HETEROPTERA STUDY GROUP

Newsletter No. 4 - November 1984

Meeting at Monks Wood Experimental Station, 6-8 July 1984

With 18 participants the meeting combined lectures, discussions, field-work and lab sessions, plus lively and productive exchanges of ideas and information in the evenings. (This account of the meeting has been abbreviated to make room for other useful articles).

Recording

The Information Package for the Recording Schemes (enclosed with this Newsletter) was circulated at the meeting. Discussion of several aspects included the distinction between recording (including habitat, seasonality, species-associations, site-related data) and mapping (a visual summary of distribution); the advantages of full dates and 8-figure grid references; the problems of abstraction from large museum collections and record centres (unless contributors to the scheme find time to help with abstracting, only the basic data for mapping may be available); and NCC's Invertebrate Site Registor, a short-term rapid-action project which has different aims and methods from a ERC scheme, so that some duplication of form-filling is unavoidable. (Any Heteropterist who has not yet informed the ISR of sites he knows which are believed to be of conservation value for their invertebrates is urged to contact: ISR, NCC, Northminster House, Peterborough, Cambs, PE1 1UA).

Bernard Nau again outlined the advantages of the Priority Squares system. Once it had been stressed that these were suggestions rather than instructions, and that their main usefulness was in areas lacking resident heteropterists, there was general agreement on their value. Maps showing Bernard's proposed squares were favourably received, with only 5 amendments, all well-reasoned from local knowledge. Maps and lists of Priority Squares have been sent to area co-ordinators in this mailing. Further suggestions for improving the representativeness of the sample should be sent to Bernard before the end of January 1985. A final list of squares will then be circulated with the next Newsletter in time for the 1985 field season.

Other topics discussed were: the value of 'unlikely' habitats such as urban wastelands (see Pete Kirby's notes); the importance of planning field-work in advance (with all available maps etc); and the realization that the detail about, say, habitat, provided on cards will vary greatly from recorder to recorder. BRC will make full use of whatever is given.

Lectures

Bernard Nau's 'Notes on Recording and Identification of Psallus', enclosed, summarise a clear and practical illustrated talk he gave at the Monks Wood meeting. Roy Crossley gave an equally lucid account of the British Saldidae. (It is hoped that more such useful presentations will feature in future meetings).

Field Trips

Visits to three National Nature Reserves (Castor Hanglands, Woodwalton Fen and Monks Wood itself) were all very productive, with over 60 species at each (excluding late additions among the 'take-homes').

The Newsletter

In addition to several short notes, this number includes an introduction to trunk-searching (which should enable one to find Loricula almost every day), and an account of one day's Priority square-bashing, which include many useful snippets. Also, a table summarizing the seasonal occurrence of Orthotylus spp. on various hosts.

Additional separates include a preliminary key to Mirid tribes and genera by Walter Le Quesne, and an alternative Microvelia key (B S Nau). Please test these as fully as possible, and provide suggestions for improvement, or at least point out difficulties to the authors. Bernard Nau's Psallus notes, while not an identification panacea, should at least allow a difficult genus to be approached sensibly.

The Information Package includes a taxonomically-ordered literature guide and an explanation of the names used on the new site-visit card RA57 (sample enclosed). There is also an updated list of area co-ordinators and referees for critical groups.

Future Meetings

It is hoped that an indoor meeting and dinner will be held in London in the Spring. Details will be sent as soon as available.

After the Monks Wood gathering, most people felt more field meetings would be very useful. Is anyone in a position to organize one for Summer/Autumn 1985? Underworked areas of the North and West would be very attractive, if a suitable (and reasonably-priced) field centre can be found. Offers to run meetings, and contributions for the next Newsletter (by the end of February if possible) should be sent to me. Feed-back on the content and format of the Newsletter, and suggestions for improvement, would also be welcome.

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FRUIT-FEEDING HETEROPTERA - A REQUEST

Dr Carlos M. Herrera, of the Estacion Biologica de Donana, Seville, is working on fruit-feeding bugs (and other animals) in Spain and other parts of Europe and would like to receive information on field records of fruit-feeding behaviour of British bugs. This will probably involve mainly Shieldbugs, with perhaps some Coreidae. Fallen seeds are not included in his present studies. If anyone has made any field observations on this subject, would they please send them to Mr W.R. Dolling, British Museum (Natural History), London SW7 5BD, who will then forward them at the end of the year to Dr Herrera. Observations in future years will also be welcome. It is known that some species, for example Coreus marginatus and Eysarcoris fabricii, are closely associated with a narrow range of hostplants in the early instars but later instars and adults feed extensively on berries of a wide range of plants, including blackberries.

The information required should include, at best, species of bug, developmental stage, number of individuals, date, species of host plant, whether the fruits were ripe or unripe (this looks as though it will be very important) and whether the bugs were actually seen with the mouthparts inserted in the fruit.

It is hoped that a condensed account of the findings will be included in a future issue of the Newsletter. W.R. Dolling

LOOKING AT TREES P. Kirby

When searching for insects of such diverse habits as the Heteroptera, it is as well to maintain a wide repertoire of methods. Those who finally tire of turning stones to look for Pygolampis bidentata may care to turn to easier game, and look at tree trunks. This is rewarding, informative, restful and far too little indulged in. It can be done in all weathers, at all times of day and night, and for much of the year.

One bug which can be virtually guaranteed by trunk-searching is Loricula elegantula, found almost anywhere that trees more than a few years old are found, and common even on isolated lines of trees in the Lincolnshire fens. I'm still waiting for someone to tell me how they get there. L. pselaphiformis seems much scarcer, but this may be partly because it is less strikingly coloured and less active. Neither Loricula is necessarily associated with lichens. Other inhabitants of tree trunks are Temnostethus spp., Empicoris spp., and Phytocoris spp.. In addition to the regulars, a number of "beneath bark" species wander from cover from time to time waiting to reward the diligent collecter, and a plethora* of other hets. occur on tree-trunks more or less casually. After strong winds, all manner of creatures can be found desperately trying to re-attain their normal niches in the canopy, and in the autumn trunks may be alive with Anthocoris looking for hibernacula; it is possible to take 5 or 6 species of the genus from a single tree!

There are several ways of collecting from trunks. A quick method of recording species, with a minimum of apparatus, is to brush the surface with a household paintbrush, catching the sweepings in a small white enamel or plastic tray. For the enthusiast, the apparatus can be scaled up. I have used, to good effect, a cheap plastic-and-nylon domestic handbrush in conjunction with a home-made catching tray made from an 18" triangular landing-net frame with the end member replaced by a length of cheese wire. A shallow bag of white material is stitched over the frame thus formed. A depth of about 6" helps on windy days. The flexible end of the frame will fit itself tolerably well to the shape of all but the most anatomically perverse of trees. The device can also double as a small beating tray. Though these tools can gather in quite a lot of material quickly, by far the most interesting tactic, which I now use almost to the exclusion of all others, is the well-tried technique of looking hard. This not only leaves more insects intact (an Empicoris whose path has crossed that of twelve inches of fray-ended nylon bristles is not always a pretty sight) but also gives an insight into the habits of the species being caught/watched. No-one can truly appreciate the beauty of Phytocoris who has not seen them in their normal state of near-invisibility in bark crevices.

When collecting direct from tree-trunks, never forget a pooter. My own absent-mindedness has caused me to spend too many hours trying to poke recalcitrant insects out of very small cracks into the mouths of all-too-difficult-to-aim glass tubes for me to recommend this occupation to any but those I really hate.

Tree-trunks by night should produce a different heteropterous fauna to that of the day-time. I have, however, always found the nocturnal het. fauna rather disappointing, though the trunks may fairly crawl with Coleoptera. I nevertheless recommend night examination of tree trunks as an exercise, particularly to while away that irritating period on camping trips, between nightfall and the time at which one can justifiably begin to feel tired (assuming the nearest pub is beyond walking distance). For such work, a lamp which can be strapped to the head is invaluable. Such devices, tastefully constructed from yellow plastic, can, I believe, still be got for a couple of pounds, and will operate for most of a night on a set of Duracell batteries. Lamps of the type used by cavers would be even better, but are, I suspect, more for the fanatic than the dabbler.

The most rewarding, and least frustrating, trunks to look at are those which are easiest to search. It may be true that trunks with a good lichen cover have

* Any better offers for a collective noun for bugs? Or Heteropterists? Ed.

greater numbers and diversity of bugs (I have yet to be absolutely convinced). They are, however, much more difficult to examine than those with just a thin covering of Pleurococcus. Similarly, the deeply-fissured and topographically varied trunks of old oaks can be infuriating to study in detail. On the other hand, the smooth trunks of young sycamores will usually produce at least the odd Loricula, and can be thoroughly examined in under a minute. Lime and ash have about the right combination of characteristics: a surface varied enough to appeal to hets., but smooth enough to be examined in a few minutes.

Thus ends my exhortation. I am convinced of the value of trunk-searching in Heteroptera recording, and the possibilities for detailed studies are legion. How do dendrophilous het. populations vary with height? with age of tree? with tree species? Are any bugs truly associated with lichens, and if so, why? And how on earth does Loricula elegantula colonise new trees?

Is this a record?

Bernard Nau

How many species of Het. can one find in a day? Bird-watchers long since proved 100 bird species is possible; there are about the same number of Hets, so 100 Hets in a day might also be possible.

There was no thought of a "tick hunt" when, on 25 August, Pete Kirby and I set out, at a leisurely 10 am, to record bugs in a Priority Square in Essex, between Colchester and the Blackwater Estuary. At Tiptree, the one-inch OS map showed, improbably for vc 18, a heath. The Geological Survey map shows all the area as London Clay, so the heath (and other sandy sites visited later in the day) are presumably on glacial deposits. Anyway, our heath kept us busy for a couple of hours, producing Piezodorus, Pachylops and Orthotylus virescens on Gorse, and the Heather specialities O. ericetorum, Nabis ericetorum, Scolopostethus decoratus and Kleidocerys truncatulus. Grass-heath, scrub-woodland and disturbed weedy ground added more species, mostly unremarkable, but with Orthotylus (= Neomecomma) bilineatus still present on Aspen and O. tenellus still on Oak. (The key in S & L doesn't give a very good impression of this translucent yellow bug with big black eyes!). By the time we left the heath, we had recorded 58 species.

We now entered the Priority Square and headed for the saltings of the Blackwater, via unprepossessing lanes amid cereals (adding a dozen species), village wasteland and a well-hedged lane to the sea-wall (a further dozen, though little of note). Patches of mud between the drifts of purple Sea-Lavender produced some saldids, mostly Saldula palustris, while Chenopods yielded Orthotylus moncreaffi and Piesma quadratum, typical saltings species. A dyke by the sea-wall had both Scirpus marsh and open water. Down among the Scirpus I found my first Nabicula lineata. For years I feared I was over-looking it in Bedfordshire, but here it was, and no mistaking it - much longer and narrower in proportion than N. limbata. Pete remarked this looked like Teratocoris habitat and, burrowing deep in the Scirpus, duly found T. antennatus. Moss on a nearby culvert yielded him the minute Tingid Acalypta parvula, and to finish he produced a kitchen sieve from his rucksack and scooped our 9 aquatics for the day. Meantime I was briefly distracted by a handsome male Roesel's Bush-cricket in my net.

Driving inland, we passed a patch of Tansy and, backing the car to it, were rewarded by (the inevitable?) Megalocoleus pilosus, visible without really needing to leave the car. A line of Grey Poplars quickly yielded Sthenarus rotermundi (also inevitable?), and an Ash or two gave Loricula elegantula from the trunks and the orange late-summer mirid Pseudoloxops and several Anthocorids, including A. simulans (= minki of S & L) from the bunches of keys. This completed our work in the Priority Square, with a respectable 60 species [illegible]

Consulting the map, we headed for a heathy area marked between Colchester and Abberton and found a heathy verge with pines and deciduous woodland adjacent. The conifers yielded Gastrodes grossipes and Atractotomus mirificus, the latter not in S & L but common on Scots pine, in the south at least. Beating an Oak gave Pilophorus perplexus, which is a pretty safe bet at this time of year on Oaks in sandy places. Sweeping some rather dried-up legumes on a grassy embankment, I encountered a largish Berytinid, which Pete diagnosed as B. hirticornis. Later, a microscope confirmed this: the hairs on the antennae are surprisingly hard to see on casual inspection, and its large size and general light colour are more helpful in the field.

We finished up with an impressive-sounding 102 species, after sorting out the 'take-homes', 93 terrestrial and 9 aquatics. These were not all within the target square, but I think the spirit of the 'Priority Squares' concept was thoroughly vindicated since we added a lot of valuable records from an area which neither of us would have visited otherwise.

Though we visited a good range of habitats, it was late in the year for most arboreal mirids, and for most Orthotylus, so there's scope to add many extra species by a June-July visit. Nonetheless, it was pleasing to see how much useful recording can be done in a day. Note that several records are still open to claim: 100 terrestrial Hets in a day; 100 in the same 10 km square in a day; etc! Who will rise to the challenge?

SHORT NOTES

ELASMOSTETHUS TRISTRIATUS (Fabricius) is listed from Somerset and Devon in Massee's vice-county tables (1955, Ent. mon. Mag. 91) but no recent localities are known in the south west. The bug was found in Minehead, S. Somerset (21/9--4--) on 10.vii.84 and 2.x.84 and at the Ness, Dawlish, S. Devon (20/9--7--) on 5.x.84. Since Juniper is not known from either site, it is likely that the bug has transferred to cypresses. Many thanks to W.R. Dolling for confirming identification, and providing information about its status. J.A. Hollier

(A single specimen of E. tristriatus was brought to Monks Wood having been found in St Ives, Cambs (52/3--7--) in late October, again in an area lacking native Juniper. Roger Hawkins reports it is common on garden conifers in parts of Surrey. Any more observations? Ed.)

TAPHROPELTUS HAMULATUS

I have the impression that little is in print on the habitats of this bug. It may therefore be of interest to note that my first finding of the species, on 8 September, 1984, was amongst moss on scrub-invaded chalk grassland on the north downs (White Downs, grid ref. 51/1249). P. Kirby

PERITRECHUS NUBILUS

I have been finding this species quite often in Essex this year. It seems generally common along the north bank of the Thames Estuary at least as far inland as Tilbury, and I also have one inland record, from disturbed ground at Belhus Park, grid ref. 51/571825. Southwood and Leston comment that the species has been recorded from a "remarkable diversity of habitats". I have seen the bug so far this year in salt- and freshwater marshes, dry grassland, and on derelict land among sparse ruderal vegetation. This is much the same range of habitats that I would normally associate with Anaptus major, and rather suggests that the two species have much in common ecologically, probably in being normally associated with dry ground and sparse cover, but readily colonising marshland of all kinds as it dries out in summer. The greatest numbers I have so far found were under Atriplex on sparsely vegetated waste ground at Canvey Island. P. Kirby

DRYMUS LATUS

Southwood and Leston report this species from the north and south downs, the Chilterns, and chalk cliffs. It is surprising, therefore, to be able to report it from an area of waste ground in the London Borough of Newham. The site is a steeply sloping bank with a good covering of weedy vegetation, including Ballota nigra, Urtica dioica, and Cirsium and Artemisia spp. The bugs were found amongst the thin litter of dry dead leaves and stalks. P. Kirby

RAGLIUS ALBOACUMINATUS

I've been finding this species this year. Southwood and Leston suggest that it is generally found in "clearings in and around woods or small cultivated areas adjacent to trees", and comment that "an association with black horehound has been suggested". I find the species to be very closely associated with Ballota nigra, usually to be got by grubbing in the soil and litter immediately at the base of the growing stems, and to have no particular association with woods or trees. I have found it around London in disturbed areas in dry grassland, derelict land, and roadside verges, as far in towards the city as Kew and East Ham. Populations of the bug often seem to be low, and rather sparsely distributed, with only a small fraction of apparently suitable plants colonised. I have a suspicion that the species may be rather often overlooked. Does anyone else have any experiences or comments? P. Kirby

BERYTINUS HIRTICORNIS

I have seen this species at a number of localities in Essex this year. The association with Lathyrus nissolia suggested by Eric Philp has held good on all but one occasion. On 26 August, 1984 Bernard Nau swept a single individual from a roadside verge south of Colchester. Searching revealed no Lathyrus nissolia, but I did discover a futher adult and a final instar nymph of Berytinus hirticornis beneath Medicago lupulina. Lathyrus nissolia is not a strikingly obvious plant at the end of August, and so small quantities of it may have gone undetected. However, the finding of a nymph beneath Medicago might suggest that other foodplants are possible, even if perhaps only in emergencies. P. Kirby

DERAEOCORIS SCUTELLARIS

This year I am able to add something to the long-running discussion on the habits of this rarely recorded species, whose inclinations, from the literature, seem to oscillate between hazel and heather. I swept a single individual from Thursley Common, grid ref. 41/9041, on 22/7/1984. The area in which it was taken was almost pure Calluna vulgaris, and a considerable distance from the nearest hazel. No further individuals could be found either by sweeping or by looking hard.

P. Kirby

DERAEOCORIS OLIVACEUS

Reports of this species are a little sparse, so it may be of interest to put in writing a couple of recent Essex records. There is one specimen in the collection of D.A. Smith, taken at Langdon Hills, Grid ref. 51/685 880, on 5 August, 1979. On 25 June, 1984 I beat three nymphs of the species from hawthorn at Upminster, Grid ref. 51/568888. A return later in the year to look for adults proved fruitless, despite extensive searching. The hawthorns in question were well-grown bushes some 15 feet high. I wonder whether my failure to find the species in a known locality might indicate that they live high in the bushes, or that they occur only at very low densities, or that they spend the day close in to the trunks, only coming out at night.

P. Kirby

IMPORTATIONS OF HETEROPTERA INTO BRITAIN

1984 saw the publication of Volume 2 of A.D. Aitken's "Insect Travellers" (MAFF, ADAS Slough Laboratory, Reference Book 437, 74 pages), which analyses interceptions of all insects except Coleoptera (the subject of Volume 1) arriving at British ports in cargoes of dry foods and feedstuffs during the years 1957-1977. Nine species of Heteroptera were intercepted, most of them mentioned by Southwood & Leston. The most frequently encountered species were the reduviid Amphibolus venator (207 interceptions) and the anthocorids Lyctocoris campestris and Xylocoris flavipes (61 and 43 interceptions respectively). A second reduviid, Peregrinator biannulipes (Montrouzier & Signoret), was found in ships arriving from twelve different countries in the Old World tropics. Other fairly frequently intercepted species were two anthocorids, Xylocoris afer and X. galactinus, and the mirid Fulvius brevicornis Reuter. The prostemmine nabid Pagasa fusca (Stein) was imported from Argentina and the reduviid Reduvius personatus arrived from Algeria. All nine species are predators of granary pests. W.R. Dolling

SEASONAL OCCURRENCE OF ORTHOTYLUS SPP. B.S. Nau

(Based on Southwood & Leston (1964))

HOST	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
ALDER *Alnus glutinosa*	*marginalis* *flavinervis*	*marginalis* *flavinervis*	*marginalis* *flavinervis*		
APPLE *Malus*	*marginalis*	*marginalis*	*marginalis*		
ASH *Fraxinus excelsior*	*tenellus*	*tenellus* *nassatus*	*tenellus* *nassatus*	*nassatus*	
BAY WILLOW *Salix pentandra*		*virens*	*virens*	*virens*	
BLACKTHORN *Prunus spinosa*	*marginalis*	*marginalis*	*marginalis*		
ELM *Ulmus* spp.		*ochrotrichus*	*ochrotrichus* *prasinus*	*prasinus*	
HAZEL *Corylus avellana*	*tenellus*	*tenellus*	*tenellus* *prasinus*	*prasinus*	
LIME *Tilia* spp.		*nassatus*	*nassatus*	*nassatus*	
OAK *Quercus* spp.	*tenellus*	*tenellus* *nassatus*	*tenellus* *nassatus* *prasinus*	*nassatus* *prasinus*	
PINE *Pinus silvestris*	*fuscescens*	*fuscescens*	*fuscescens*		
SALLOW *Salix* spp.	*marginalis*	*marginalis*	*marginalis*		
SYCAMORE *Acer pseudoplatanus*	*flavinervis*	*flavinervis*	*flavinervis*		
WILLOW *Salix* spp.	*marginalis*	*marginalis* *nassatus* *diaphanus*	*marginalis* *nassatus* *diaphanus*	*nassatus*	
WYCH ELM *Ulmus glabra*		*viridinervis*	*viridinervis*		
BROOM *Cytisus scoparius*	*adenocarpi*	*adenocarpi* *virescens* *concolor*	*adenocarpi* *virescens* *concolor*	*adenocarpi* *virescens* *(concolor)*	
GOOSEFOOT *Chenopodium*	*flavosparsus*	*flavosparsus* *moncreaffi*	*flavosparsus* *moncreaffi*	*flavosparsus* *moncreaffi*	*flavosparsus* *moncreaffi*
CURRANT *Ribes* spp.	*marginalis*	*marginalis*	*marginalis*		
HEATHER *Calluna vulgaris*	*ericetorum*	*ericetorum*	*ericetorum*	*ericetorum*	*ericetorum*
NETTLE *Urtica*		*ochrotrichus*	*ochrotrichus*		
[illegible]SSWORT *Sal[illegible]cornia*		[illegible]	*rubidus*	*rubidus*	*rubidus*

October 1984

DRAFT KEYS TO MIRID GENERA

Walter Le Quesne, Anne Cottage, 70 Lye Green Road, Chesham, Bucks

It has been clear for some time that there is a need for practical keys to Mirid genera, avoiding the use of arolia, which cause problems for many of us, particularly those dealing with carded specimens.

The keys given here are very provisional ones (based mainly on my incomplete collections and otherwise on the literature at my disposal), aimed firstly to see how far one could key to tribal level using easy characters; and secondly what one could do with the Orthotylini and Phylini, which one could not separate on readily-seen characters.

I would be grateful if you could try out these keys and find out where the difficulties and errors lie, so that we can try to get a workable key. Of course, some of these characters would be easier to use if accompanied by drawings. I hope later to look at the other tribes, particularly the Mirini, where there are also problems in use of Southwood and Leston's keys.

TENTATIVE KEY TO TRIBES IN MIRIDAE

1 Membrane pilose (?Visible in brachypterous females) ..... Bothynotus
CLIVINEMINI

Membrane glabrous 2

2 Collar, rounded in cross-section, present between vertex and pronotum 3

Collar flat or absent 5

3 Membrane of fore-wings in macropters with only one cell. Brachypters with uniformly light brown fore-wings reaching almost to end of abdomen. Less than 4 mm long ..... BRYOCORINAE

Macropterous, with membrane of fore-wings with two cells; usually more than 4 mm long 4

4 Pronotum and coriaceous part of fore-wings strongly punctate and glabrous. Third and fourth antennal segments thinner than second and short, together distinctly shorter than second segment. Tooth-like swelling at base of claw.. DERAEOCORINI

If pronotum and coriaceous parts of fore-wing punctate and glabrous, third and fourth antennal segments together at least as long as second segment. Claw not swollen into tooth at base ..... MIRINI

5 Vertex either with longitudinal furrow or transverse depression [collar absent] ..... STENODEMINI

Vertex without longitudinal furrow or transverse depression 6

6 Well developed flattened collar present between vertex and pronotum, wider than width of fore tibia. [Rather frail and elongate species less than 5.5 mm long] ..... DICYPHINI

Collar, if present, narrower than width of fore tibia 7

7 Fore-wings more or less dark brownish, with two transverse lines of silvery hairs, anterior line broken medially. [Posterior margin of vertex distinctly concave] ..... PILOPHORINI

Fore-wings without transverse bands of silvery hairs (though possibly with widely distributed silvery hairs) ... 8

8 Normally brachypterous; widest part of pronotum in anterior part. (Macropters not yet examined) ..... PITHANINI

Pronotum widened towards posterior margin 9

9 Macropterous or brachypterous, with well-defined hyaline patches on otherwise brown forewings. Second antennal segment only very slightly widened apically. [Distinct flattened collar present. Ant mimics] ..... HALLODAPINI

If fore-wings brown with hyaline patches present, then second antennal segment strongly thickened apically or hyaline patches at base of fore-wing merge gradually into grey-brown colouration 10

10 Head about three times as wide as long. [Black or brown species; head and legs sometimes yellow] ..... Strongylocoris (HALTICINI)

Head not more than 2.5 times as wide as long 11

11 Face long and genae high 12

Face not long, genae normal 13

12 General colour black or dark brown; hind femora modified for jumping in some species ..... HALTICINI (part)

Colour entirely yellow-green or yellowish. Hind femore not modified for jumping ..... Amblytylus (PHYLINI

13 Hind tibiae with strong black spines, longer than diameter of tibia. Pronotum without strong median transverse impression ..... PHYLINI (part)

Hind tibiae without strong spines, or spines lighter in colour. (In Blepharidopterus, rather dark brown spines present on hind tibiae and strong median transverse impression on pronotum) ..... ORTHOTYLINI + some PHYLINI

PHYLINI (part) (from couplet 13, first option)

1 Large species, over 6 mm in length. Rostrum not extending beyond front coxae. Second antennal segment of ♂ with apical tubercle ..... Harpocera

Smaller species, less than 6 mm in length. Rostrum extending beyond front coxae. Antennae without apical tubercle 2

2 Black spines on hind tibiae arising from conspicuous black spots 3

Black spines on hind tibiae not arising from distinct black spots 11

3 Head very short, in side view lower margin of head in front of eye by less than half width of eye. (Second antennal segment not longer than width of head) ..... Campylomma

Head longer, lower margin of head in front of eye by at least half height of eye 4

4 Second antennal segment black, strongly thickened, flattened or cylindrical, at least twice as broad as third segment. (Species unicolorous black or dark red-brown, with flattened scale-like hairs.) ..... Atractotomus

Second antennal segment black or pale, less than twice thickness of third segment 5

5 Small black or black-brown patch present at base of hind tibia. (Hairs all simple, dark or pale) ..... Plagiognathus

Base of hind tibiae not darkened or, at most, brownish 6

6 Fore-wings pale, uniformly marked with brownish dots. (Hind femora dark) ..... Compsidolon

Fore-wings either with darker background colour or, if pale, without spots or with less regular reddish spots 7

7 Small species (2.0-2.7 mm), entirely black, with legs and apex of antennae yellowish ..... Chlamydatus pullus

Usually larger than 2.7 mm. Body and fore-wings partly or wholly paler 8

8 Vertex with keel along posterior margin. Hairs pale, short, simple and adpressed. Femora wholly or in part red, without dark spots. (Coloration variable, reddish or blackish) ..... Sthenarus roseri

Vertex without distinct keel along posterior margin. Either pilosity consisting wholly or partly of flattened pale hairs (which are easily rubbed off) or posterior femora largely dark, without red coloration 9

9 Vertex with a pair of transverse depressions near to hind margin, one on each side. Hairs short, pale, adpressed. Hind femora mainly black-brown. Ground colour black-brown, normally with some paler areas on fore wings ..... Monosynamma

Vertex without transverse depressions. Pilosity consisting wholly or partly of flattened pale hairs. (Femora often reddish, with black spots) 10

10 Fore-wings light greyish, with cuneus reddish, densely covered with flattened pale hairs, unmixed with dark hairs, giving very pale overall appearance ..... Sthenarus roterr

Fore-wings often largely reddish or blackish, occasionally pale greyish with irregular reddish spots. Pubescence a mixture of thin dark hairs and silver or golden scale-hairs Psallus

11 Dorsal surface of fore-wings almost glabrous, with a few sparse short hairs. Pronotum twice as broad as long, lateral margins concave ..... Conostethus

Dorsal surface of fore-wings with distinct hairs, pronotum less than twice as broad as long, or with lateral margins not concave 12

12 Fore-wings entirely black or black apically and brown at base ..... Chlamydatus (pa

Fore-wings either greenish (fading to yellowish), sometimes with red-brown areas, or pale 13

13 Fore-wings broadly marked with red-brown, extending across into embolium. Claws long and thin, smoothly curved ..... Tuponia

Fore-wings normally uniform in colour or slightly mottled; if red-brown areas are present, these are more diffuse and do not extend onto embolium. Claws thicker, often narrowing suddenly at apex or swollen at base 14

14 Tarsi blackish throughout. Antennae distinctly dusky. Vertex often with dark markings. (Yellow-green, with rather diffuse red-brown coloration toward the mid-line, fading after death) ..... Tinicephalus

At most apical segment of tarsi blackish. Antennae not or slightly dusky. Vertex without dark markings 15

15 Hairs entirely pale. Membrane clear. (Light greenish, male sometimes orange) ..... Psallodema

Pilosity either of mixed dark and pale hairs or entirely dark. Membrane often with more or less distinct greyish patches 16

16 Hairs coarse and entirely black, easily rubbed off 17

Hairs finer, mixed dark and pale 18

17 Tibiae with black adpressed hairs (as well as longer outstanding spines). Colour blue-grey or yellowish grey .. Placochilus

Tibiae with brown adpressed hairs (as well as black outstanding spines). Colour yellow-green, fading to yellow-brown after death ..... Megalocoleus pilosus

18 Usually larger, 4.0-5.0 mm. Greyish green, mottled with grey. Claw strongly swollen at base ..... Megalocoleus molliculus

Usually smaller, 3.6-4.3 mm. Uniformly grey-green. Claw not swollen at base, more smoothly tapering and curved .... Asciodema

ORTHOTYLINI + some PHYLINI (from couplet 13, second option)

1 Brachypterous, with fore-wings not reaching end of abdomen 2

Macropterous, with fore-wings extending beyond end of abdomen 5

2 Fore-wings uniformly pale greenish yellow, nearly reaching end of abdomen. Vertex black with two paler spots near eyes ..... Tytthus geminus

Fore-wings with darker markings or only about half length of abdomen. Vertex uniformly pigmented 3

3 Fore-wings with yellowish or hyaline markings or largely pale ..... Globiceps

Fore-wings uniformly blackish or dark brown 4

4 Head black ..... Mecomma

Head rust-red ..... Orthonotus

5 Second antennal segment broadly flattened. (Black with both normal and flattened scale-like pubescence, legs greenish) ..... Heterotoma

Second antennal segment not flattened 6

6 Pronotum divided by a deep transverse furrow, narrow anterior to this and broadened in posterior part 7

Pronotum not divided by deep transverse furrow 10

7 Green species with black spots at base of each tibia, posterior angles of pronotum and parts of antennae black .. Blepharidopterus

Overall colour not green 8

8 Fore-wings dark with four large yellow spots. Pronotum entirely black 9

Fore-wings rust brown, with cuneus yellowish and inner margin of corium pale. Pronotum partly yellow or whitish . Cyllecoris

9 Posterior margin of vertex yellowish. Pronotum and fore-wings with long fine erect hairs only. Posterior part of pronotum strongly raised ..... Dryophilocoris

Head entirely black. Pronotum and fore-wings with both short fine and white scale-like pubescence. Posterior part of pronotum less strongly raised ..... Globiceps (part)

10 Pubescence with both simple and scale-like hairs. (Black species) ..... Heterocordylus

Pubescence of simple hairs only 11

11 Pronotom uniformly black or very dark brown 12

Pronotom paler (moderately dark brown in Tytthus), at least in part 17

12 Fore-wings partly hyaline, grading into grey-brown area; cuneus much longer than broad, more or less hyaline 13

Fore-wings darker, without hyaline areas; cuneus not substantially longer than broad, dark or greenish 14

13 Antennae entirely black. Base of pronotum much wider than head ..... Mecomma

Antennae with first, third and fourth segments lighter. Base of pronotum only just wider than head ..... Globiceps dispar

14 Fore-wings largely green (often fading after death), black toward mid-line ..... Cyrtorhinus

Fore-wings not greenish, usually dark brownish 15

15 Antennae entirely black or deep red. (Legs orange-yellow) Brachyarthrum

Antennae partly or wholly pale 16

16 First and second antennal segments dark; elongate species . Orthonotus

Antennae entirely pale. Small species, less than 3.5 mm long, more convex-sided ..... Plesiodema

17 Eyes rather small, remote from pronotum, with sides of vertex behind eyes convex 18

Eyes larger, touching, or close to, pronotum 19

18 Fore-wings mottled green and hyaline. Underside of first and base of second antennal segments black ..... Malacocoris

Greyish ochreous, without well defined markings. Antennae uniformly grey-brown ..... Lopus

19 General coloration red or brown. Antennae clear yellowish (basal segment yellowish or reddish). Hairs pale 20

If general coloration red or brown, either antennae partly/ wholly dark or pilosity black 21

20 Mottled red and yellow. Basal antennae segment normally reddish, with numerous long dark hairs ..... Pseudoloxops

Uniformly red or brown (except possibly for head). Basal antennal segment yellowish, without dark hairs. (Rather elongate species) ..... Phylus

21 Vertex completely black or black with two pale spots near eyes 22

Vertex pale or with more extensive pale areas 24

22 Pronotum, scutellum and fore-wings uniformly orange-brown . **Brachyarthrum**

Fore-wings partly or wholly greenish or pale greenish yellow (usually fading to yellow after death) 23

23 Clavus of fore-wings deep green, corium and cuneus yellowish, sometimes tinged greenish or reddish. Larger species (4.8-5.3 mm) ..... **Orthotylus virens (some)**

Fore-wings uniformly pale greenish yellow. Smaller (2.2-3.3 mm) ..... **Tytthus**

24 Vertex with two black or black-brown marks, each shaped like a boot. (Mustard-brown, with whitish streaks along two of veins of fore-wings. (Pilosity coarse and black) .. **Hoplomachus**

Vertex with small median grey-brown patch or unmarked 25

25 Entirely yellow-brown, except that second antennal segment and much of first black ..... **Fieberocapsus**

At least in part green or red, or, if entirely light brown, then antennae also entirely brown 26

26 Membrane grey, with prominent white veins enclosing cells. Hairs black and very coarse ..... **Macrotylus**

Membrane sometimes grey, but veins enclosing cells not prominent and white. Hairs finer, pale, dark or both mixed 27

27 Rostrum with third segment apically and fourth segment basally swollen. (Pubescence of mixed black and silvery hairs. Grey-green; clavus often dusky in male. Length 3.5-4.5 mm) ..... **Pachylops**

Rostrum normal. (Mostly green species; one species (*rubidus*) red) ..... **Orthotylus**

NOTES ON THE RECORDING AND IDENTIFICATION OF *PSALLUS*

B.S. Nau, September 1984

This note aims to help recorders become familiar with species of *Psallus* and to facilitate finding them. What is not intended is a means of identifying specimens at random.

By approaching *Psallus* methodically we can make use of any knowledge of host plant and season of occurrence, plan fieldwork month by month and host by host. This will also help you to build up a reference collection of *Psallus*. When searching for *Psallus* look for trees with plenty of flowers or fruits: these will be much more productive than barren trees.

Psallus are typically small-medium bugs, 3-5 mm long and shades of brown, black, red and white. They have two kinds of hairs on the upper parts: ordinary long black hairs and shiny flattened scale-like hairs which are white or gold. These scales tend to abrade so may be very sparse. The tibiae have long black spines, arising from black spots in most species.

The identification of the nineteen or so species of *Psallus* may seem intimidating but the problems can be reduced to manageable proportions. Half the species are fairly straightforward. The remainder fall into two groups found mainly on Oak; only within these is there any real difficulty.

The sexes may be separated in the field by shape: in side view, the male abdomen is fairly flat, while that of the female is strongly convex, and almost keeled on the mid line.

Two useful papers dealing with this genus are:

WOODROFFE, G.E. 1957. A preliminary revision of the British *Psallus* Fieber (Hem., Miridae) with a description of a new species. *Ent. mon. Mag.*, 93 : 258-271.
(This was the basis of the keys in S & L but includes diagrams of genitalia not shown in S & L.)

AUKEMA, B. 1981. A survey of the Dutch species of the sub-genus *Hylopsallus* of *Psallus* (Ham.-Het., Miridae). *Tijdschrift voor Entomologie*, 124 (1) : 1-25.

(Note: 'S & L' denotes Southwood and Leston (1959) *Land and water bugs of the British Isles*)

1. BIRCH: *Psallus* on Birch are normally one of two species. Searching in June is only likely to produce *P. betuleti*, whilst in August-September only *P. falleni* is likely.

   P. betuleti is very distinctive as it is the largest *Psallus* (5-6 mm) and has diagnostic antennae: in the male segments 1-3 are blackish, contrasting with the 4th; in the female they are similar but the second has a pale median band. Only *P. ambiguus* might be confused with *betuleti* but the 3rd antennal segment in *ambiguus* is pale in both sexes. One is very unlikely to find *betuleti* away from Birch.

P. falleni is rather uniformly red and resembles *P. scholtzi* (= *alnicola*) in its medium size, red colour, and late season (Aug-Sept). The host of *scholtzi* is Alder but, as this may grow near Birch and is closely related, the 2 species may overlap. However, *falleni* has white at both base (broadly) and apex (narrowly) of the cuneus, whereas *scholtzi* has only the basal band and this is narrow. Seen together, *falleni* is a redder species than *scholtzi*, which is normally browner. The key in S & L indicates that *scholtzi* has a short rostrum, not surpassing the mid-coxae, but I suspect this is not reliable.

2. ALDER: Two species of *Psallus* are commonly found on Alder, and are unlikely to be confused with each other: *P. ambiguus* is a fairly early species, best sought in June-July, while *P. scholtzi* (= *alnicola*) is a late species best sought in August.

P. scholtzi is a medium-sized reddish bug which can be confused with the Birch bug *P. falleni* (above).

P. ambiguus can be confused with *P. betuleti*, although not quite as large. The antennae are diagnostic (above). The sexes differ in colour. Males are blackish brown variably tinged reddish and often with a red cuneus; females are paler.

3. ASH: *Psallus* found on Ash are normally one of two species, both medium-sized, one of light appearance and the other dark. Both have a short rostrum which only reaches to about the mid-coxae. The short rostrum will positively eliminate any Oak species straying onto Ash, although with a little practice the two Ash species are quite distinctive in colour.

P. flavellus is predominantly light-brown, orange towards the cuneus; it has an extremely short season, two or three weeks in mid-July.

P. lepidus is rather uniformly blackish brown, with a slight red tinge; it appears a week or so before *flavellus* and is readily found through August.

4. CONIFERS: The two *Psallus* normally found on conifers are unlikely to be confused with each other but could be confused with species in related genera:

P. luridus is found on Larch in June-August and is greyish with the base of the cuneus pale. Confusion is possible with *Plagiognathus vitellinus* which is brownish-green or brownish yellow, found on Spruce and usually smaller, 2.5-3.5 mm as compared with 3.5-4.0 mm.

P. obscurellus is found on Pine in June-August and is uniformly black-brown. Confusion can occur with the two conifer species of *Atractotomus: A. magnicornis* on Spruce and *A. mirificus* (added to the British list by Woodroffe (1971) *Entomol.*, 265-267) on Pine. The antennae will distinguish them: in *obscurellus* the antennae are pale brownish and uniformly thin (2nd segment at least 10-times as long as thick). In *Atractotomus* the first two segments are black, and thickened compared with the end two segments (2nd segment not more than about 10-times its thickness).

Another Pine bug, *Plesiodema pinetellum*, resembles *obscurellus* but the female is easily distinguished by the paler black-brown of the forewings, contrasting wtih the darker pronotum and head. In both

sexes of *pinetellum* the base of the cuneus is pale, unlike *obscurellus*. Also the tibial spines are fine and pale compared with the strong black spines of *obscurellus*.

5. SHRUBS: The two species of *Psallus* with an entirely white cuneus are both medium-sized late season bugs occurring on shrubs, and best looked for in August and September. Although the usually whitish upper parts may be flushed with red in varying degrees, both have very finely spotted forewings making identification fairly straightforward:

Psallus haematodes (= *roseus*) occurs on Sallows and is characterised by small rather sparse pinkish-red spots on the forewings. This seems to be a particularly active bug.

Compsidolon salicellus (= *Psallus salicellus*) is best looked for on Bramble and has numerous small brown spots on the forewings. This species occurs on a variety of other shrubs and trees, but less often.

This completes the straightforward species of *Psallus*.

6. MAPLE: One species of *Psallus* is readily found on Field Maple in June and July, at least in the south of England.

P. assimilis is externally indistinguishable from *P. variabilis*. Males are separate on genitalia but females are completely indistinguishable. However, *variabilis* is apparently very uncommon and is not usually found on Maple. The relative measurements is the S & L key do not stand up to scrutiny (see Aukema). The forewings of *assimilis* are usually medium-brown merging to dark red towards the cuneus, quite unlike *perrisi* and *wagneri*. *P. quercus*, which I have not seen, has white scales on the forewings rather than gold and is a little larger on average.

7. OAK: *Psallus* species on Oak can be separated into two groups but there really is no alternative to collecting males and checking the genitalia to ascertain the specific identity.

Group I Darker species: hind femur mostly dark, often reddish-black, not conspicuously spotted; general coloration of upper parts ranging through black to dark brown, often with red tinge, especially towards the cuneus (Sub-genus *Hylopsallus*).

Group II Lighter species: hind femur pale with conspicuous dark spots; general coloration ranging through light brown to orange-red.

Apart from *assimilis*, all the Group I and II species are normally found on Oak, although *perrisi* and *varians* wander onto other trees and herbage quite often. Even what I believe to be *assimilis* is occasionally found on Oak in some numbers!

Group I (dark species, see Aukema (op. cit.) for detailed descriptions and measurements) -

P. perrisi & P. wagneri A species-pair separated only on male genitalia (see S & L or Woodroffe). In Bedfordshire *perrisi* is the more numerous, about 20% of bugs of this pair being *wagneri*. The

appearance of the males of the two species is distinctive: the body and forewings are almost entirely black except that there may be a reddish tinge to the cuneus and the basal areas of the forewings; antennae and tibiae are yellowish. Females differ from males in the paler browner basal part of the forewings, contrasting with the black pronotum and head.

P. variabilis (& P. assimilis) A species-pair separated only on male genitalia (see S & L). With a little practice this species-pair is readily distinguished from other Group I species (see under *P. assimilis*). *P. variabilis* presents several problems, not least because the nomenclature usage in Britain was very confused until Woodroffe's 1957 paper (op. cit.) so little is known of its status here. However this paper also precipitates a problem, it gives as hosts: "... little known, but at present *Salix, Populus, Crataegus*". This information is quoted in S & L (hosts given as Sallow and Aspen). In contrast, Aukema's recent paper shows this bug to be widespread and common on Oak in The Netherlands, where *assimilis* is unknown. This is the basis for regarding *variabilis* as an Oak species in these notes. I have yet to be certain that I have found this species, which Woodroffe regarded as 'very uncommon', Aukema examined seven British Museum specimens from five sites in Britain. For the external characteristics of this bug refer to the notes under *assimilis*, but identification requires dissection of male genitalia.

P. quercus: in my experience a rarity. The last of the Group I species. In The Netherlands it is common on Oak where adults are found from mid-May to the end of July (Aukema). S & L regarded it as uncommon in the south of England and I have yet to meet it in Bedfordshire despite much searching: but it has been recorded from both Wales and Scotland (S & L). It is slightly larger than the other Group I species (male 3.8-4.7 mm, female 3.5-4.3 mm) and is unique in having white rather than gold scales. The head, pronotum, and scutellum are dark brown, red-brown or blackish; the forewings dirty grey-brown to dark brown, apex and margin tinged with red; the cuneus is red-brown.

Group II (light species, see Woodroffe (op. cit.) for details of genitalia not in S & L). In the Group *diminutus* and *mollis* have claws angled abruptly through almost 90° towards the end, while the other species, *varians* and *albicinctus*, have claws which are only gently curved (S & L).

P. varians is probably the commonest of all *Psallus* (in Beds. at least), the adults are found in numbers in June and July. It is the largest Group II species and with a little practice can be recognised by its size, though requiring confirmation of male aedaegus, which is very distinctive (see Woodroffe). Typically upper parts are light brown tending to orange-red towards the cuneus, which is white at base and apex; redder specimens are not infrequent.

P. diminutus is also very common but not quite as abundant as *varians*. It appears a week or so later and perhaps disappears a little earlier, but can be readily found in late June and July by looking for 'small *varians*'. There is scope for confusion with two similar sized species: *mollis* ('*masseei*' in S & L) which is probably not too uncommon and has angled claws, and *albicinctus* which is probably quite rare and has curved claws.

P. mollis (= *masseei*) is probably much less common than *diminutus* but not rare. It may be found in July by looking for broad, redder (or more orange) '*diminutus*'. Angled claws separate this species from *albicinctus* and *varians* but genitalia need to be examined to separate it from *diminutus* and confirm identification.

P. albicinctus: this is probably quite rare. In June or July look for small, redder (or more orange) '*diminutus*'. Subsidiary characters are the presence of fine brown freckles on the head and pronotum; the broad hind femur (width about one third of length); and two faint dark spots on the first segment of the antennae. Genitalia of males have to be checked for a confirmed identification.

SEASONAL OCCURRENCE OF PSALLUS AND ALLIED GENERA B.S. Nau

(Based on Southwood & Leston (1964))

HOST	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
ALDER *Alnus glutinosa*	*Psallus ambiguus*	*P. ambiguus*	*P. ambiguus* *Psallus scholtzi* *Compsidolon salicellus*	*P. ambiguus* *P. scholtzi* *C. salicellus*	*P. scholtzi* *C. salicellus*	*C. salicellus*
APPLE *Malus*	*P. ambiguus*	*P. ambiguus*	*P. ambiguus* *C. salicellus*	*P. ambiguus* *C. salicellus*	*C. salicellus*	*C. salicellus*
ASH *Fraxinus excelsior*		*Psallus lepidus*	*P. lepidus* *Psallus flavellus*	*P. lepidus*	*P. lepidus*	
ASPEN *Populus tremula*		*Psallus variabilis* *Psallus diminutus*	*P. variabilis* *P. diminutus*			
BIRCH *Betula* spp.	*Psallus betuleti*	*P. betuleti*	*Psallus falleni*	*P. falleni*	*P. falleni*	
BRAMBLE *Rubus*			*C. salicellus*	*C. salicellus*	*C. salicellus*	*C. salicellus*
HAWTHORN *Crataegus*	*P. ambiguus*	*P. ambiguus* *Psallus perrisi*	*P. ambiguus* *P. perrisi* *(Psallus wagneri)*	*P. ambiguus* *P. perrisi* *(P. wagneri)*		
HAZEL *Corylus avellana*			*C. salicellus*	*C. salicellus*	*C. salicellus*	*C. salicellus*
LARCH *Larix*		*Psallus luridus*	*P. luridus*	*P. luridus*		
MAPLE *Acer campestris*		*Psallus assimilis*	*P. assimilis*			

SEASONAL OCCURRENCE OF PSALLUS AND ALLIED GENERA

HOST	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
OAK *Quercus* spp.		*P. perrisi* *P. wagneri* *Psallus quercus* *P. diminutus* *Psallus albicinctus* *Psallus varians*	*P. perrisi* *P. wagneri* *P. quercus* *P. diminutus* *Psallus mollis* *P. albicinctus* *P. varians*	*P. perrisi* *P. quercus* *P. varians*	*P. varians*	
PINE *Pinus silvestris*		*Phoenicocoris obscurellus*	*P. obscurellus*	*P. obscurellus*		
POPLAR *Populus* spp.		*P. diminutus*	*P. diminutus*			
SALLOW *Salix* spp.	*P. ambiguus*	*P. ambiguus* *P. variabilis*	*P. ambiguus* *P. variabilis* *Psallus haematodes* *C. salicellus*	*P. ambiguus* *P. haematodes* *C. salicellus*	*P. haematodes* *C. salicellus*	*C. salicellus*

October 1984

IDENTIFICATION OF MICROVELIA

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Whilst keying-out Microvelia using the keys in S & L and in Macan, I felt that neither was entirely satisfactory. On referring to the paper in which Walton first reported the two rarer species from Britain, I found this very useful, as it has detailed descriptions, and excellent plates of all three British species, re-drawn here; the original should still be consulted for the fine details of plates and descriptions. At the same time I have put together a composite key, based on the three sources, which I hope may be easier to use. For completeness, I include Hebrus and Velia, which resemble each other in form and habit.

1 Antennae with 5 segments; ocelli present ..... Hebrus

Antennae with 4 segments; ocelli present 2

2 Tarsi with 3 segments ..... Velia

Tarsi with 2 segments ..... Microvelia 3

3 Winged 6

Wingless 4

4 Hind tarsus segments of equal length; mesonotum covered by pronotum ..... M. pygmaea

Hind tarsus segments unequal, 1st only half 2nd 5

5 Hind margin of pro- and mesonotum curved uniformly; pale pronotal collar interrupted on the median line ..... M. reticulata

Hind margin of pro- and mesonotum sinusoid; collar continuous ..... M. umbricola

6 Hind tarsus segments of equal length; pronotum dark grey ... M. pygmaea

Hind tarsus segments unequal, 1st half 2nd; pronotum dark brown 7

7 Forewing with a recurved pale mark near centre, surrounded by several pale spots ..... M. reticulata

Forewing with cream oval spot near apex and in females another centrally ..... M. umbricola

REFERENCES

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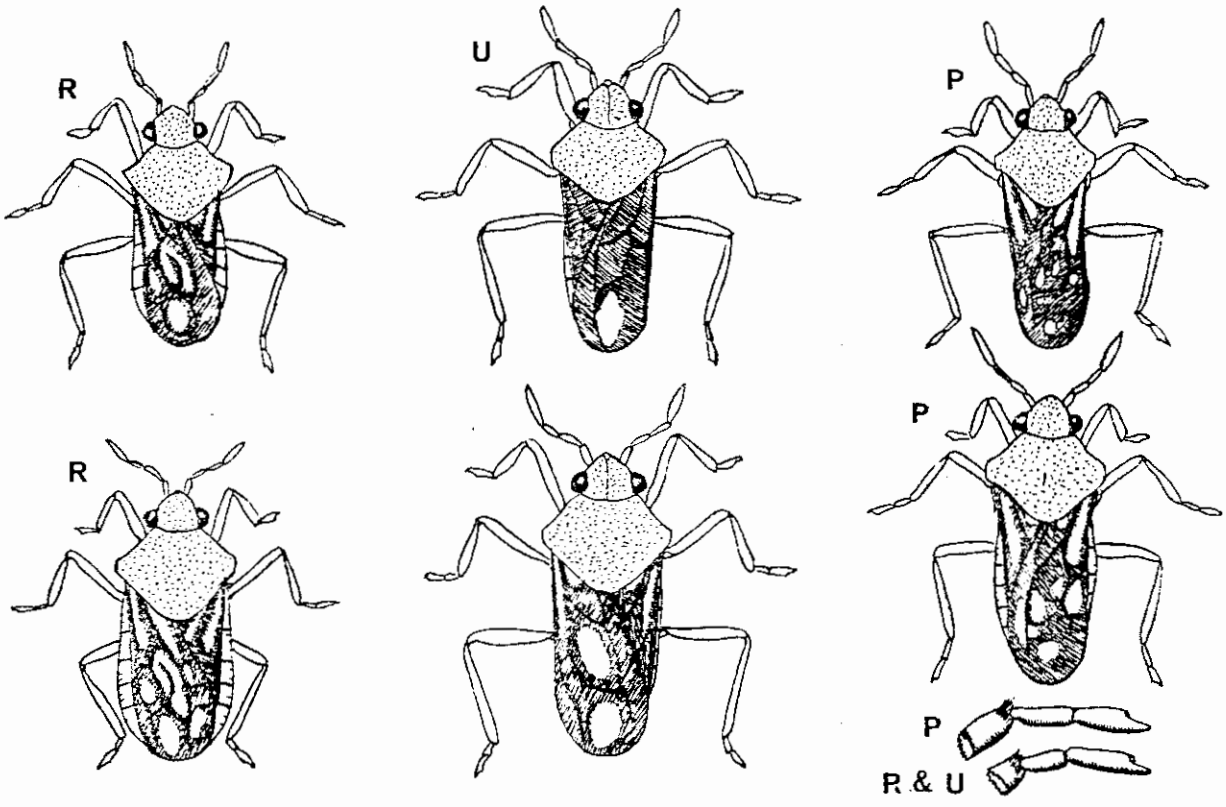
SOUTHWOOD & LESTON 1959. *Land and water bugs of the British Isles.* London: Warne.

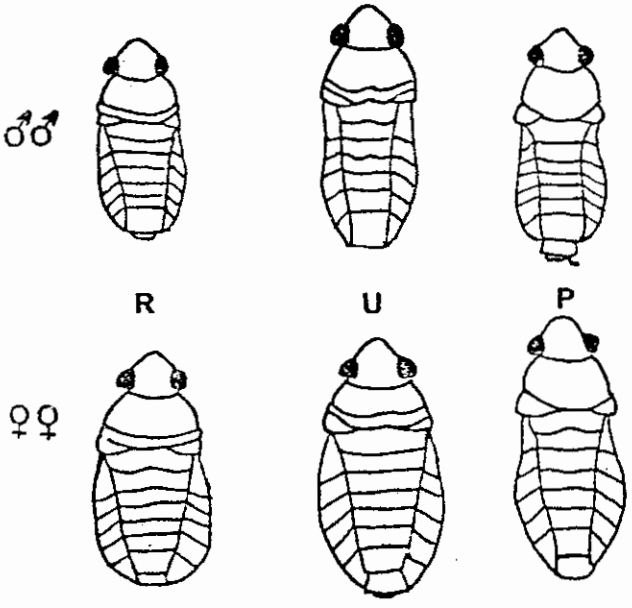
WALTON, G.A. 1939. Two water bugs new to Gt Britain: Microvelia pygmaea Duf. & M. umbricola Wrob. (Hemipt.). *J. Soc. Brit. Ent.* 2 (1) : 26-33.

MALE MACROPTERS

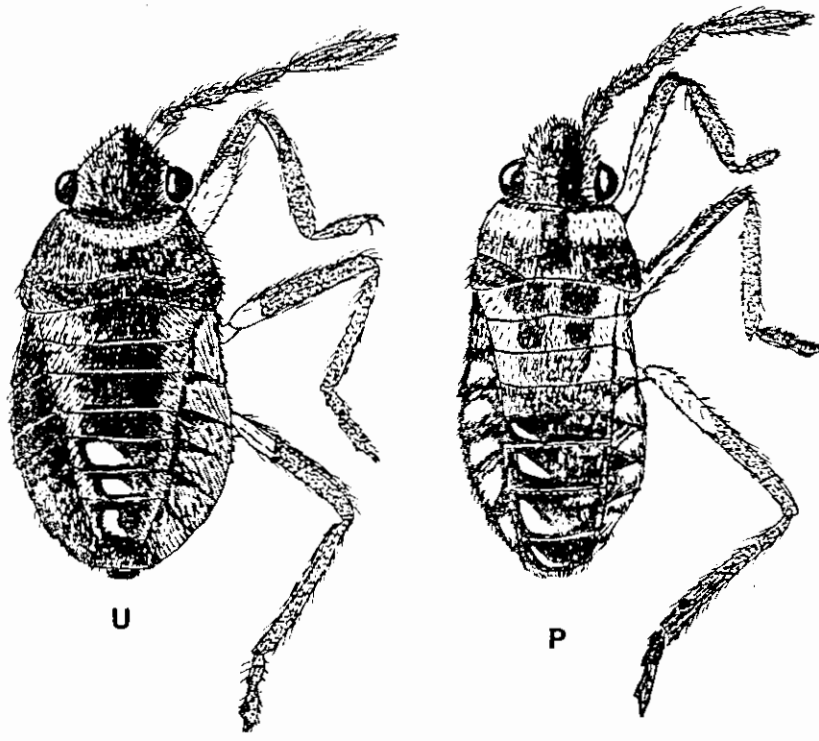
FEMALE MACROPTERS



HIND TARSI



Outlines showing tergite shape (apters)



Pronotal collar and other coloration (female apter