of these genera.
ARNOLDIOLA Strand, **1928** – amended date.
Arnoldiola ***gemmae*** (Giraud, 1868 – *Cecidomyia*) – new combination, = *Cecidomyia gemmae* Rübsaamen, 1892, new synonymy.
Dasineura angelicae Rübsaamen, **1916** – amended date.
Dasineura artemisiae Rübsaamen, **1916** – amended date.
Dasineura aucupariae (Kieffer, **1909**) – amended date.
Dasineura auritae Rübsaamen, **1916** – amended date.
Dasineura brassicae – see *Dasineura napi*.
Dasineura cardaminicola Rübsaamen, **1916** – amended date.
Dasineura filicina – see *Dasineura pteridis*.
Dasineura marginemtorquens (Bremi, 1847) – transferred from *Rabdophaga*.
Dasineura miki (Kieffer, **1909**) – amended date.
Dasineura ***napi*** (Loew, 1850 – *Cecidomyia*), new combination, = *Dasineura brassicae* (Winnertz, 1853) – new synonymy.
Dasineura ***pteridis*** (Müller, 1871 – *Cecidomyia*), new combination, = *Dasineura filicina* (Kieffer, 1889) – new synonymy.
Dasineura ***rosae*** (Bremi, 1847) = *Cecidomyia rosarum* Hardy, 1854, synonymised by Hardy (1854), = *Wachtliella rosarum* (Hardy). This reverses the unjustified designation of *rosae* as a *nomen oblitum* by K.P. BLAND (2000. *loc. cit.*) as Hardy had already synonymised his name under *rosae* in 1854 (*The Scottish Gardener* **3,** 168-171) and R.J. GAGNÉ (1972. *Proceedings of the Entomological Society of Washington* **74,** 321-326) used *rosae*, so the conditions of Article 29.9.2 do not apply.
Dasineura symphyti (Rübsaamen, **1892**) – amended date.
Dasineura tetensi (Rübsaamen, **1892**) – amended date.
Dasineura tubicola – see *Dasineura tubicoloides*.
Dasineura ***tubicoloides*** Gagné, 2004 – new name for *Cecidomyia tubicola* Kieffer, 1889, junior primary homonym of *Cecidomyia tubicola* Osten Sacken, 1862.

Geocrypta ***campanulae*** (Müller, 1871 – *Cecidomyia*) – new combination, = *Cecidomyia trachelii* Wachtl, 1885 – new synonymy.
Jaapiella cirsiicola Rübsaamen, **1916** – amended date.
Macrolabis jaapi Rübsaamen, **1916** – amended date.
Macrolabis lamii Rübsaamen, **1916** – amended date.
Neomikiella lychnidis (von Heyden) – see *Neomikiella lychnidis* (Vallot).
Neomikiella ***lychnidis*** (Vallot, 1827 – *Cecidomyia*) - new combination, = *Neomikiella lychnidis* (von Heyden, 1861) – new synonymy.
Rabdophaga cinerearum – see *Rabdophaga strobilina* (synonymy accepted; see Note 31 of checklist)
Rabdophaga ***jaapi*** Rübsaamen, 1916 = *Rabdophaga repentis* Skuhravá, 1986 – proposed as a new name to avoid homonymy with *Dasyneura jaapi* Rübsaamen, 1914 when the species was assigned to *Dasineura* by Skuhravá.
Rabdophaga ***nielsenii*** **Kieffer**, 1906 – amended spelling and author attribution.
Rabdophaga strobilina (Bremi, 1847) = *Rabdophaga rosaria* (Loew, 1850), = *Rabdophaga cinerearum* (Hardy, 1850), = *Cecidomyia capreae* Hardy, 1854 – synonymy of *cinerearum* supported (listed separately in checklist for reasons stated in Note 31).
Spurgia capitigena – see *Spurgia euphorbiae.*
Spurgia ***euphorbiae*** (Vallot, 1827 – *Cecidomyia*) – new combination, = *Cecidomyia capitigena* Bremi, 1847 – new synonymy.
Wachtliella rosarum – see *Dasineura rosae.*

Poomyini (ex Oligotrophini)
Gagné included the British genera *Mayetiola* and *Pemphigocecis* (as synonyms) in this tribe:
MAYETIOLA Kieffer 1896 = PEMPHIGOCECIS Rübsaamen, 1916 – synonymy by M. ERTEL (1975. *Stuttgarter Beiträge zur Naturkunde (A)* **267,** 1-64) accepted.
Mayetiola phalaris Barnes, **1927** – amended date.
Mayetiola ***graminis*** (Fourcroy, 1785 – *Cynips*) – new combination, = *Cecidomyia poae* Bosc d'Antic, 1817 – new synonymy.
Mayetiola poae – see *Mayetiola graminis.*
Mayetiola ventricola (Rübsaamen, 1899 – *Oligotrophus*) transferred from *Pemphigocecis.*
PEMPHIGOCECIS – see MAYETIOLA.

Rhopalomyiini (ex Oligotrophini)
Gagné included the British genera *Misospatha* and *Rhopalomyia* (as synonyms) in this tribe:
MISOSPATHA – see RHOPALOMYIA.
RHOPALOMYIA Rübsaamen, 1892 = MISOSPATHA Kieffer, 1913 – synonymised by R.J. GAGNÉ (1994. *The gall midges of the Neotropical Region* p. 93).
Rhopalomyia grossulariae Felt 1911 is an unplaced species of Cecidomyiinae.
Rhopalomyia palearum (Kieffer, 1890) = *Misospatha palearum.*

Trotteriini (ex Oligotrophini)
Gagné included the following British genus in this tribe: *Trotteria.*

Unplaced Lasiopteridi
Gagné has been unable to determine tribal placings for many genera, including the following genera that are currently included in the British checklist: *Amerhapha, Blastomyia, Craneiobia, Cystiphora,*

Didymomyia, Iteomyia, Mikiola, Mikomya, Phegomyia, Physemocecis, Psectrosema, Sackenomyia, Semudobia and *Taxomyia.*
Blastomyia origani (Tavares, **1901**) – amended date.
Cystiphora sonchi (**Vallot, 1827** – *Cecidomyia*) – new combination, = *Cystiphora sonchi* (Bremi, 1847).
Iteomyia major (Kieffer, **1898**) – amended date.
Psectrosema tamaricis (**De Stefani**, 1902) – amended author.

Unplaced species of Cecidomyiinae
Gagné lists as unplaced the species of *Cecidomyia* described by Walker (1856) and recorded by Chandler (1998) as *nomina dubia*. Type specimens of most of these species are present in the Stephens Collection in the Natural History Museum, London. They are dry-mounted on pins and most are in such poor condition that it may not be possible to identify them to genus, let alone to species.

Culicidae. Authorship of RUSTICOIDUS, transferred as a subgenus from *Aedes* to *Ochlerotatus* by Reinert (2000), was omitted in this section in the previous issue. It is Shevchenko & Prudkina, 1973.

Chironomidae. The following species was added from Ireland in the previous issue and mentioned in the update of the Irish list but inadvertently omitted from the checklist changes section:
Chaetocladius ***insolitus*** Caspers, 1987++

The following species was added by B. MICHIELS and M. SPIES (2002 Description of *Conchapelopia hittmairorum* spec. nov., and redescription of similar western Palaearctic species (Insecta, Diptera, Chironomidae, Tanypodinae). *Spixiana* **25,** 251-272):
Conchapelopia ***hittmairorum*** Michiels & Spies, 2002

Dolichopodidae. GYMNOPTERNUS has been raised from a subgenus of *Hercostomus* to generic rank, to include all the species listed under it in the checklist, resulting from a comparative morphological study by M. POLLET (2004. A critical note on the systematic position of *Gymnopternus* (Diptera: Dolichopodidae). *Studia dipterologica* **10,** 537-548).

Lonchaeidae. The following species is added in the present issue:
Earomyia ***netherlandica*** MacGowan, 2004

Odiniidae. The following change is proposed in the present issue:
Odinia ***rossi*** MacGowan & Rotheray, 2004 = *Odinia betulae* MacGowan & Rotheray, 2002, preocc.

Chloropidae. The following synonymy was proposed by E.P. NARTSHUK (2002. Additions and corrections to Chloropidae (Diptera) of Poland. *Annales Zoologici* **52**(2)**,** 319-325):
Dicraeus styriacus (Strobl, 1898) = *Dicraeus vallaris* Collin, 1946
[*D. styriacus* sensu Collin, 1946 is a different species (J. Ismay *pers. comm.*)].

Fanniidae and Muscidae. *Anthomyia elapsa* Walker, 1865 has been transferred from the synonymy of *Fannia scalaris* to that of *Hydrotaea irritans* by A.C. PONT (2004. Newly-discovered types of Muscidae and Anthomyiidae (Diptera) described by Francis Walker and located in the Melbourne Museum, Australia. *Studia dipterologica* **10,** 673-678).

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The hoverflies (Diptera, Syrphidae) of the Madeiran Archipelago, Portugal

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Summary

The syrphid fauna of the Madeiran Archipelago is reviewed, based on revision of collections, review of literature and field study. A new species, *Eumerus hispidus* **sp. n.**, is described from Madeira and its status is discussed in relation to the other Macaronesian *Eumerus* species. *Paragus mundus* Wollaston, 1858 is recognised as a junior synonym of *Paragus coadunatus* Rondani, 1847 **syn. n.** Argument is presented that *Xylota puella* Becker, 1921 should be regarded as a junior synonym of *Xylota segnis* (Linnaeus, 1758), **syn. n.** A checklist and distribution maps are provided for the 25 species of hoverfly (Diptera, Syrphidae) reliably recorded from the Madeiran Archipelago. *Eupeodes nuba* (Wiedemann, 1830) is recorded from Madeira for the first time. The presence of *Syrphus torvus* Osten-Sacken, 1875 on the archipelago is confirmed. *Eumerus purpureus* Macquart, 1839 and *Syrphus ribesii* (Linnaeus, 1758) are removed from the Madeiran species list. A provisional key to the identification of Madeira hoverfly species is provided. The species *Eumerus purpurariae* Báez, 1982, recently incorrectly synonymised with *Eumerus etnensis* van der Goot, 1964 (Marcos-García and Pérez-Bañón 2000), is **re-instated** as a valid species.

Introduction

The aims of the current study are (1) to provide a revision of the nomenclature for the Madeiran hoverfly fauna, seeking to clarify the identity of taxa where there has been confusion in the past, and (2) to draw together location records to provide distribution maps for the reliably recorded species. The maps are intended to provide a baseline against which future observations of Madeiran hoverfly distribution can be compared and this should facilitate understanding of the long-term conservation status of these flies. The study is based on revision of several hoverfly collections both in and outside Madeira, review of literature and field study.

The Madeiran Archipelago

Madeira (33° 10' - 32° 20' N latitude; 16° 10' - 17° 20' W longitude) is the largest island in a small volcanic archipelago that lies approximately 960 km south west of continental Portugal and 560 km west of Rabat on the west coast of Morocco (West Africa). It includes an UNESCO World Heritage Site (the endemic laurel forest or laurisilva; see below) and covers an area of approximately 730 km^2, rising to its highest point at Pico Ruivo (1861m). Madeira is accompanied by a number of smaller islands, of which the largest is the inhabited Porto Santo (approximately 60 km to the north east of Madeira; highest point Pico do Facho (517m); area approximately 50 km^2). To the south are a number of smaller uninhabited islands: (1) Ilhas Desertas (three dry, rocky islands 17.5 km off the south-east coast of Madeira with a total area of less than 15 km^2; highest point 442m); (2) Salvages (three small dry islands 300 km south of Madeira with a total area of less than 3 km^2; highest point 153m), and a number of associated islets. The age of these oceanic islands has been given various

estimates ranging from 2-70 million years before the present and together with the Azores, Canary Islands, Cape Verde Islands and a small area of the West Coast of Africa make up the geographical region known as Macaronesia. Although these islands were formed by volcanic activity, none of those constituting the Madeiran Archipelago now appears to be active.

Climate and vegetation

Unlike the dry, smaller islands in the archipelago, Madeira itself is a lush, wet island. Approximately 38% of its area lies above 1000m and dense coastal fogs develop over its mountainous terrain. Water droplets condense from these fog clouds on the vegetation, collect in streams and eventually flow down to sea level in natural watercourses (ribeiras) or in a network of man-made irrigation channels (levadas). The climate is mild, the air temperature is fairly constant throughout the year, and frost is virtually unknown.

In its pristine state, and before the arrival of the Portuguese in the fifteenth century, Madeira appears to have had four main vegetation zones on the southern side of the island (Press and Short 1994; Capelo *et al.* 1999):

Zone 1: Sea level to 300m: dry herb and scrub plant associations including species such as dragon trees (*Dracaena draco* (L.) L.), and endemic species such as *Echium nervosum* Dryand and *Euphorbia piscatoria* Aiton.

Zone 2: 300m - 700m: dry evergreen forest (dry laurisilva) plant associations characterised by *Apollonias barbujana* (Cav.) Bornm.

Zone 3: 700m - 1200m: humid evergreen forest (humid laurisilva) plant associations characterised by species such as *Persea indica* (L.) Spreng., *Ocotea foetens* (Aiton) Baill., *Laurus azorica* (Seub.) Franco, and *Clethra arborea* Aiton (Fig. 1).

Zone 4: Above 1200m: upland vegetation characterised by plant associations that include species such as *Erica arborea* L. and *Vaccinium padifolium* Sm.

On the northern side of the island, which is generally wetter, humid laurisilva probably extended a further 200m down towards the coast (Zone 1 only occurring in the first 100m above sea level) and about 100m further up the mountains. Since the Portuguese first arrived on Madeira in the fifteenth century, the area of humid laurisilva has been reduced from 60% to less than 16% of the island area, and is now mainly restricted to the northern side of the island (Fig. 1). The native lowland vegetation (Zone 1) and dry laurisilva (Zone 2) have been almost completely replaced by terraced agriculture, forest plantation of *Acacia* spp. and *Eucalyptus* sp., as well as by urban development. Only the mountain slopes on the northern side of Madeira still retain areas of humid laurisilva (Zone 3). Laurisilva is a relict of the subtropical forest that appears to have covered much of southern Europe and northern Africa in the Tertiary Period. Today, it is restricted to Macaronesia, where the oceanic climate and isolation of the islands have allowed it to survive.

Production of the distribution maps

The distribution maps are based on collected specimens, published data and field observations dating back to the 1800s. Altogether data from over 2,250 specimens, much of which has never been published before, are included in the distribution maps. The first author has checked the majority of this material, while revising and extracting data from syrphid collections held in the Insect Collection of the Laboratório Agrícola da Madeira, Camacha (ICLAM), the collection of the Museu Municipal do Funchal (MMF) and the private collection of Isamberto Silva (IS). Additional label data were recorded from the private collections of António M.F. Aguiar (Madeira, Portugal; AMFA), Ulrich Schmid (Stuttgart, Germany; US), Andrew Wakeham-Dawson (London, England; AWD) and John Smit (Utrecht, the Netherlands; JTS).

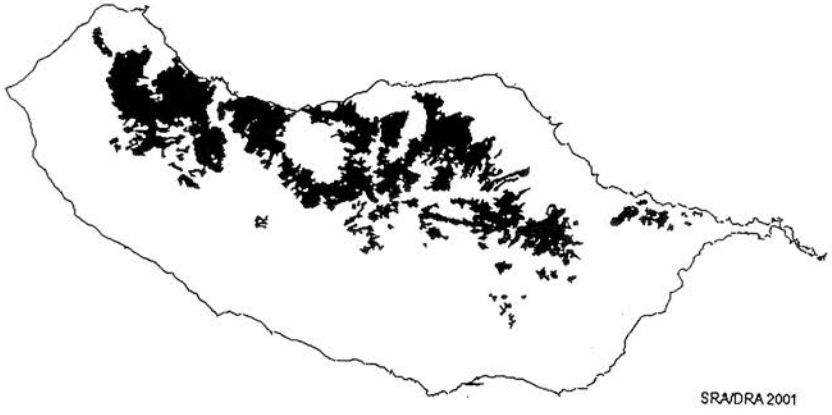


Fig. 1. Distribution of humid laurisilva (shaded areas) on Madeira Island.

The third author extracted data from Madeiran material held in the British Museum (Natural History) (BMNH) (now The Natural History Museum, London). Published data were extracted from Frey (1939, 1949), Gomes and Báez (1990) and Barkemeyer (1999). A.M.F. Aguiar, A. McCullough, B. Roels, J. Smit, J.T. Smit and A. Wakeham-Dawson collected additional new data during various field studies made between 1976 and 2003.

The second author plotted these data on maps based on 1:25000 Madeira Military Maps. The grid on these maps is based on the Universal Transverse Mercator (UTM) projection and the nine sheets that compose Madeira are inside zone 28S (100 km squares BB and CB) of the world grid. This paper provides distribution maps for the species that occur on Madeira Island itself. Each small grid-square represents 1 km^2. However, no map is provided for *Scaeva albomaculata* (Macquart), which has only been found on Madeira's adjacent islands and not on Madeira Island proper. For the endemic and rare species, the sources of information used to construct the distribution maps are provided in the text. In the cases of the other species, where data sources are too numerous to present easily in the text, the information is summarized only in the maps. A map showing the distribution of endemic humid evergreen forest (laurisilva) (Fig. 1) on Madeira Island is also provided for comparison with the distribution maps.

The hoverflies of Madeira

Until now, a total of 26 hoverfly species has been recorded from the Madeiran Archipelago (Barkemeyer 1999; Becker 1921; Gomes and Báez 1990). The current study has revealed that the actual number of species reliably recorded from the Madeiran Archipelago is 25. This includes four endemic species. In the following checklist, species are presented in alphabetical order. For each species, the name of the genus in which it was first described (if it is different from the current placing), reference to the original description and to previous records in the literature for Madeira,

reference to an illustration, a summary of flight period(s), and the worldwide distribution are provided. The first and third authors have checked the page numbers and publication dates of original species descriptions. Publication dates have also been checked against Evenhuis (1997). Records of the species from the Azores and the Canary Islands are based on Báez (1977), Barkemeyer (2002b) and Rojo *et al.* (1997).

1. *Episyrphus balteatus* (De Geer, 1776) (*Musca*)
Mémoires pour servir à l'histoire des insectes, vol. 6, p. 116
Syrphus balteatus (De Geer): Walker (1849), Osten-Sacken (1884), Schiner (1868), Becker (1908)
Epistrophe balteata (De Geer): Frey (1939, 1949)
Episyrphus balteatus (De Geer): Gomes and Báez (1990), Barkemeyer (1999), Carles-Tolra (2002)

Illustrated by Stubbs and Falk 2002 (Plate 3, Fig. 1). This species is common and widely distributed in Madeira Island and Porto Santo Island. It can be found in a wide range of habitats on Madeira, including laurisilva. It has been recorded from Deserta Grande and Selvagem Grande. It has been recorded in all months of the year except December (Fig. 17).

Worldwide distribution: a migrant species whose range includes the Australasian, Oriental and Palaearctic regions. It has also been recorded from the Azores and Canary Islands.

2. *Eristalinus aeneus* (Scopoli, 1763) (*Musca*)
Entomologia carnolica, p. 347
Eristalinus aeneus (Scopoli): Gomes and Báez (1990), Barkemeyer (1999), Carles-Tolra (2002)

Illustrated by Stubbs and Falk 2002 (Plate 11, Fig. 9). This species has been recorded in low numbers from only a few locations near the southeast coast of Madeira Island (4 specimens, Caniço, 20.ii.1982, leg. & coll. U. Schmid; 1 ♂, Machiço-Canical, 11.x.1981, Gomes and Báez (1990)) and in Porto Santo Island (2 ♀, Vila Balerira, 23.viii.1989, Gomes and Báez (1990)). Wollaston collected nine specimens between 1847 and 1855, which are now held at BMNH and a specimen is held in the Funchal Museum (collected on 8.v.1980). The species is restricted to the warmer coastal habitats in the south side of Madeira and throughout Porto Santo. It has been recorded in February, May, August and October, with several adults observed feeding at the flowers of some yellow Asteraceae (Fig. 18).

Worldwide distribution: present in all biogeographical regions, except the Neotropical region. It has also been recorded from the Azores and Canary Islands.

3. *Eristalis tenax* (Linnaeus, 1758) (*Musca*)
Systema Naturae, p. 591
Eristalomyia tenax (Linnaeus): Frey (1939, 1949)
Eristalomyia tenax var. *campestris* Meigen: Frey (1939, 1949)
Eristalomyia tenax var. *hortorum* Meigen: Frey (1939, 1949)
Eristalis tenax (Linnaeus): Becker (1908), Osten-Sacken (1884), Schiner (1868), Gomes and Báez (1990), Barkemeyer (1999), Carles-Tolra (2002)
Eristalis ustus Wollaston, as a synonym of *E. tenax* var. *hortorum* Meigen: Becker (1908) (misidentification)

Illustrated by Stubbs and Falk 2002 (Plate 11, Fig. 1). This species is common and widely distributed in Madeira and Porto Santo Island, and has been recorded from Deserta Grande. On Madeira it can be found in a wide range of habitats including laurisilva. Records have been made in every month except January (Fig. 19).

Worldwide distribution: a cosmopolitan, anthrophile species. It has been recorded from the Azores and Canary Islands.

4. *Eumerus hispidus* sp. n.

Eumerus purpureus Macquart: Becker (1908), Frey (1949), Gomes and Báez (1990), Barkemeyer (1999), Carles-Tolra (2002) (all misidentifications)

The only species of *Eumerus* previously recorded from Madeira is *E. purpureus* Macquart, 1839. However, this species is endemic to the Canary Islands. Comparison of Madeiran specimens with material collected in the Canary Isles reveals that, although very similar, these specimens clearly belong to two different taxa. The occurrence of *E. purpureus* in Madeira is doubtful and all previous records of *E. purpureus* are probably misidentifications of *E. hispidus* **sp. n**. All material collected by the three current authors represents this new species (Plate 2, Fig. 1).

The holotype is deposited, together with one ♂ and two ♀ paratypes, in the Zoological Museum Amsterdam, Netherlands (ZMAN). Further paratypes are deposited in the Insect Collection of the Laboratório Agrícola da Madeira, Camacha (ICLAM), The Natural History Museum, London and the private collections of the authors.

Holotype: ♂ **Madeira**: Ribeira Brava, Boa Morte, 5.v.1998, (leg. JTS, coll. ZMAN).

Paratypes:

Madeira: Canhas, Salões, 500m., 1.vi.1999, 1 ♀ (leg. & coll. AMFA); Funchal, Pico dos Barcelos, 7.vii.1997, 1 ♂, 1 ♀ (leg. & coll. JTS); 9.vii.1997, 1 ♂ (leg. & coll. JTS); 13.vii.1997, 1 ♀ (leg. & coll. JTS); Funchal Pico de Santo António, 1.iii.1998, 2 ♂ (leg. & coll. JTS); 11.vi.1998, 1 ♂ (leg. & coll. JTS); Garajau, 8-15.vi.1998, 1 ♂ (leg. & coll. JTS); João Frino, 19.vii.1997, 2 ♀ (leg. & coll. JTS and ZMAN); Loreto, 5.v.1998, 1 ♀ (leg. & coll. JTS); Machico, Pico do Facho, 270m, 14.iv.2003, 1 ♂ (leg. AMFA, coll. ICLAM); 12.vi.2003, 1 ♀, (leg. AMFA, coll. ICLAM); Madalena do Mar, 15.vii.1997, 1 ♀ (leg. & coll. JTS); Monte, 4.iii.1998, 1 ♂, 1 ♀ (leg. & coll. JTS); Palheiro Ferreiro, 19.vii.1997, 1 ♂, 1 ♀ (leg. & coll. JTS); Ponta Delgada, 12.vii.1997, 1 ♂, 1 ♀ (leg. & coll. JTS); Ponta do Pargo, 5.v.1998, 1 ♂ (leg. J. Smit, coll. JTS); 19.v.1998, 5 ♂ (leg. & coll. JTS, 1 ♂ in ZMAN); Ponta do Sol, Lombo de São João, 10.xi.1994, 1 ♀ (leg. & coll. AMFA); Ponta do Sol, Lugar de Baixo, 10-30m, 30.ix.1991, 1 ♀ (leg. & coll. AMFA); Ribeira Brava, 3.iii.1998, 2 ♂, (leg. & coll. JTS); Ribeira Brava, Boa Morte, 5.v.1998, 3 ♂, 1 ♀ (same date as holotype) (leg. & coll. JTS); Ribeira da Janela, 10-17.iv.2003, 2 ♂ (leg. AWD & AMcC, 1 ♂ coll. AWD, 1 ♂ BMNH); Ribeira dos Socorridos, 24.ii.1998, 1 ♀ (leg. & coll. JTS); 3.iv.1998, 1 ♀ (leg. & coll. JTS); 7.vi.1998, 2 ♂, 2 ♀ (leg. & coll. JTS, 1 ♀ in ZMAN); São Gonçalo, 300m, 8-15.vii.2002, on *Aeonium glutinosum*, 1 ♂, 4 ♀ (leg. & coll. AWD, 2 ♀ BMNH); São Vicente, 10-17.iv.2003, 1 ♂, 2 ♀ (leg. AWD & AMcC, coll. AWD); Tabúa, 10-17.iv.2003, in *Euphorbia* scrub, 2 ♂ (leg. AWD & AMcC, coll. AWD).

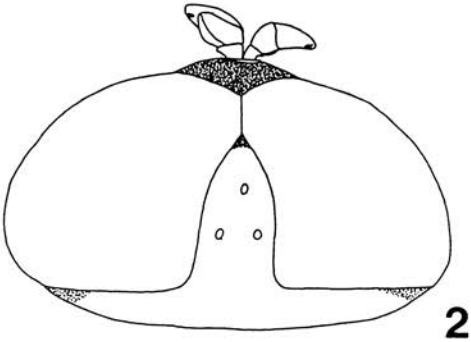
Porto Santo: Calheta, 10m, 8-15.vii.2002, 2 ♀ (leg. & coll. AWD, 1 ♀ BMNH); Vila Baleira, 19.iv.1998, 7 ♂, 2 ♀ (leg. B. Roels & JTS, coll. JTS).

Additional material:
Madeira: Madeira, without further location, 1847-1855, 4 specimens (leg. T.V. Wollaston, coll. BMNH); Caniço, 5.iii.1982, 1 specimen (leg. & coll. US); Encumeada, 1000m, 23.vii.2000, 1 ♂ (leg. C. & S. Leidenroth, coll. US); Funchal, Botanical Gardens, 18.ii.1977, 1 specimen (leg. A.E. Stubbs, coll. BMNH); Funchal, Pico dos Barcelos, 15.ii.1998, 3 specimens (leg. JTS, coll. MMF); Garajau, Caniço, 27.v.1998, 1 ♀ (leg. JTS, not collected); Pico do Facho, 14.iv.2003, 1 specimen (leg. AWD, not collected); Quinta Reid, 10.viii.1929, 1 specimen (leg. J. Balfour-Browne, coll. BMNH); Ribeira Brava, 3.iii.1998, 1 specimen (leg. JTS, not collected); Ribeira da Janela, 15.iv.2003, 1 specimen (leg. AWD, not collected); Ribeira dos Socorridos, 11.ii.1998, 1 specimen (leg. JTS, coll. MMF); 16.ii.1998, 1 ♀ (leg. JTS, not collected); 24.ii.1998, 1 ♀ (leg. JTS, not collected); 7.vi.1998, 1 ♀ (leg. JTS, not collected); São Vicente, 15.iv.2003, 1 specimen (leg. AWD, released); Tabúa, 13.iv.2003, 1 specimen (leg. AWD, released)
Deserta Grande: Deserta Grande, 28.ix.1993, 1 specimen (leg. & coll. IS).
Porto Santo: Ribeira do Zimbral, 14.ii.1963, 2 specimens (leg. E.W. Classey, coll. BMNH).

Description
Male:
Head (Fig. 2)**:** face is small, entirely white dusted and completely white haired. Eyes are contiguous over a distance that is more or less equal to the length of the ocellar triangle. Frons is shining black, lightly golden dusted forward from the base of the ocellar triangle; the extreme point of the frontal triangle is heavily white dusted. Frons has black hairs, which are intermixed and eventually replaced by light brown hairs at the hind margin. Occiput: on top of the head shining, at the sides white dusted. Eyes have scattered white hairs. Antennae are dark, the third segment slightly longer than broad, the upper corner rounded, the lower corner pointed, giving it a somewhat elongated shape (Fig. 3).

Thorax: mesonotum has four white dusted stripes: the two in the middle just reaching the scutellum, the two at the side margins reaching the posterior calli. Hairs black and light (yellowish brown), in the middle predominantly black and present in two lengths, the light hairs are more abundant at the sides. Just before the scutellum and on the scutellum itself, there are short light hairs and longer black hairs. The mesonotum and scutellum are punctuated but shining bronze, in some lights a little purplish shining, more obvious in females and living specimens. The pleura are slightly dusted. The wings are microtrichose, although the base of both basal cells and the alula are bare of microtrichia. The pterostigma is brown, slightly lighter in colour than the veins. Legs are predominantly black. Tibia 1 and 2 orange at the basal third, tibia 3 with the basal quarter orange. The extreme apex of the femora is orange. The first segment of tarsomere 2 is orange; the other segments are dark. The hairs on the legs are predominantly white, turning orange golden on the tarsus. The anterior and dorsal sides of femora 1 and 2 have very short, black hairs. The apical quarter of femur 3 has black hairs of normal length anteriorly and dorsally. Tibia 3 has black hairs intermixed with the white ones at the basal part. Femur 3 is strongly swollen, ventrally with two rows of small spines at the top. Tibia 3 is thickened at the posterior two thirds.

Figs 2-6. *Eumerus* species heads. 2, *E. hispidus*, male head; 3, *E. hispidus*, antenna; 4, *E. purpureus*, antenna; 5, *E. hispidus*, female head; 6, *E. purpureus*, female head.



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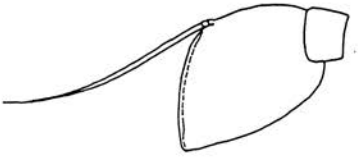

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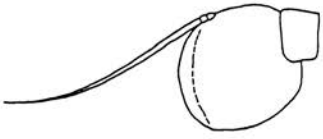

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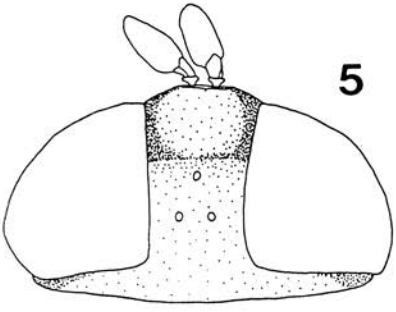

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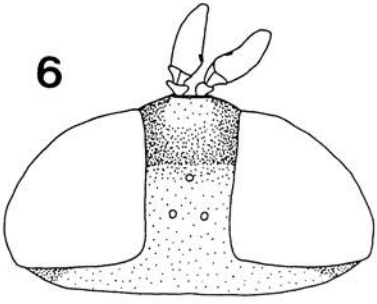

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Abdomen: entirely black with three pairs of white dusted spots on the tergites. The spots on the second and third tergites are situated in a small depression. The tergites are punctuated, shining black with a bluish tinge in the middle, laterally more shiny bronze. Tergite 1 is dusted in the lateral corners. The abdomen is slightly tapering towards the tip. Tergite 3 is clearly less broad than tergite 2. Tergites 2 to 4 have short, adpressed black hairs in the middle, laterally the hairs are longer, lighter and more erect, these light hairs continue over the dust spots. Tergite 2 has the anterior corners covered with the same light hairs. The black hairs on the fourth tergite are longer in the posterior third and on the pregenital segment. Sternites 2 and 3 are small, slightly dusted and entirely white haired. The shape of the fourth sternite is very characteristic, especially the position of the short black bristles (Fig. 7), in contrast to *Eumerus purpureus* (Fig. 10).

Genitalia (Figs 8-9)**:** extremely similar to those of *E. purpureus* (Figs 11-12). The apical extension of the anterior surstyle lobe is forked in *E. hispidus* sp. n., whereas it is simple in *E. purpureus*, viewed from ventral side. Furthermore the dorsal corner of the anterior surstyle lobe, above the membranous part of the surstyle of is more pointed in *E. hispidus* and more rounded in *E. purpureus*.

Length: Body: 9 mm. Wing: 6.5 mm.

Variability observed in the paratype series

The white dust stripes on the thorax may not reach the scutellum and or the posterior calli. Tibia 3 can be nearly entirely black or orange up to the basal quarter. The first segments of all tarsomeres can be orange. The second tarsomere may have the first until the third segment orange.

Length: Body: 6.5 – 10 mm. Wing: 5.5 – 7.5 mm.

Female:

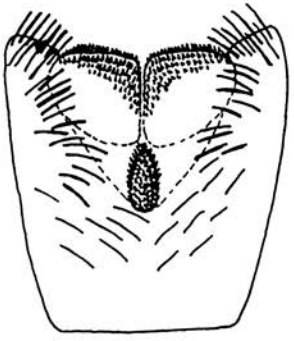
Similar to the male except for the following differences: **Head** (Fig. 5)**:** frons is entirely dusted from the occiput to the base of the antenna, more or less golden, becoming intermixed with white dust from the antennae to just before the frontal ocellus, the white dusting becoming predominant towards the eye margins. The frons is black and light haired, until just under the base of the antennae; the lighter hairs are more or less confined to the middle of the frons between the antennae and the frontal ocellus. The legs may be lighter than in the males, especially tarsomere 2, which is sometimes entirely orange. Sternites 2 and 3 are entirely white haired, whereas sternite 4 can have a few white hairs at the front, but is usually otherwise entirely black haired like sternite 5.

Length: Body: 8.0 – 11.5 mm. Wing: 6.0 – 8.0 mm.

Diagnosis:

Eumerus hispidus is readily recognized within the Macaronesian group of *Eumerus* species by the following combination of characters. The eyes in males are contiguous over a length more or less equal to the length of the ocellar triangle and scattered with white hairs. The third antennal segment is pointed (Fig. 3), the abdomen is entirely dark, with three pairs of dusted white spots and the posterior femur is strongly swollen with two rows of small spines at the top.

Figs 7-12. *Eumerus* species males. *E. hispidus*: 7, sternite 4; 8, right surstylus in lateral view; 9, apical extension of anterior surstyle lobe, ventral view. *E. purpureus*: 10, sternite 4; 11, right surstylus in lateral view; 12, apical extension of anterior surstyle lobe, ventral view.



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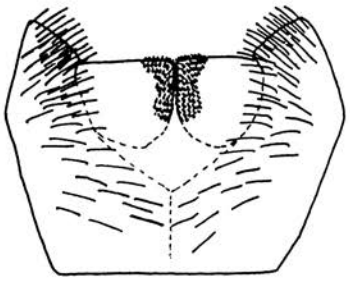

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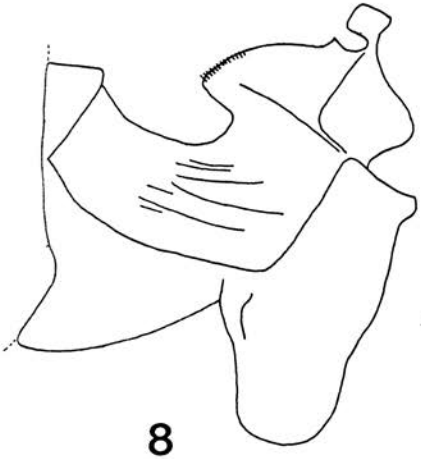

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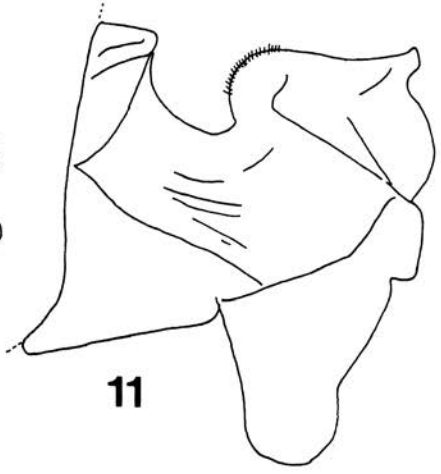

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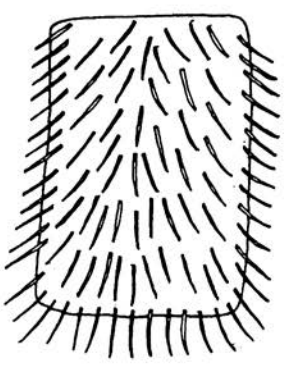

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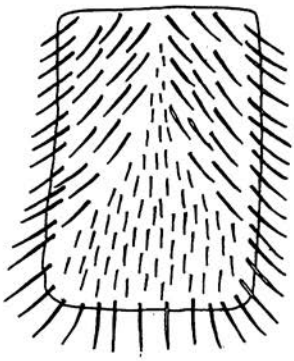

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Figs 13-14. *Eumerus* species, female sternite 3. 13, *E. hispidus*; 14, *E. purpureus*.

Males of *Eumerus hispidus* can be separated easily from *E. purpureus* by the characteristic shape and position of the small black bristles on the fourth sternite and by the apical extension of the anterior surstyle lobe, which is forked in *E. hispidus* sp. n. (Figs 7 and 9). *E. purpureus* always has a few black hairs next to the base of the antenna, but these are absent in *E. hispidus*. In *E. hispidus*, the third antennal segment is slightly longer than broad and somewhat elongated, making it appear less square than in *E. purpureus* (Fig. 4). The frons is partly shining in *E. hispidus*, whereas the entire frons is slightly golden pilose up to the occiput in *E. purpureus*.

Females of *Eumerus hispidus* can be separated from females of *E. purpureus* by the complete lack of black hairs on sternite 3 (Fig. 13). In *E. purpureus* there is a triangle of short black hairs among the white ones on sternite 3, which is more of less continuous to the black hairs on sternite 4 (Fig. 14). The third antennal segment is slightly longer than broad in *E. hispidus*, making it appear more elongated and less square than in *E. purpureus* (Fig. 4). The white dusting on the frons before the ocelli is less extensive in *E. purpureus* (Fig. 5) than in *E. purpureus* (Fig. 6).

Etymology:
Hispidus is Latin for rough, hairy, bristly and prickly and in the current species description refers to the small black bristles on the fourth sternite of the male (Fig. 7). This is the main diagnostic character separating the males of *Eumerus hispidus* sp. n. from the similar species *E. purpureus* Macquart.

Ecology
Adult *Eumerus hispidus* can be found in vegetation Zones 1 and 2 (up to about 1000m ; see above in 'climate and vegetation section'), especially in thinly vegetated Madeiran xerophytic spurge communities near the coast. This species cannot be found in laurisilva. The adults fly low above the ground and are frequently found sitting on bare ground, stones and rocks, occasionally on leaves and

branches, at field margins and forest edges. Often they are found in quite large numbers on and around *Euphorbia piscatoria*-bushes. They also feed at the flowers of *Aeonium glutinosum*. The immature stages of this species have not been described. Records have been made in all months except January and December (Fig. 20).

Worldwide distribution: an endemic species of the Madeiran Archipelago, found in Madeira, Porto Santo and Deserta Grande.

5. *Eupeodes corollae* (Fabricius, 1794) (*Syrphus*)
Entomologia systematica, vol. 4, p. 306
Eupeodes corollae (Fabricius): Barkemeyer (1999), Carles-Tolra (2002)
Metasyrphus corollae (Fabricius): Gomes and Báez (1990)
Syrphus corollae Fabricius: Becker (1908), Schiner (1868), Osten-Sacken (1884), Frey (1939, 1949)

Illustrated by Stubbs and Falk 2002 (Plate 2, Fig. 12). This species is relatively scarce on Madeira Island, with a concentration of records around Funchal and Ribeiro Frio. It has also been recorded from Porto Santo Island and Deserta Grande. This species can be found in the more open habitats, it has not yet been recorded in laurisilva. Oromí (1983) recorded this species from the Selvagens Archipelago. Records have been made in all months except January, September, November and December (Fig. 21).

Worldwide distribution: Afrotropical, Oriental and Palaearctic. It has also been recorded from the Azores and the Canary Islands.

6. *Eupeodes luniger* (Meigen, 1822) (*Syrphus*)
Systematische Beschreibung, vol. 3, p. 300
Eupeodes luniger (Meigen): Barkemeyer (1999), Carles-Tolra (2002)
Metasyrphus luniger (Meigen): Gomes and Báez (1990)
Syrphus luniger Meigen: Frey (1939, 1949)

Illustrated by Stubbs and Falk 2002 (Plate 2, Fig. 14). In the Madeiran Archipelago, this species appears to be relatively scarce; most records come from the centre and southern side of Madeira Island and it has also been recorded from Porto Santo and Deserta Grande. It can be found in the more open habitats up to the secondary forests, there are only a few records from laurisilva. It has been recorded in all months except January, November and December (Fig. 22).

Worldwide distribution: Palaearctic. It has also been recorded from the Canary Islands.

7. *Eupeodes nuba* (Wiedemann, 1830) (*Syrphus*)
Aussereuropäische zweiflügelige Insecten, vol. 2, p. 136.

This is the first record of this species from the Madeiran Archipelago, where it has been recorded in only one location: an area of waste ground near Ribeira Brava (3 ♂, 2 ♀, 1-21.v.1998, leg. & coll. JTS; 2 ♂, 1 ♀, 11.iii.2001, leg. & coll. AWD) on the south coast of Madeira Island. According to Speight (2003), this species is mainly found on open or sparsely vegetated ground beside dry, seasonal rivers. The records from Madeira are from an area of waste ground next to a small stream.

This site has since been disturbed by a road-building project. The species is illustrated in Plate 1, Fig. 1. Records were made in March and May (Fig. 23)

Worldwide distribution: the Mediterranean part of the Palaearctic region, including north Africa, south-western part of Asia and the eastern part of the Afrotropical region. This species has also been recorded from the Canary Islands.

8. *Ischiodon aegyptius* (Wiedemann, 1830) (*Syrphus*)
Aussereuropäische zweiflügelige Insecten, vol. 2, p. 133
Ischiodon aegyptium (Wiedemann): Frey (1949)
Ischiodon aegyptius (Wiedemann): Gomes and Báez (1990), Barkemeyer (1999), Carles-Tolra (2002)
Ischiodon scutellaris (Fabricius): Frey (1939) (misidentification)
Syrphus aegyptius (Wiedemann): Loew (1860), Osten-Sacken (1884)
Syrphus brachypterus Thomson: Thomson (1869), Osten-Sacken (1884) (synonym)
Syrphus brachypterus Thomson as synonym of *Ischiodon aegyptium* (Wiedemann): Frey (1949)
Syrphus scutellaris (Fabricius) [*Milithreptus*]: Becker (1908) (misidentification and misspelling of *Melithreptus* (= synonym of *Sphaerophoria*))

Illustrated in Plate 1, Fig. 2. On Madeira Island this species is mainly restricted to coastal regions, especially on the southern side of the island. It has also been recorded from Porto Santo Island and Deserta Grande. It has been recorded in all months except January and November (Fig. 24).

Worldwide distribution: Africa, including the Mediterranean part and the Arabian peninsula, recorded as far north as the Balearic Islands and southern Spain, and eastwards to Iran (coll. JTS). It has also been recorded from the Canary Islands.

9. *Melanostoma mellinum* (Linnaeus, 1758) (*Musca*)
Systema Naturae, Ed. 10. p. 594
Melanostoma mellinum (Linnaeus): Becker (1908), Frey (1949), Gomes and Báez (1990), Barkemeyer (1999), Carles-Tolra (2002)

Illustrated by Stubbs and Falk 2002 (Plate 1, Fig. 3). This species is widespread in Madeira Island and also present on Porto Santo. It can be found in all habitats on Madeira, including laurisilva, though *M. wollastoni* is more abundant in the forested habitats. This species has been recorded in all months, except December (Fig. 26).

Worldwide distribution: Holarctic. It has also been recorded from the Azores and the Canary Islands.

10. *Melanostoma wollastoni* Wakeham-Dawson, Aguiar, Smit, McCullough and Wyatt, 2004
Dipterists Digest (Second Series), Vol. 10, p. 90
Melanostoma babyssa (Walker) [*Syrphus*]: Becker (1908) (misidentification)
Melanostoma babyssa (Walker): Frey (1939, 1949), Gomes and Báez (1990), Barkemeyer (1999) (misidentification)

Historically, this species has been mistakenly referred to as *Melanostoma babyssa* (Walker, 1849) (see Wakeham-Dawson *et al.* 2004, for details). It is generally restricted to forested areas in the centre of the island, mainly the endemic laurisilva and *Erica* forests and, to a lesser degree,

Acacia/Eucalyptus plantations. Recorded from March to October (Fig. 25). See Wakeham-Dawson *et al.* (2004) for detailed distribution data. Illustrated in Plate 1, Fig. 5

Worldwide distribution: Endemic to Madeira Island.

11. *Meliscaeva auricollis* (Meigen, 1822) (*Syrphus*)
Systematische Beschreibung, vol. 3, p. 318
Syrphus maculicornis (Zetterstedt): Becker (1908) (synonym)
Syrphus docorus (Meigen): Becker (1908) (synonym and misspelling of *decorus* Meigen)
Epistrophe auricollis (Meigen) (= *maculicornis* Zetterstedt): Frey (1939)
Epistrophe auricollis (Meigen): Frey (1949)
Meliscaeva auricollis (Meigen): Gomes and Báez (1990), Barkemeyer (1999), Carles-Tolra (2002)

Illustrated by Stubbs and Falk 2002 (Plate 3, Fig. 2). On Madeira Island, this species is generally restricted to forested areas, including all types of forest, secondary as well as laurisilva. Recorded in all months except January, June, November and December (Fig. 27).

Worldwide distribution: Western Palaearctic. It has also been recorded from the Azores and the Canary Islands.

12. *Milesia crabroniformis* (Fabricius, 1775) (*Syrphus*)
Systema Entomologiae, p. 768
Milesia crabroniformis (Fabricius): Walker (1849), Osten-Sacken (1884), Becker (1908), Frey (1939, 1949), Gomes and Báez (1990), Carles-Tolra (2002)

This species (illustrated in Plate 1, Fig. 3) appears to be rare on Madeira, where it has been recorded infrequently in humid laurisilva and coastal areas during May and in July-October (Fig. 28); 1 specimen, Camacha, 20.ix.1951, leg. M. Câmara, coll. MMF; 1 specimen, Caniçal, 8.viii.1963, leg. Weinreich, coll. MMF; 1 specimen, Funchal, 22.vii.1990, leg. T. Maul, coll. MMF; 1 specimen, captured in MMF laboratory, Funchal, 3.x.1985; 1 specimen, Funchal, 31.x.1951, leg. M. England, coll. MMF; 1 ♀, Lombada dos Marinheiros, 650m, 15.viii.1993, leg. & coll. S. Roberts; 1 ♂, Madalena do Mar, 15.vii.1997, leg. &. coll. JTS; 1 specimen, Pico das Pedras, 22.viii.1976, coll. ICLAM; 1 specimen, Ribeira da Janela, 14.x.1989, leg. F. Zino, coll. MMF; 1 specimen, Santo da Serra, ix.1962, coll. MMF; 1 ♀, Socorridos Valley, 28.v.1998, leg. & coll. JTS; 1 specimen, Vale Formoso, 15.viii.1987, leg. Ameias, coll. MMF; 1 ♀, Corujeira, Funchal, 600m, 9.x.2001, leg. & coll. AWD; 3 specimens, Madeira, 1847-1855, leg. T.V. Wollaston, coll. BMNH; 1 ♀, Terreiro da Luta, Funchal, 4.x.1981, Gomes and Báez (1990); 1 ♂, Funchal, 24.viii, Frey (1939); 1 ♀, Pico das Pedras, (Parque Florestal), 900m, 22.viii.1976, leg. & coll. AMFA (no. 4); 1 ♀, Folhadal, 23.viii.2001, leg. AMFA, coll. ICLAM (no. 0829); 1 specimen observed, Levada Nova, 700m, 11.ix.2001, AMFA.

According to Rotheray (1993), *Milesia* larvae live in decaying heartwood and rot-holes in deciduous trees. Speight (2003) stated that the adults tend to fly high among trees, descending only to feed, drink or oviposit. As a result, it is possible that this species is less rare than indicated by the relatively small number of specimens present in collections.

Worldwide distribution: Western Palaearctic, where it is mainly restricted to the Mediterranean region.

13. *Myathropa usta* (Wollaston, 1858) (*Eristalis*)
Annals and Magazine of Natural History, series 3, vol. 1, p. 115)
Eristalis ustus Wollaston: Wollaston (1858), Osten-Sacken (1884)
Myiatropa mallotiformis Frey: Frey (1939, 1949) (synonym and misspelling of *Myathropa*)
Myathropa mallotiformis Frey: Gomes and Báez (1990) (synonym)
Myathropa mallotiformis Frey as synonym of *M. usta*: Barkemeyer (1999), Carles-Tolra (2002)
Myathropa usta (Wollaston): Barkemeyer (1999), Carles-Tolra (2002)

This species (illustrated in Plate 1, Fig. 4) is restricted to the areas of humid laurisilva and *Erica* forests in the centre of the island where it has been recorded in March, May and July-September (Fig. 29). It is sometimes abundant, feeding at flowers including several *Ranunculus* species, *Tolpis macrorhiza*, *T. succulenta*, and *Pericallis aurita*. Specimens are variable in colour, with some examples much darker than others.

Type material examined: Holotype ♀, Madeira, 1847-1855, leg. T.V. Wollaston, coll. BMNH.
Other material: 1 ♂, Chão da Ribeira, 23.v.1998, leg. & coll. JTS; 1 ♂, 1 ♀, Encumeada–Paul da Serra, 1300m, 25.vii.1997, leg. & coll. IS; 1 ♂, Fajã da Nogueira, 480m, 14.ix.1996, leg. & coll. IS; 1 ♀, Fajã da Nogueira, 10.iii.1998, leg. & coll. JTS; 3 ♀, Perto do Fanal, 1100m, 19.vii.1992, leg. & coll. IS; 1 ♀, Perto do Lomho, 640m, 18.vi.1992, leg. & coll. IS; 1 ♂, Portela, 31.vii.1998, leg. AWD, coll. JTS; 7 ♂, 2 ♀, Rabaçal, 20.vii.1997, leg. & coll. JTS; 1 ♀, Ribeiro do Alecrim, 1430m, 4.v.1997, leg. & coll. IS; 4 ♂, 1 ♀ captured, many others seen on flowers, Rabaçal, 8-15.vii.2002, leg. & coll. AWD; 10 ♂, 2 ♀, Rabaçal, 17.vii.1935, Frey (1939); 1 ♂, 1 ♀, Rabaçal, 8-15.vii.2002, leg. AWD, coll. AMFA (no. 1275); 1 specimen, Rabaçal, 6.v.1938, Frey (1949)).

Worldwide distribution: endemic to Madeira Island.

14. *Neoascia podagrica* (Fabricius, 1775) (*Syrphus*)
Systema Entomologiae, p. 768
Ascia podagrica (Fabricius): Becker (1908)
Neoascia podagrica (Fabricius): Frey (1949), Gomes and Báez (1990), Barkemeyer (1999), Carles-Tolra (2002)

Illustrated by Stubbs and Falk 2002 (Plate 7, Fig. 14). This small species is present on Madeira Island. It can be found in a wide range of habitats, except for the very dry and open habitats. It has not been recorded from Porto Santo or the Desertas. It has been recorded in all months except January, November and December (Fig. 30).

Worldwide distribution: Palaearctic.

15. *Paragus coadunatus* Rondani, 1847
Nuovi Annali delle scienze naturali [Bologna], series 2, vol. 8, p. 346.
Paragus coadunatus Rondani: Gomes and Báez (1990), Barkemeyer (1999), Carles-Tolra (2002)
Paragus mundus Wollaston: Wollaston, 1858, Osten-Sacken (1884) (synonym.)
Paragus mundus Wollaston as synonym of *P. tibialis* (Fallén): Becker (1908), Frey (1949) (misidentification)
Paragus tibialis (Fallén): Osten-Sacken (1884), Becker (1908), Frey (1939, 1949) (misidentification)
Paragus tibialis var. *coadunatus* Rondani: Schiner (1868)

Paragus tibialis var. *meridionalis* Becker: Frey (1939, 1949) (misidentification.)

The number of names mentioned above reflects the difficulties associated with identifying species of this genus. Báez (1978) clarified this problem for the Canary Islands, where both *P. coadunatus* and *P. tibialis* (Fallén) are present. Later Gomes and Báez (1990) checked material from Madeira, which revealed that only *P. coadunatus* is present. Gomes and Báez (1990) listed all names that have previously been applied to the *Paragus* species from Madeira, also mentioning that Becker (1908) placed *P. mundus* Wollaston as a junior synonym of *P. tibialis*. However, as Wollaston's *P. mundus* specimens (nine syntypes are held in BMNH) originated from Madeira and Porto Santo, *Paragus mundus* Wollaston, 1858 is a junior subjective synonym of *P. coadunatus* Rondani, 1847, **new synonymy**, rather than a junior synonym of *P. tibialis* (Fallén).

Illustrated in Plate 1, Fig. 6. In some specimens the abdomen is black, while in others it is red or partially red. In the Madeiran Archipelago, this is largely a coastal species inhabiting the southern side of Madeira Island, avoiding the forested habitats. It is also present on Porto Santo. The species has been recorded in all months except January and December (Fig. 31).

Worldwide distribution: Western Mediterranean. It is also recorded from the Canary Islands.

16. *Scaeva albomaculata* (Macquart, 1842) (*Syrphus*)
Diptères exotiques nouveaux ou peu connus, vol. 2, pt. 2, p. 86; tab. 15, fig. 6
Lasiophthicus albomaculatus (Meigen): Becker (1908) (misspelling of *Lasiopthicus* and wrong author)
Scaeva albomaculata (Macquart): Gomes and Báez (1990), Carles-Tolra (2002)
Syrphus gemellarii (Rondani): Schiner (1868), Osten-Sacken (1884) (synonym)

Illustrated by Stubbs and Falk 2002 (Plate 3, Fig. 13). This migrant species has only been recorded within the Madeiran Archipelago from Porto Santo (1 specimen, 21-28.ii.1963, leg. E.W. Classey, coll. BMNH) and Deserta Grande (2 ♀, 10.v.1992, leg. & coll. IS) and not from Madeira itself. It is unlikely that this species will be found in the humid laurisilva biome.

Worldwide distribution: Eurasian, mainly restricted to the Mediterranean in the European region, but highly migratory. It has also been recorded from the Canary Islands.

17. *Scaeva pyrastri* (Linnaeus, 1758) (*Musca*)
Systema Naturae, p. 594
Catabomba [*Lasiophthicus* Rondani] *pyrastri* (Linnaeus): Becker (1908) (misspelling of *Lasiopthicus*)
Lasiopticus pyrastri (Linnaeus): Frey (1939) (misspelling of *Lasiopthicus*)
Scaeva pyrastri (Linnaeus): Gomes and Báez (1990), Barkemeyer (1999), Carles-Tolra (2002)
Syrphus pyrastri (Linnaeus): Schiner (1868), Osten-Sacken (1884)

Illustrated by Stubbs and Falk 2002 (Plate 3, Fig. 11). This species is widespread but infrequent on Madeira Island (where it occurs mainly on the southern side), Porto Santo Island and Deserta Grande. There are only a few records of this species from the laurisilva. It has been recorded in all months except January, November and December (Fig. 32).

Worldwide distribution: Holarctic.

18. *Scaeva selenitica* (Meigen, 1822) (*Syrphus*)
Systematische Beschreibung, vol. 3, p. 304, Tab. 30, fig. 21
Lasiophthicus seleniticus (Meigen): Becker (1908) (misspelling of *Lasiopthicus*)
Scaeva cf. *selenitica* (Meigen): Gomes and Báez (1990)
Scaeva selenitica (Meigen): Barkemeyer (1999), Carles-Tolra (2002),
Syrphus seleniticus (Meigen): Schiner (1868), Osten-Sacken (1884)

Illustrated by Stubbs and Falk 2002 (Plate 3, Fig. 12). This species is relatively rare on Madeira and has not been recorded on any of the adjacent islands. It has been recorded in February, April, May, July and October (Fig. 33); 1 specimen, Madeira, coll. ICLAM; 1 ♀, Canhas, 10.iv.1998,; 1 ♀, Montado do Barreiro, 20.v.1998; 1 ♂, P. dos Barcelos, 22.ii.1998; 1 ♂, 6 ♀, Ponta de São Lourenço, 27.ii.1998, coll. MMF; 1 ♀, Rabaçal, 20.vii.1997; 1 specimen, São Martinho, 2.v.1997, coll. ICLAM; 1 ♀, Socorridos Valley, 11.ii.1998; all leg. & coll. JTS, unless otherwise stated; 1 ♀, Fajã da Nogueira, 600-800m, 19.iv.1993, leg. & coll. AMFA (no. 785); 1 ♀, Jardim da Serra, 1030m, 22.x.1998, leg. & coll. AMFA (no. 1278)).

Worldwide distribution: Palaearctic and Oriental. It has also been recorded from the Canary Islands.

19. *Sphaerophoria rueppellii* (Wiedemann, 1830) (*Syrphus*)
Aussereuropäische zweiflügelige Insecten, vol. 2, p. 141.
Sphaerophoria rueppellii (Wiedemann): Barkemeyer (1999)

Illustrated by Stubbs and Falk 2002 (Plate 4, Fig. 20). This is a rare species on Madeira (Fig. 34), where it is only known from one coastal site near Machico (the mouth of the Ribeira de Machico, where it has been recorded in February, April, May and July; 1 ♀, coll. MMF, 27.ii.1998 (location unknown); 7 ♂ (2 in coll. Pierre Goeldlin de Tiefenau), 1 ♀, 19.vii.1997; 2 ♀, coll. MMF, 5.v.1998; all leg. JTS, all coll. JTS, unless otherwise stated). On Porto Santo, it appears to be more abundant (Barkemeyer 1999). The first author of the current paper collected 14 ♂ and 2 ♀, 18-20.iv.1998 near Vila Baleira, Porto Santo Island (all coll. JTS). In continental Europe, this species is mainly found in places with disturbed vegetation. Speight (2003) mentioned wetland and open ground as preferred environment, especially exposed vegetated sand and the gravel banks of major rivers. In southern Europe, the preferred habitat is irrigation ditches and dry riverbeds that are seasonally flooded. In the Madeiran Archipelago, Porto Santo's dry, sandy conditions and intermittent seasonal streams appear to suit this species better than the continuously wetter conditions of Madeira Island.

Worldwide distribution: Palaearctic, Oriental and the eastern part of the Afrotropical region. It has also been recorded from the Azores and the Canary Islands.

20. *Sphaerophoria scripta* (Linnaeus, 1758) (*Musca*)
Systema Naturae, p. 594
Melithreptus scriptus (Linnaeus) = *strigatus* Staeger: Becker (1908)
Melithreptus strigatus (Staeger): Schiner (1868) (synonym)
Sphaerophoria scripta (Linnaeus): Frey (1939, 1949), Gomes and Báez (1990), Barkemeyer (1999), Carles-Tolra (2002)
Sphaerophoria strigata (Staeger) (*Melithreptus*): Osten-Sacken (1884) (synonym)

Illustrated by Stubbs and Falk 2002 (Plate 4, Fig. 16). This species is widespread on the islands of Madeira and Porto Santo. It can be found in a wide range of habitats including laurisilva, though it is more common in the coastal areas. It has been recorded in all months except January, November and December (Fig. 35).

Worldwide distribution: Holarctic and Oriental. It has also been recorded from the Azores and Canary Islands.

21. *Syritta pipiens* (Linnaeus, 1758) (*Musca*)
Systema Naturae, p. 594
Syritta pipiens (Linnaeus): Schiner (1868), Osten-Sacken (1884), Becker (1908), Frey (1949), Gomes and Báez (1990), Barkemeyer (1999), Carles-Tolra (2002)

Illustrated by Stubbs and Falk 2002 (Plate 10, Fig. 8). This species is widespread and especially common in coastal areas on Madeira and Porto Santo Islands, but has also been found in the laurisilva. It has been recorded in all months except January (Fig. 36).

Worldwide distribution: Holarctic and Oriental. It has also been recorded from the Azores and Canary Islands.

22. *Syrphus torvus* Osten-Sacken, 1875
Proceedings of the Boston Society of Natural History, vol. 18, p. 139
Syrphus ribesii (Linnaeus): Gomes and Báez (1990) (misidentification)
Syrphus cf. *torvus* Osten-Sacken: Gomes and Báez (1990)
Syrphus torvus Osten-Sacken: Barkemeyer (1999), Carles-Tolra (2002),

This species (illustrated by Torp 1994: Plate 2, Fig. 49) is rare on Madeira and generally found in forested areas, including laurisilva in March-May, July-August, October and December (Fig. 37): 1 ♀, Chão da Ribeira, 450m, 19.v.1998; 2 ♂, Loreto, 5.v.1998; 1 ♂, Pico do Arieiro, 1800m, 16.viii.1989, leg. & coll. M. Báez; 3 specimens, Pico das Torres, 1500m, 6.xii.1992 (leg. & coll. IS); 2 ♂, 6 ♀, Rabaçal, 1150m, 20.vii.1997, leg. & coll. JTS (2 ♂, 2 ♀ in coll. Goeldlin de Tiefenau); 1 ♂, Ribeira Brava, 3.iii.1998; 1 ♂, São Jorge, 4.v.1998; 1 ♀, Socorridos Valley, 3.iv.1998; all leg. & coll. JTS, unless otherwise stated; 2 specimens, 55.7 on the data label, Madeira, 1847-1855, leg. T.V. Wollaston, coll. BMNH; 1 ♀, Rabaçal, 8-15.vii.2002, leg. & coll. AWD; 1 ♂ on *Quercus robur* with aphids, Ponta do Sol-Paul da Serra-Fanal, 10.x.1981, Gomes and Báez (1990); 1 ♀, Santa Cruz-Poiso, 9.x.1981, Gomes and Báez (1990).

Gomes and Báez (1990) recorded *Syrphus ribesii* (Linnaeus, 1758) from Madeira (1 ♂, Pico do Arieiro, 16.viii.1989, leg. & coll. M. Báez). However, re-examination by the current paper's first author of the specimen on loan from Marcos Báez revealed that it is also a specimen of *S. torvus*. The specimens from Madeira tend to be much bigger and darker, especially in the wings, than the continental specimens of *S. torvus*. This is perhaps why Gomes and Báez (1990) recorded this species as comparable to, but not exactly the same as, *S. torvus* (i.e *S.* cf. *torvus*). Careful examination of the Madeiran specimens reveals no morphological differences with the continental ones, either externally or in the genitalia. Four specimens were sent to Dr. Goeldlin de Tiefenau for examination and he confirmed that, although they are darker in colour, no morphological differences could be found between Madeiran specimens and a series of continental specimens.

Worldwide distribution: Holarctic and Oriental.

23. *Syrphus vitripennis* Meigen, 1822
Systematische Beschreibung, p. 308
Syrphus vitripennis Meigen: Gomes and Báez (1990), Barkemeyer (1999), Carles-Tolra (2002),

Illustrated by Stubbs and Falk 2002 (Plate 2, Fig. 1). This species is widespread in Madeira Island, but especially common around Funchal and Ribeiro Frio. It is found in a wide range of habitats, including laurisilva. It has been recorded in all months except January and December (Fig. 38).

Worldwide distribution: Holarctic.

24. *Xanthandrus babyssa* (Walker, 1849) (*Syrphus*)
List of the specimens of the dipterous insects in the collection of the British Museum, pt. 3, p. 584
Syrphus babyssa Walker: Walker (1849), Osten-Sacken (1884)
Xanthandrus babyssa (Walker): Carles-Tolra (2002), Wakeham-Dawson *et al.* (2004)
Xanthandrus parhyalinatus (Bigot): Bigot (1884), Becker (1908), Frey (1939, 1949), Gomes and Báez (1990), Barkemeyer (1999), Carles-Tolra (2002) (synonym)

This species has previously been recorded as *Xanthandrus parhyalinatus* (Bigot, 1884), which is a junior synonym of *X. babyssa* (Walker, 1849) (see Wakeham-Dawson *et al.* 2004). Illustrated in black and white by Barkemeyer (1999, Fig. 1, p. 126) and here in colour: Plate 2, Figs 2 and 3. It is widespread in areas of endemic laurisilva, and to a much lesser extent in other forested areas (Fig. 39). It has been recorded in all months except January and June.

Type material examined: Holotype ♀, Madeira (Walker 1849)
Other material: 1 ♂, 3 ♀, Barreira, 900m, 19.ii.1998; 4 ♀, Chão da Ribeira, 19.v.1998; 1 ♀, Chão da Ribeira, 20.iii.1998; 1 ♀, Encumeada, 12.vii.1997; 1 specimen, Encumeada, 12.ix.1996, coll. ICLAM; 2 ♀, Fajã da Nogueira, 10.iii.1998; 1 ♀, Fontes, 16.vii.1997; 1 ♀, Jardim Botânico, Funchal, 11.iv.1998; 4 specimens, Pico dos Barcelos, 355m, 7.ii.1998; 1 ♀, Lombada dos Marinheiros, 15.vii.1997; 3 ♀, Pico dos Barcelos, 21.ii.1998; 1 ♀, Poço da Neve, 11.vii.1997; 2 ♀, Ponta de São Lourenço, <100m, 27.ii.1998; 1 ♀, Portela, 31.vii.1998, leg. AWD, coll. JTS; 1 specimen, Terreiro-Portela (after Pico do Suna), 11.xii.1988, leg. & coll. AMFA; 1 ♂, R. Brava, Boa Morte, 5.v.1998; 1 ♀, R. Sta Luzia, Corujeira, 24.v.1998; 7 ♂, 11 ♀, Rabaçal, 20.vii.1997; 1 ♀, Rabaçal, 3.iii.1998; 1 ♀, Ribeira Brava, 3.iii.1998; 1 ♂, Ribeiro Frio, 500m, 21.vii.2000, leg. C. &. S. Lei, coll. US; 6 ♂, Ribeiro Frio, 17.vii.1997; 1 specimen, Santana, Queimadas, 22.viii.1976, coll. ICLAM; 1 ♀, Serra da Eira da Laje, 5.iv.1998; 7 ♂, 5 ♀ (2 of these in coll. MMF), Socorridos Valley, 11.ii-24.iv.1998; all specimens leg. & coll. JTS unless otherwise stated; 2 ♂, Encumeada, 800m, 10.iii.2001; 1 ♂, Chão da Ribeira, 2.iii.2000, 1 ♀, Montado do Sabugal, 10.xii.2000, leg. AMFA, coll. AWD; 1 ♀, Encumeada, 800m, 12.x.2001; 7 ♂, Encumeada, 800m, 8.x.2001, all leg. & coll. AWD, unless otherwise stated; 8 specimens, Madeira, leg. T.V. Wollaston, coll. BMNH; 3 specimens, Ribeiro Frio, 3.viii.1962 (2 specimens det. R.L. Coe, puparium case, ex *Myrica faya* fruit material), xi.1960 (1 specimen), leg. N.L.H. Krauss, coll. BMNH; 3 ♂, Calheta, Parque do Rabaçal, 14.ix.1980, Gomes and Báez (1990); 1 ♀, Terreiro da Luta, Funchal, 4.x.1981, Gomes and Báez (1990); 1 ♀, Ponta do Sol-Paul da Serra-Fanal, 10.x.1981, Gomes and Báez (1990); 1 ♀, Santana-Queimadas, 10.ix.1980, Gomes and Báez (1990); 1 ♂, 5 ♀, Santana-Queimadas, 2.x.1981, Gomes

and Báez (1990); 7 ♂, 6 ♀, Encumeada, 800m, 20.viii.1989, Gomes and Báez (1990); 1 ♂, Ribeiro Frio, 27.viii.1989, Gomes and Báez (1990); 2 ♂, 2 ♀, Rabaçal, 17.vii-4.viii, Frey (1939); 2 ♂, 11 ♀, Caramujo, 6.viii-14.viii, Frey (1939), 1 ♂, Rabaçal, 8-15.vii.2002, leg. & coll. AWD; 2 ♂, Ribeiro Frio - Portela, 8-15.vii.2002, leg. & coll. AWD; 1 ♂, Queimadas, Santana, 880m, 22.viii.1976, leg. & coll. AMFA (no. 66); 1 ♂, Terreiro-Portela (after Pico do Suna), 11.xii.1988, leg. & coll. AMFA (nº 286), 1 ♀, Montado do Sabugal, 10.ii.2000, leg. & coll. AMFA (no. 1287); 1 ♀, Folhadal, 23.viii.2001, leg. & coll. AMFA (no. 1288); 1 ♂, Chão da Ribeira, 28.vii.1998, leg. AMFA, coll. ICLAM (no. 0846); 1 ♀, Folhadal, 23.viii.2001, leg. AMFA, coll. ICLAM (no. 0847); 1 ♀, Entrosa, Boa Ventura, 20-185m, 14.ii.2001, leg. AMFA, coll. ICLAM (no. 0848); 1 specimen, Ribeiro Frio, 920m, 11.iv.2003, leg. AMcC & AWD; 1 specimen, Ribeira da Janela, 50-400m, 15.iv.2003, leg. AMcC & AWD; 1 ♂, Montado do Sabugal, 960m, 12.viii.2003, leg. AMFA & Jesus, coll. ICLAM (no. 0886).

Worldwide distribution: Endemic to Madeira Island.

25. *Xylota segnis* (Linnaeus, 1758) (*Musca*)
Systema Naturae, p. 595
Xylota segnis (Linnaeus): Becker (1908), Frey (1939, 1949), Gomes and Báez (1990), Barkemeyer (1999), Carles-Tolra (2002)
Xylota puella Becker: Becker (1921) (synonym)

Illustrated by Stubbs and Falk 2002 (Plate 9, Fig. 6). This species is widespread but infrequent on Madeira Island, where it is often associated with *Hydrangea macrophylla* plants. It can be found in all forested areas, including laurisilva. It has been recorded in all months except January, September, October and December (Fig. 40).

Worldwide distribution: Holarctic, also recorded from the Azores and Canary Islands.

Becker (1921) described the species *Xylota puella* from Madeira based on a single female. The description suggests that this is an intersex specimen of *Xylota segnis* (Linnaeus, 1758). Unfortunately the holotype, held in the Museum fur Naturkunde in Berlin (ZMHU), is lost (J. Ziegler *pers. comm.*). Only a bare pin remains; this still holds the original labels, one of which records the catalog number (50991) mentioned in the description. Becker (1921) stated that *X. puella* is closely related to *X. segnis*, but is immediately separated from this and all other known *Xylota* species by the aberrant form and colouring of the frons. In *X. puella* the frons is described as triangular and is, at its narrowest point, only as broad as one third of the length of the third antennal segment. In addition, the frons of *X. puella* is described as dull black and the dust spots, which are less well developed than in *X. segnis*, are restricted to the eye margins. In *X. segnis*, the frons is shining black and the two distinct dust spots are frequently connected on the frons. Comparable aberrations can be observed in intersex specimens of the genus *Platycheirus*, where intersex specimens are more frequently encountered than in the genus *Xylota*. The antennal coloration of *X. puella* (brown-black with the first two segments red) and abdominal markings (yellow) may also be dependent on the freshness of the specimen. In *X. segnis*, the *X. puella* coloration can be observed in specimens that have just emerged from the puparium. As a result, we regard the nominal species *Xylota puella* Becker, 1921 to be an intersex (or immature form) of *X. segnis* (Linnaeus, 1758), and thus the name *Xylota puella* to be a junior subjective synonym of *Xylota segnis*, **new synonymy**. It should be noted that this is

not the first aberrant specimen that Becker described as a separate species (Báez *et al.* 1986; Smit and Zeegers 2002).

Discussion:

Origin and zoogeography of Madeira's syrphid fauna

As Madeira is an oceanic island formed by volcanic activity from the seabed, there has probably never been a land bridge between it and a continental landmass. As a result, hoverfly species have probably arrived on the island as migrating adults, although immature stages may have been imported to the region in plant material. The migratory capabilities of some hoverfly species have been documented (e.g. Williams 1958; Speight 1996; Gatter and Schmid 1990; Schmid 1999; Kehlmaier 2002). In their extensive survey, Gatter and Schmid (1990) revealed that the majority of the migratory hoverflies are those that have zoophagous, and to a lesser extent, aquatic saprophagous larvae. For Madeira, these two ecological groups account for 84% of the species (respectively 17 and 4 species). However, adults may also be blown unintentionally between locations. The 'Leste', a very strong wind originating in the African desert, has been shown to blow Lepidoptera (Classey 1966) and one Odonata species (Smit 1998) from Africa to Madeira. This wind probably blows hoverflies from Africa to Madeira or from the Canary Islands to Madeira.

The Azores anticyclone is another probable factor in the migration and unintentional movement of insect species to Madeira. This anticyclone has a strong influence on the climate of Madeira (Stauder 1990; Press and Short 1994) and causes a predominant wind to blow from continental Western Europe (and to a lesser degree from the Mediterranean) towards Madeira, allowing insects to be blown from Europe to Madeira. The zoogeographical affinities between the various syrphid faunas in the Macaronesian region support the view that these weather systems are influential in the movement of hoverflies between mainland and the archipelagos (Table 1).

The same can be observed in dragonflies (Odonata), tachinid flies (Diptera: Tachinidae) and wasps (Hymenoptera: Vespoidea) (Smit 1998; Smit 2000; Smit and Zeegers 2002). The zoogeographical affinities of these groups match those of most of the terrestrial faunistic groups present in Madeira (Báez 1993): i.e. a strong affinity with central Europe, a weak affinity with the Mediterranean region and a very weak affinity with the Afrotropical region.

Table 1. The differences in syrphid zoogeographical affinity among the four north-eastern Atlantic archipelagos (Macaronesian region), showing a shift from mainly Palaearctic to a more Mediterranean and Afrotropical affinity from north to south. The species numbers are based on Barkemeyer 2002b (Azores), Báez 1977, 1978, 1982 (Canary Islands) and Barkemeyer 2002a (Cape Verde Islands). Note that the Mediterranean fauna is a sub-set of the Palaearctic fauna. Similarly the endemic fauna is a sub-set of the species totals for each archipelago.

Affinity	Azores furthest north	Madeira	Canary Isles	Cape Verde furthest south
Holarctic	5	9	5	2
Palaearctic	17	14	24	3
(Mediterranean)	(2)	(3)	(12)	(1)
Afrotropical		2	4	10
(Endemic)	(2)	(4)	(12)	(2)
Total number	22	25	33	15

Comments on the *Eumerus* species of the Macaronesian Islands

Much has recently been published on the *Eumerus* species of the Macaronesian archipelagos, including description of new species and proposed new synonymies (e.g. Báez 1982; Marcos-García and Pérez-Bañón 2000; Barkemeyer 2002a and 2002b; Haeseler *et al.* 2002; Báez and Barkemeyer 2002). However, knowledge of the Macaronesian syrphids in general and the genus *Eumerus* in particular is still limited, as illustrated by the previous confusion over the true identity of *Eumerus hispidus*. This reflects the incomplete understanding of the taxonomy of this genus in the Western Palaearctic as a whole, where there are over 100 described species.

Within Macaronesia, the genus *Eumerus* has been under-surveyed (both in terms of island area and time of year). Most surveys have taken place for short periods of time and, with the exception of Barkemeyer (2002a, 2002b), rarely compare results between archipelagos. To date, the most detailed studies have been carried out in the Canary Islands. In his monograph, Santos-Abreu (1924) recorded five species of *Eumerus* from the Canary Islands. In his 1982 revision, Báez recorded a total of nine species from this archipelago, four of which were described as new species. More recently, two of the previously recorded species, *Eumerus purpurariae* Báez, 1982 and *E. terminalis* Santos-Abreu, 1924, have been synonymised with continental European species (Báez and Barkemeyer 2002; Marcos-García and Pérez-Bañón 2000) and yet another species *Eumerus obliquus* (Fabricius, 1805) has been added to the list (Haeseler *et al.* 2002). In addition to this, the first author of the current paper has a single female specimen of a yet unidentified species from Tenerife. This specimen is clearly different from all the other species currently known from this archipelago. However, this specimen can only be identified with certainty if a matching male is found. Barkemeyer (2002a) experienced a similar problem with a *Eumerus* taxon from the Cape Verde Islands.

The synonymisation of *Eumerus purpurariae* Báez, 1982 with *E. etnensis* van der Goot, 1964 proposed by Marcos-García and Pérez-Bañón (2000) seems incorrect. Comparison of specimens from the Canary Isles (Fuerteventura) with specimens taken from France, Gibraltar, Portugal and Spain, reveals that there are consistent, albeit slight, differences in sternite 4, in metatarsus 3 and in the male terminalia (Figs 15 and 16) between the mainland and the Canary Islands specimens (Table 2). Examination of the holotype of *Eumerus etnensis* van der Goot, 1964 confirms the difference between the two taxa. The above-mentioned continental specimens are conspecific with this holotype. Therefore we hereby re-instate the species *Eumerus purpurariae* Báez, 1982, which is an endemic species of the Canary Islands (Fuerteventura and Lanzarote).

Material examined:

***Eumerus etnensis* van der Goot, 1964** (a continental species, not occurring on any island in the Macaronesian region); 15 specimens: 12 ♂ and 3 ♀ examined:

Type material: Holotype ♂, Italy, Sicily, Etna, Rif. Filiciusa, 1400-1500 m, 22-28. vii. 1961 (leg. V.S. van der Goot, coll. RMNH)

Other material: **France**: Pyrenées Orientales, Perpignan, Terreiles Plage, 21.vii.1999, 1 ♂ (leg. J. Smit, coll. JTS); **Gibraltar**: Upper Rock Nature Reserve, 16.x.2001, 7 ♂, 2 ♀ (leg. & coll. JTS); **Portugal**: Algarve, 6-27.iv.1998, 1 ♂ (leg. W. Fliervoet, coll. JTS); **Spain**: Andalucia, Cádiz, Conil de la Frontera, 15.x.2001, 1 ♂ (leg. & coll. JTS); Alicante, Javea, L. Del Descubridor, 29.iv.1994, 1 ♂ (leg. C. Pérez-Bañon, coll. JTS); Alicante, Isla Nueva Tabarca, 20.iv.1994, 1 ♀ (leg. C. Pérez-Bañon, coll. JTS).

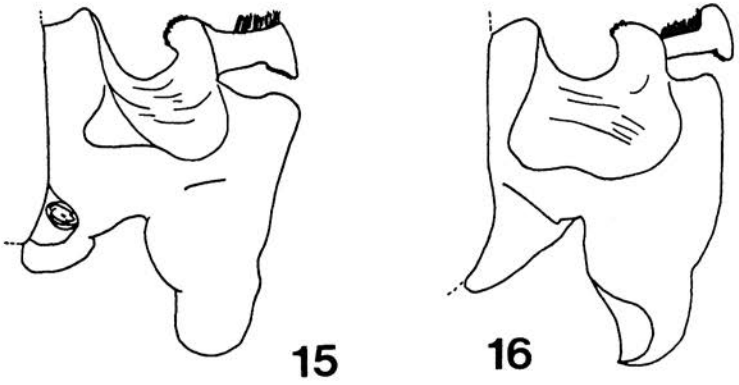
Character	*Eumerus purpurariae* (n = 15)	*Eumerus etnensis* (n = 15)
Males		
Metatarsus 3	Clearly broadened at the base, at most 1½ times as long as broad at the base.	Not broadened, about twice as long as broad at the base.
Sternite 4	The black bristles on the posterior part, somewhat shorter and finer.	The black bristles on the posterior part, longer and thicker.
	Posterior margin, between the lateral corners and the incision in the middle, slightly concave.	Posterior margin straight between the lateral corners and the incision in the middle.
Genitalia	Fig. 15, tip of posterior surstyle lobe round.	Fig. 16, tip of posterior surstyle lobe concave dorsally.
Males and females		
Mesonotum	Brightly shining, only faintly dusted, with 2-5 indistinct dusted stripes.	Heavily dusted, with four darker stripes that are less dusted but not shining.
Scutellum	Brightly shining, not dusted.	Entirely dusted, only weakly shining.

Table 2. The main differences between *Eumerus purpurariae* and *E. etnensis* (n = number of specimens examined).

***Eumerus purpurariae* Báez, 1982** (an endemic species of the Canary Islands, occurring only on Fuerteventura and Lanzarote); 15 specimens: 8 ♂ and 7 ♀ have been examined from the following locations: **Spain**: Islas Canarias, Fuerteventura, Betancuria, 7.v.2002, 7 ♂, 3 ♀ (leg. & coll. JTS); Vega de Rio Palmas, 7.v.2002, 1 ♂, 4 ♀ (leg. & coll. JTS).

Summary of revisions

This study has established the true identities of a number of nominal taxa. The records of *Eumerus purpureus* from Madeira are misidentifications of *E. hispidus* **sp. n**. The records of *Melanostoma babyssa* of all authors other than Walker (1849) are misidentifications of *M. wollastoni* (see Wakeham-Dawson *et al.* 2004 for details). The record of *Syrphus ribesii* (Gomes and Báez 1990) is a misidentification of *S. torvus*. *Paragus mundus* Wollaston, 1858 is a junior subjective synonym of *P. coadunatus* Rondani, 1847, **new synonymy**. *Xanthandrus parhyalinatus* (Bigot, 1884) is a junior subjective synonym of *X. babyssa* (Walker, 1849) (see Wakeham-Dawson *et al.* 2004, for details). *Xylota puella* Becker, 1921 is a junior subjective synonym of *X. segnis* (Linnaeus, 1758), **new synonymy**. The species *Eumerus purpurariae* Báez, 1982, recently incorrectly synonymised with *E. etnensis* van der Goot, 1964 (Marcos-García and Pérez-Bañón 2000), is **re-instated** as a discrete species.



Figs 15-16. *Eumerus* species male genitalia, right surstyle in lateral view. 15, *Eumerus purpurariae*; 16, *E. etnensis*.

Provisional key to the hoverfly species of the Madeiran Archipelago

1	Wing: inner cross-vein (r-m) before the middle of the discal cell.	2
-	Wing: inner cross-vein (r-m) at or beyond the middle of the discal cell.	19
2	Scutellum more brightly coloured than thorax, often clear yellow, sometimes brown. Face always partly yellow.	3
-	Scutellum with the same colour as the thorax, dark, often metallic shining. Face entirely black, except in *Paragus*.	15
3	Thoracic pleura with clear yellow markings, mesoscutum laterally always with a clear yellow band along the sides.	4
-	Thoracic pleura without clear yellow marking, mesoscutum laterally sometimes with a faint yellow band along the sides.	6
4	Abdomen distinctly margined.	*Ischiodon aegyptius*
-	Abdomen unmargined.	5
5	The yellow band alongside the mesoscutum interrupted above the wing base. Abdomen slightly constricted. Smaller species.	*Sphaerophoria rueppellii*
-	The yellow band alongside the mesoscutum continuous. Larger species.	*Sphaerophoria scripta*

6 Eyes distinctly hairy. Frons inflated. Abdomen with yellow spots or completely black, never with yellow bands. 7

- Eyes bare, if some hairs present (*Syrphus torvus*) then abdomen with yellow bands. Frons never inflated. 9

7 Abdomen: tergites 3 and 4 with broad oblique bars. *Scaeva albomaculata*

- Abdomen: tergites 3 and 4 with less broad oblique bars, more comma-like markings, or completely black. 8

8 Abdomen: Tergites 3 and 4 with hooked bars of almost equal width at each end and with the inner end reaching further forward than the outer end, or abdomen completely black (var. *unicolor*). *Scaeva pyrastri*

- Abdomen: Tergites 3 and 4 with comma-like markings with both ends of equal distance from the anterior edge of the segment. *Scaeva selenitica*

9 Mesoscutum dull. Squama with long hairs on the dorsal surface. 10

- Mesoscutum metallic shining. Squama without such hairs. 11

10 Eyes hairy, less distinct in females. Wing: basal cell entirely covered with microtrichia. *Syrphus torvus*

- Eyes entirely bare. Wing: basal cell at the base with a patch bare of microtrichia. *Syrphus vitripennis*

11 Abdomen: tergites 3 and 4 with double bands. *Episyrphus balteatus*

- Abdomen: tergites 3 and 4 with spots, which might be connected into a single yellow band. 12

12 Abdomen: tergites 3 and 4 with the hind margin of the oblique spots (var. *maculicornis*), which might be connected (var. *auricollis*), straight, more or less V-shaped. *Meliscaeva auricollis*

- Abdomen: tergites 3 and 4 with the hind margin of the spots, or bands, curved. 13

13 Femora entirely yellow, face small. *Eupeodes nuba*

- Femora black at the base, face broader. 14

14 Females: black markings on the frons with a Y-shaped extension forwards. Males: genitalia small, not reaching the fourth sternite, hind margin of sternite 5 more or less straight. *Eupeodes luniger*

- Females: black markings on the frons without a Y-shaped extension. Males: genitalia large, nearly reaching the fourth sternite, hind margin of sternite 5 convex. *Eupeodes corollae*

Plate 1. Fig. 1, *Eupeodes nuba* (♂); 2, *Ischiodon aegyptius* (♀); 3, *Milesia crabroniformis* (♀); 4, *Myathropa usta* (♂); 5, *Melanostoma wollastoni* (♀); 6, *Paragus coadunatus* (♂).

1

2

3

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5

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3

15 Face yellow. Abdomen entirely black or partly red, without clear spots on the tergites. *Paragus coadunatus*

\- Face black. Abdomen entirely black or with spots. 16

16 Abdomen petiolate. Abdomen: tergites 2 and 3 with a yellow band or with yellow spots. Wing: marginal cross-veins infuscated. *Neoascia podagrica*

\- Abdomen with parallel side margins or broad in width, never petiolate. 17

17 Abdomen broad, never with parallel side margins. Female: abdomen entirely black or with small yellow rounded spots. Male: abdomen with pairs of broad yellow spots on tergites 3 and 4; pairs of spots sometimes connected. *Xanthandrus babyssa*

\- Abdomen with parallel side margins, with or without spots. 18

18 Abdomen entirely black. Larger species. *Melanostoma wollastoni*

\- Abdomen with clear orange markings, triangular on the third and fourth tergite in females, rectangular in males. *Melanostoma mellinum*

19 Wing: third longitudinal vein more or less straight. 20

\- Wing: third longitudinal vein strongly curved downwards. Bee or wasp (hornet) mimics or abdomen entirely metallic green. 22

20 Abdomen with a broad orange/red band. *Xylota segnis*

\- Abdomen without an orange/red band, with pale yellow spots or with white dust spots. 21

21 Abdomen more or less parallel sided, with pale yellow spots. Smaller species, hind femur swollen. *Syritta pipiens*

\- Abdomen broader, with spots of white dusting. Broader species. *Eumerus hispidus*

22 Abdomen entirely metallic green. *Eristalinus aeneus*

\- Abdomen dark with lighter markings, never metallic green. 23

23 Thorax and abdomen with bright yellow and orange/red markings. Face entirely yellow. Hornet mimic. Very large species. *Milesia crabroniformis*

\- Thorax and abdomen with yellow brown markings. Face with a black stripe in the middle. Bee-like species. 24

24 Wing: cell I open. Tibia 3 with basal half yellow. *Myathropa usta*

\- Wing: cell I closed. Tibia 3 entirely black or dark brown. *Eristalis tenax*

Plate 2. Fig. 1, *Eumerus hispidus* (♀); 2, *Xanthandrus babyssa* (♂); 3, *Xanthandrus babyssa* (♀).

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References

Báez, M. 1977. Los Sirfidos de las Islas Canarias (Diptera, Syrphidae). *Monografias del Instituto de Estudios Canarios en la Universidad de la Laguna* **15,** 143 pp.
Báez, M. 1978. Revision del género *Paragus* en las Islas Canarias (Dipt., Syrphidae). *Boletín de la Asociación española de Entomología* **1,** 119-122.
Báez, M. 1982. Nuevas especies del Genero *Eumerus* en las Islas Canarias (Diptera: Syrphidae). *Annali del Museo Civico di Storia Naturale di Genova* **84,** 41-51.
Báez, M. 1993. Origins and affinities of the fauna of Madeira. *Boletim do Museu Municipal do Funchal* Supplement **2,** 9-40.
Báez, M. and Barkemeyer, W. 2002. The identity of *Eumerus terminalis* Santos-Abreu, 1924 (Diptera: Syrphidae). *Studia Dipterologica* **9**(2), 518.
Báez, M., Herting, B. and Tschorsnig, H.-P. 1986. The Tachinidae (Diptera) of the Canary Islands. *Stuttgarter Beiträge zur Naturkunde, Serie A (Biologie)* Nr. **394,** 15 pp.
Barkemeyer, W. 1999. Zur Kenntnis der Syrphidenfauna des Madeira-Archipels. *TenDenZen Supplement* 1999 Übersee-Museum Bremen pp. 115-134.
Barkemeyer, W. 2002a. Zur Syrphidenfauna der Kapverdischen Inseln (Diptera: Syrphidae). *Mitteilungen des Internationalen Entomologischen Vereins Frankfurt am Main* **27**(1/2), 9-28.
Barkemeyer, W. 2002b. Zur Schwebfliegenfauna der Azoren (Diptera: Syrphidae). *Mitteilungen des Internationalen Entomologischen Vereins Frankfurt am Main* **27**(3/4), 181-194.
Becker, T. 1908. Dipteren der Insel Madeira. *Mitteilungen aus dem Zoologischen Museum in Berlin* vol. **4,** pt. 1, 183-206.
Becker, T. 1921. Neue Dipteren Meiner Sammlung. *Mitteilungen aus dem Zoologischen Museum in Berlin* vol. **10,** 1-93.
Bigot, M.J.-M. 1884. Diptères nouveaux ou peu connus. *Annales de la Société Entomologique de France* **32,** 76.
Capelo, J., Costa, J. C., Lousã, M., Fontinha, S., Jardim, R., Menezes de Sequeira, M. and Rivas-Martínez, S. 1999. Vegetação da Madeira (Portugal): I - Aproximação à tipologia fitossociológica. *Silvalusitana* **7,** 257-282.
Carles-Tolrá, M. (Ed.) 2002. Checklist of the Diptera from Iberian Peninsula, Baleares, Canarias, Madeira and Azores. **In** *Catalogo de los Diptera de España, Portugal y Andorra.* Monografias S.E.A. vol. **8,** 323 pp.
Classey, E.W. 1966. The 'Leste' and migration. *Boletim do Museu Municipal do Funchal* **20**(92), 38.
Evenhuis, N. 1997. *Litteratura taxonomica dipterorum (1758-1930).* 2 vols. Backhuys, Leiden.
Frey, R. 1939. Die Arthropodenfauna von Madeira nach den Ergebnisse der Reise von Prof. Dr. O. Lundblad Juli-August 1935. Diptera Brachycera. *Arkiv for Zoologi* **31**(A)(4), 1-18.
Frey, R. 1949. Der Dipterenfauna der Insel Madeira. *Commentationes Biologicae* **8**(16), 1-47.

Gatter, W. and Schmid, U. 1990. Wanderungen der Schwebfliegen (Diptera, Syrphidae) am Randecker Maar. *Spixiana, Supplement* **15,** 1-100.

Gomes, A. and Báez, M. 1990. Contribución al conocimiento de los Sírfidos del archipiélago de Madeira (Diptera, Syrphidae). *Vieraea* **19,** 339-345.

Haeseler, V., Lauterbach, K.-E. and Barkemeyer, W. 2002. Erstnachweis für *Eumerus obliquus* (Fabricius, 1805) auf den Kanarischen Inseln (Diptera, Syrphidae). *Studia Dipterologica* **9**(1), 212.

Kelhmaier, C. 2002. Ein kleiner Beitrag zur Wanderaktivität von Schwebfliegen auf dem Mittelmeer (Diptera, Syrphidae). *Volucella* **6,** 154-156.

Loew, H. 1860. Die Dipteren-fauna Sudafrika's. *Abhandlungen des Naturwissenschaftlichen Vereins für Sachsen und Thüringen in Halle* **2,** 57-402.

Marcos-García, M.A. and Pérez-Bañón, C. 2000. *Eumerus etnensis* van der Goot, 1964 (= *Eumerus purpurariae* Báez, 1982), syn. nov. (Diptera, Syrphidae). *Nouvelle Revue d'Entomologie (N.S.)* **17**(4), 336.

Oromí, P. 1983. Sobre el origen de la fauna entomologica de las Islas Selvajes. *Vieraea* **12**(1/2), 271-293.

Osten-Sacken, C.R. 1884. List of the Diptera of the Island Madeira, so far as they are mentioned in entomological literature. *Entomologist's monthly Magazine* **21,** 32-34.

Press, R. J. and Short, M. 1994. *The Flora of Madeira.* HMSO. London.

Rojo, S., Isidro, P.M., Perez-Bañón, C. and Marcos-García, M.A. 1997. Revision of the hoverflies (Diptera: Syrphidae) from the Azores archipelago with notes on Macaronesian Syrphid fauna. *Arquipélago* **15A,** 65-82.

Rotheray, G.E. 1993. Colour guide to hoverfly larvae (Diptera, Syrphidae). *Dipterists Digest* (*First Series*) **9,** 1-156.

Santos-Abreu, E. 1924. Monografía de los Syrphidos de Canarias. *Memorias de la Real Academia de Ciencias y Artes de Barcelona* **19**(1), 1-147.

Schiner, J.R. 1868. Diptera. **In** Scherzer, K. von (Ed.) Reise der Oesterreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859. *Zoologischer Theil* **2**(1)B, 1-338

Schmid, U. 1999. Schwebfliegen auf dem Mittelmeer (Diptera, Syrphidae). *Volucella* **4**(1/2), 167-170.

Smit, J. 2000. The wasps of Madeira (Hymenoptera: Chrysididae, Pompilidae, Vespidae, Sphecidae). *Entomofauna* **21**(13), 165-180.

Smit, J.T. 1998. De Zoogeografie van de libellen en de zweefvliegen van Madeira (Odonata and Diptera; Syrphidae). *Scriptie Hogeschool van Utrecht Faculteit Educatieve Opleidingen, Utrecht* 40 pp.

Smit, J.T. and Zeegers, T. 2002. The Tachinidae and Oestridae (Diptera) of Madeira, with description of a new species. *Stuttgarter Beiträge zur Naturkunde, Serie A (Biologie)* Nr. **642,** 11 pp.

Speight, M.C.D. 1996. A mass migration of *Episyrphus balteatus* and *Eupeodes corollae* arriving in the south-west and remarks on other migrant hoverflies (Dipt., Syrphidae) in Ireland. *Irish Naturalists' Journal* **25**(5), 182-183.

Speight, M.C.D. 2003. Species accounts of European Syrphidae (Diptera): special commemorative issue, Second International Workshop on the Syrphidae, Alicante, June 2003. Pp. 231. **In** Speight, M.C.D., Castella, E., Obrdlik, P. and Ball, S. (Eds.) *Syrph the Net, the database of European Syrphidae* vol. 38. Syrph the Net publications, Dublin.

Stauder, A. 1990. Untersuchungen des Makrozoonbenthos in einem Bach auf Madeira mit zoogeographischen Aspekten. *Diplomarbeit, Albert – Ludwigs – Universität.*

Stubbs, A.E. and Falk, S.J. 2002. British hoverflies. *British Entomological and Natural History Society*. 469 pp.

Thomson, C.G. 1869. 6. Diptera, species nova descripsit. Pp. 443-614 **In** *Kongliga Svenska Vetenskaps-Akademien, Kongliga svenska fregatten Eugenies resa omkring jorden under befall af C.A. Virgin, aren 1851-1853, 2 (Zoologie) 1, Insekta.*

Torp, E. 1994. Danmarks Svirrefluer (Diptera: Syrphidae). *Danmarks Dyreliv, Bind 6.* Apollo Books. 490 pp.

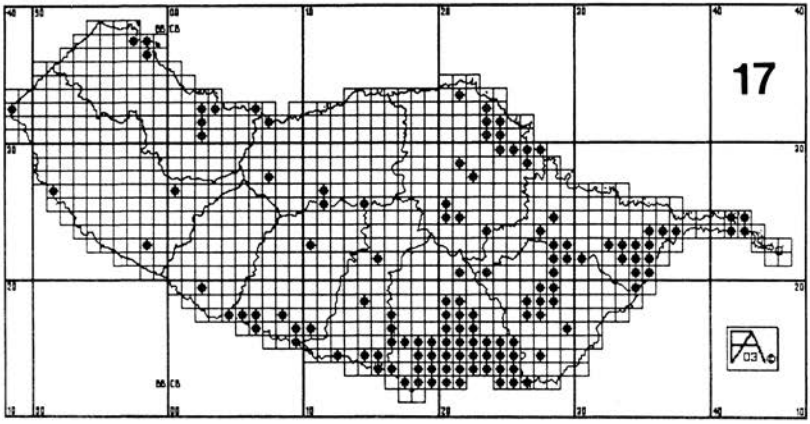
Wakeham-Dawson, A., Franquinho Aguiar, A.M., Smit, J.T., McCullough, A. and Wyatt, N. 2004. *Melanostoma wollastoni* sp. n. (Diptera, Syrphidae) from Madeira, Portugal. *Dipterists Digest (Second Series)* **10,** 89-94.

Walker, F. 1849. *List of the specimens of Dipterous Insects in the Collection of the British Museum* pt 3, pp. 485-687

Williams, C.B. 1958. *Insect migration.* Collins, 235 pp

Wollaston, T.V. 1858. Brief diagnostic characters of undescribed Madeiran Insects [concluding part]. *The Annals and Magazine of Natural History* (3)**1,** 113-125.

Figs 17-40. Distribution of species of Syrphidae on Madeira Island. 17, *Episyrphus balteatus*; 18, *Eristalinus aeneus*; 19, *Eristalis tenax*; 20, *Eumerus hispidus*; 21, *Eupeodes corollae*; 22, *Eupeodes luniger*; 23, *Eupeodes nuba*; 24, *Ischiodon aegyptius*; 25, *Melanostoma wollastoni*; 26, *Melanostoma mellinum*; 27, *Meliscaeva auricollis*; 28, *Milesia crabroniformis*; 29, *Myathropa usta*; 30, *Neoascia podagrica*; 31, *Paragus coadunatus*; 32, *Scaeva pyrastri*; 33, *Scaeva selenitica*; 34, *Sphaerophoria rueppellii*; 35, *Sphaerophoria scripta*; 36, *Syritta pipiens*; 37, *Syrphus torvus*; 38, *Syrphus vitripennis*; 39, *Xanthandrus babyssa*; 40, *Xylota segnis.*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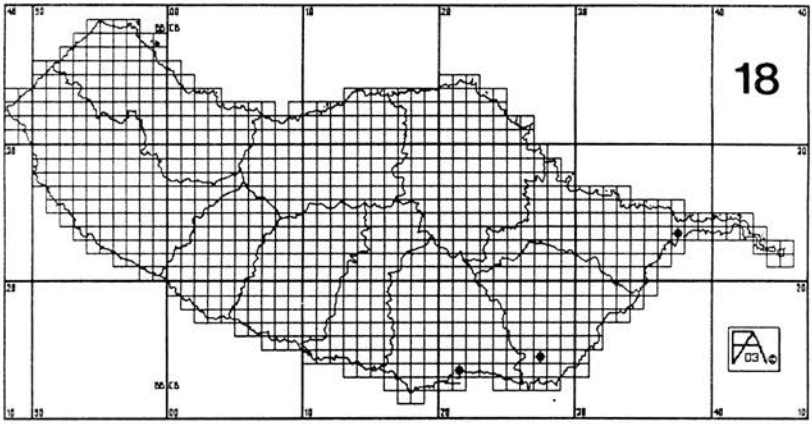
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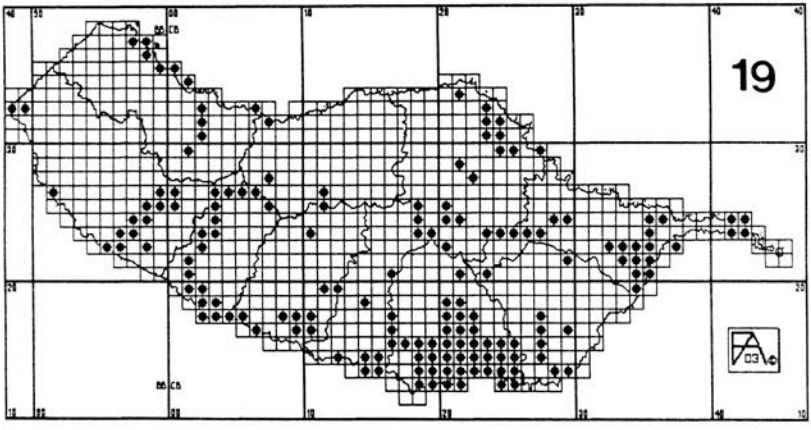
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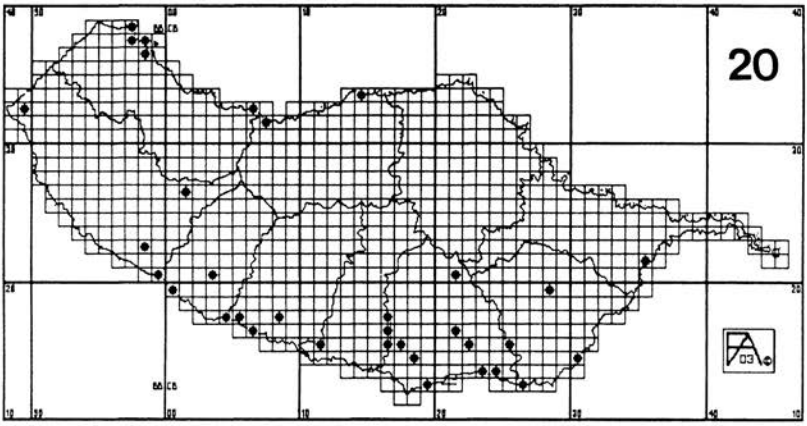
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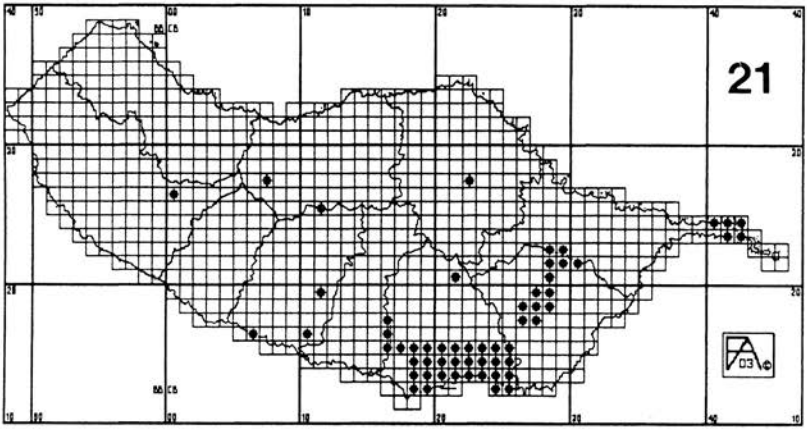
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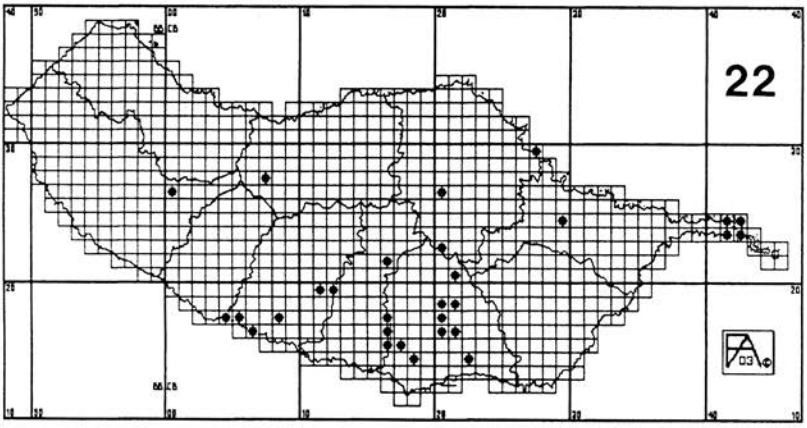
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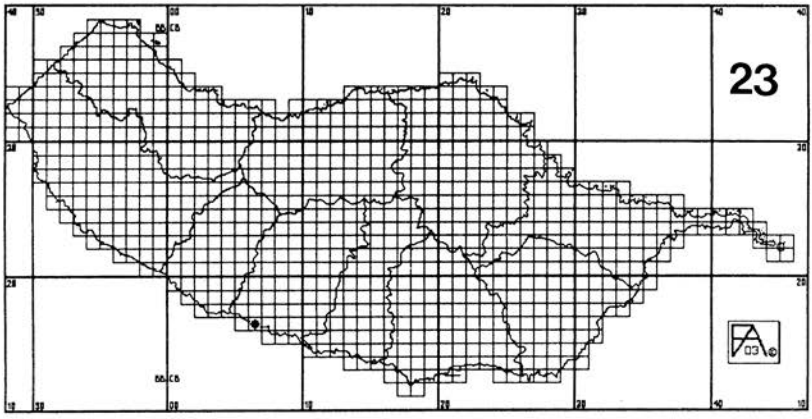
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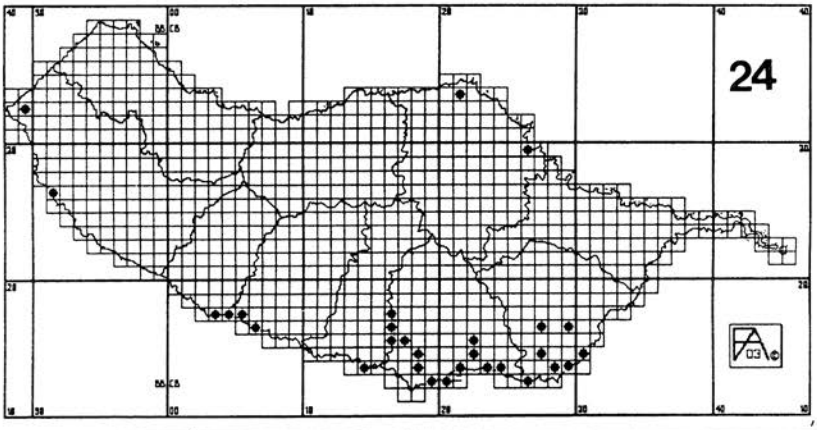
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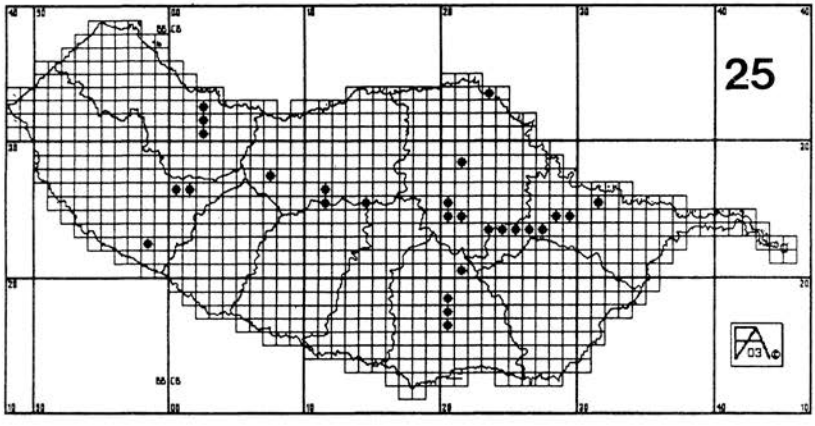
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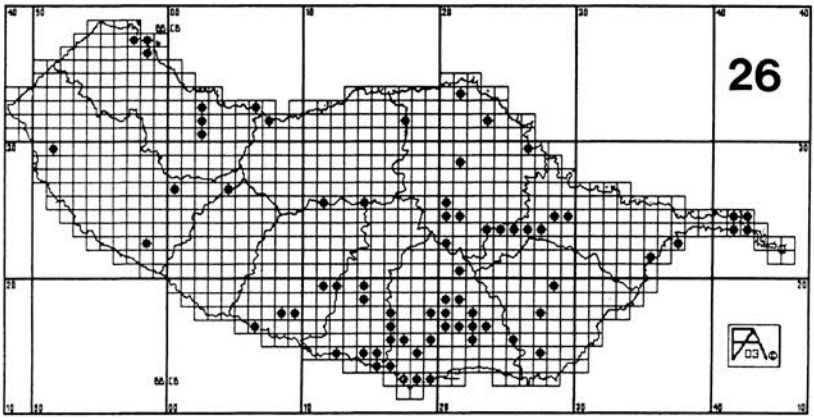
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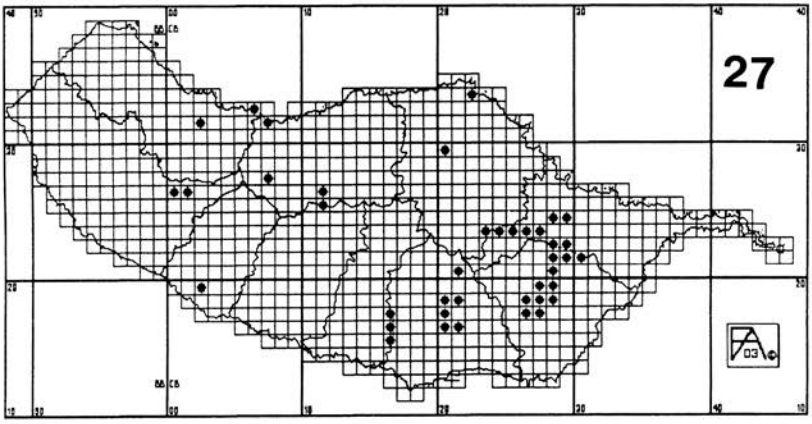
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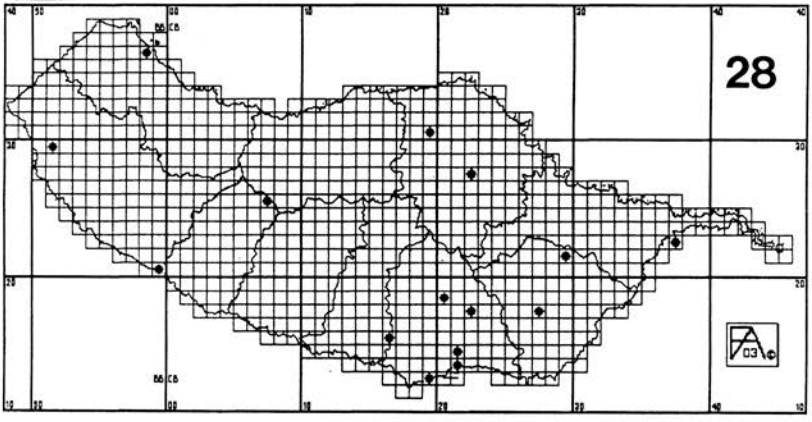
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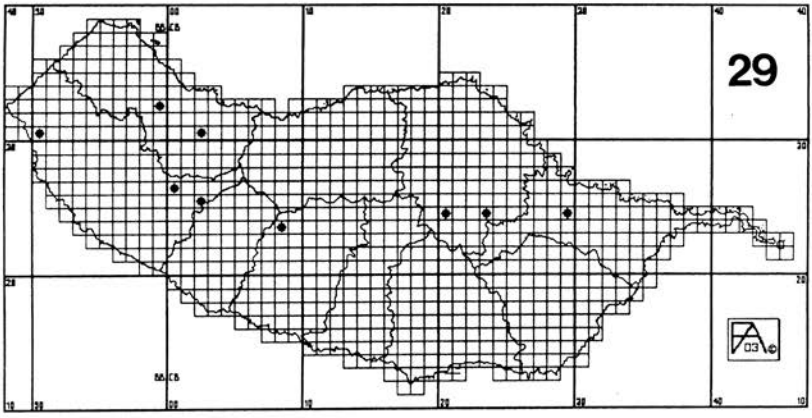
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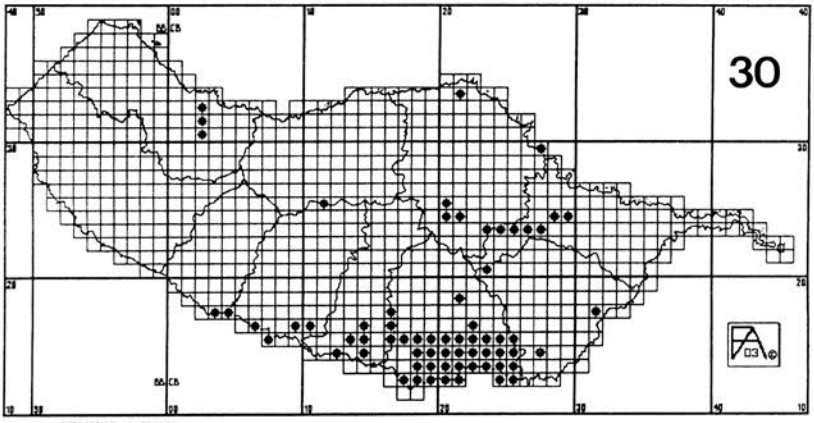
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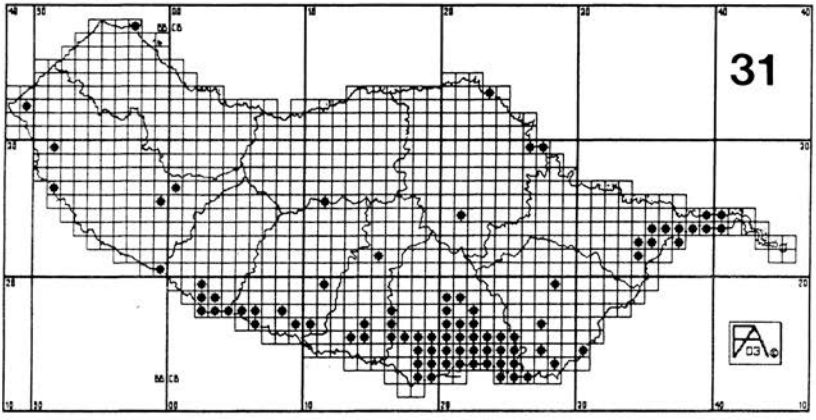
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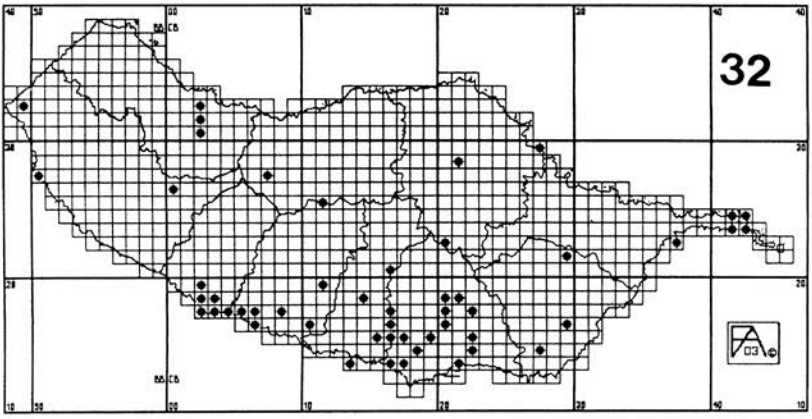
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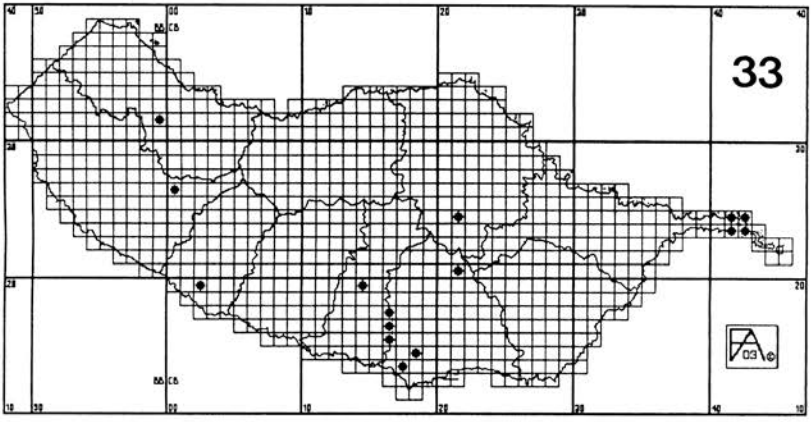
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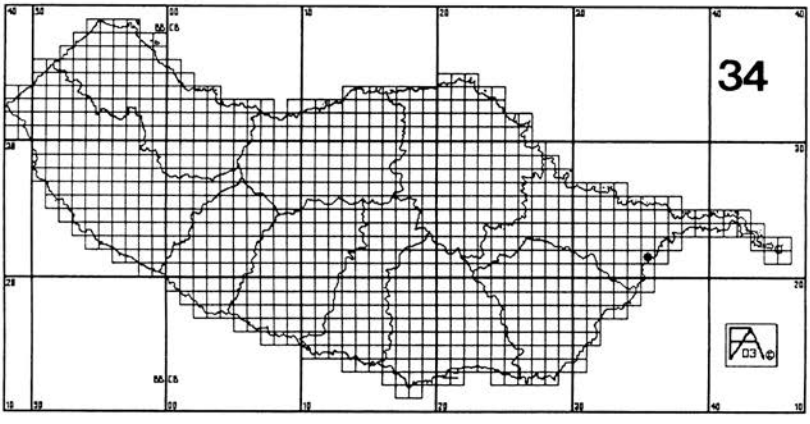
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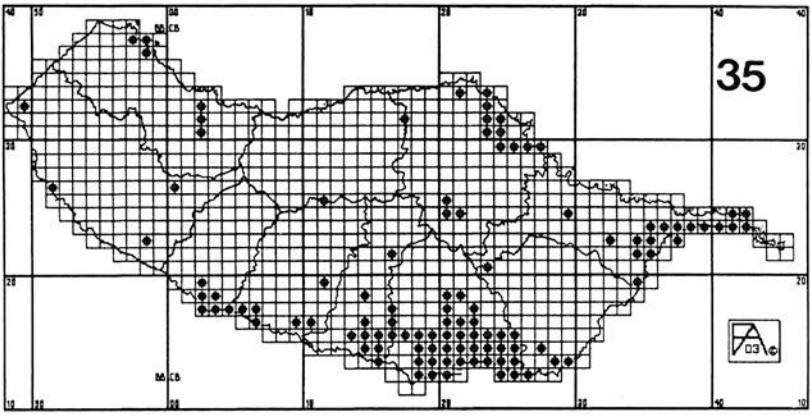
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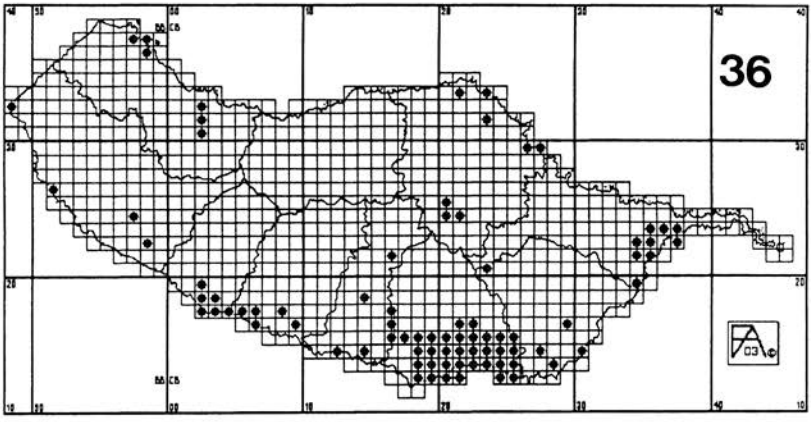
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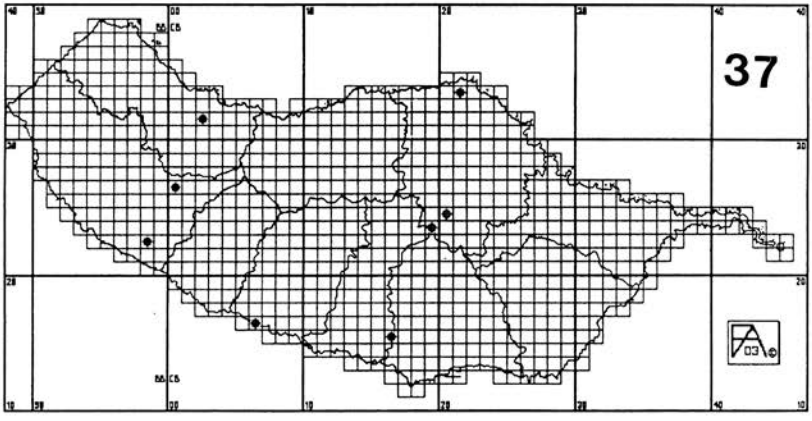
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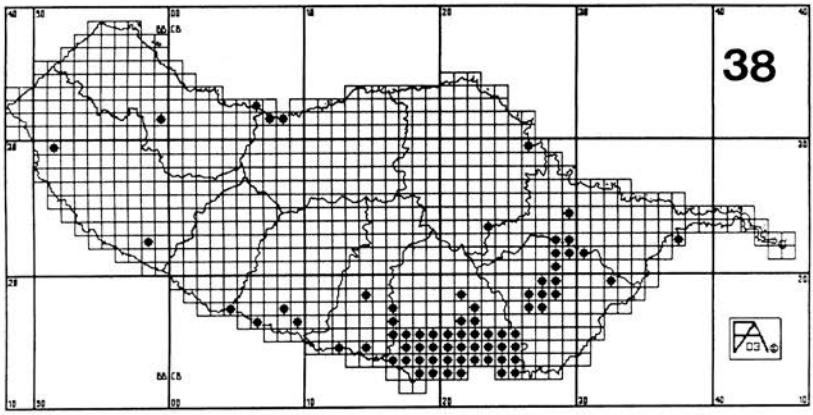
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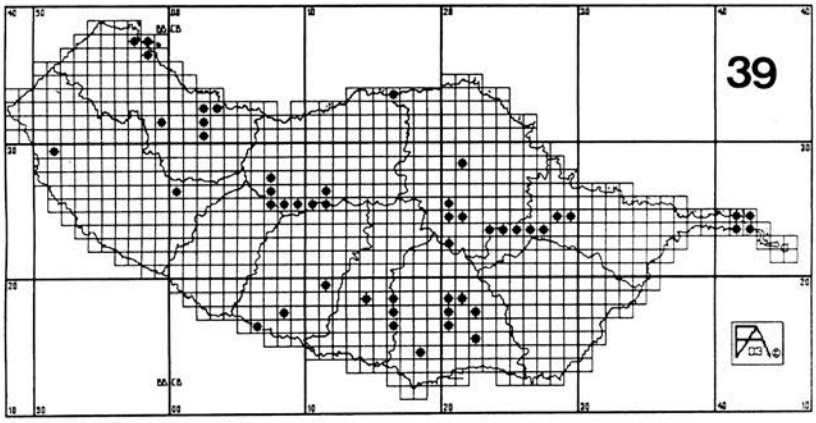
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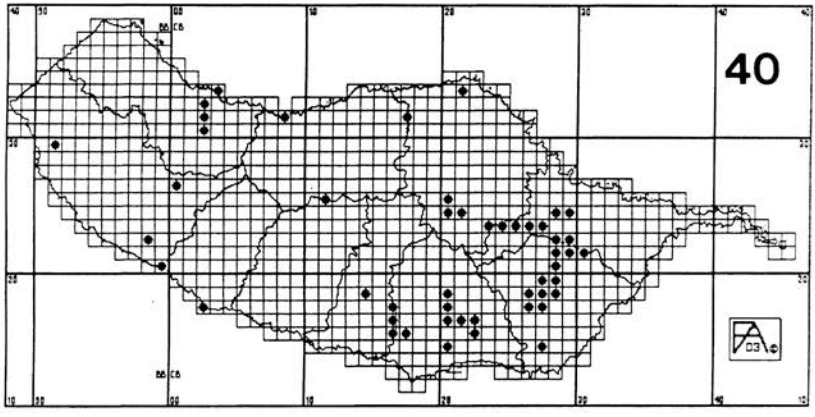
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