Micridium angulicolle – a rare European beetle discovered in Finland (Coleoptera: Ptiliidae)

MIKAEL SÖRENSSON & TOM CLAYHILLS

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The featherwing beetle *Micridium angulicolle* (Fairmaire, 1858) (Coleoptera: Ptiliidae) is recorded from SE Finland through window-trap samples from snags and hollow trees of aspen (*Populus tremula*). The (few) known finds in Finland, Sweden, France, Italy, Austria and Slovakia are listed and mapped. It is shown that *M. angulicolle* possesses a larger European distribution and a wider host tree spectrum than previously understood. An ecological connection to hollow deciduous trees of older (mature) forest fragments is suggested. Characters and a key for separating the European species of *Micridium* Motschulsky, 1869 is given, including illustrations of the male genitalia of *M. angulicolle* and *M. halidaii* (Matthews, 1868).

Mikael Sörensson, Lund University, Ecology Bldg., Sölveg. 37, SE-22362 Lund, Sweden. E-mail: mikael.sorensson@biol.lu.se
Tom Clayhills, Tennbyvägen 33-35, B4, FIN-21600 Pargas, Finland. E-mail: tom.clayhills@parnet.fi

The beetle family Ptiliidae (featherwing beetles) is a group of staphylinoid beetles which are best known for their minute size (body length: 0.3-4 mm) and reduced, feather-like alae. Being primarily microphagous spore feeders in litter and other decaying organic matter, their life style remains obscure. Some species thrive in decaying wood, under bark and in hollow trees, others in bracket fungi (species of Nanosellini), in compost, under sea weed on the sea shores, in wetland and along margins of streams, lakes and ponds. In the nemoral and boreal forest regions, they can be seen in flight in vast numbers during calm afternoons, occasionally counting thousands.

In the Palaearctic region, 215 species in 34 genera have been recorded so far (Sörensson 2015, 2016), a rough quarter of the world species total. The European region, including the Caucasus, currently holds 139 species, 84 of which occur in northern Europe (Sörensson 2015, 2016). The condition in this European subregion is close to saturation, and not many more species are expected to be discovered in the future (Sörensson 2016). Therefore, it was with curiosity we noted the surprising find of a species of the genus *Micridium* Motschulky, 1869 in eastern Finland, made by the junior author (TC), which initially posed problems as to its identification. Previously, only *Micridium halidaii* (Matthews, 1868) had been recorded from Finland (Rassi *et al*. 2015, Silfverberg 2010, Sörensson 2015).

Due to the rather large external variation in *M. halidaii*, also involving the variable pronotal puncturation, the Finnish *Micridium* specimens initially, with some hesitation, were interpreted as belonging to *M. halidaii*. However, after dissecting males for the genitalia, it became clear

Figure 1. Sun-exposed, south-faced clear-cut slope at Vesikivi, S. Karelia, finding place for *Micridium angulicolle*. The mature aspens on which the window-traps were placed are seen in the background. Secondary vegetation dominated by *Lonicera xylosteum*, *Ribes alpinum*, *Pulmonaria obscura* and *Lathyrus vernus*. Photo: T. Clayhills.

Solexponerat, ca tioårigt granplanterat hygge i sydvänd sluttning vid Vesikivi, Södra Karelen, fyndplats för *Micridium angulicolle*. I fonden syns mogna aspar som har undersökts med fönsterfällor. Skogstry, måbär, lungört och vårärt dominerade busk- och fältskikt. Foto: T. Clayhills.

that a different species was involved. Comparison of the known *Micridium* species of the Palaearctic and the Nearctic realms proved our species to be identical to *Micridium angulicolle* (Fairmaire, 1858). This is a rare species, previously only known from historical records in South and Central Europe, and a few reasonably recent in northern Italy and eastern Austria, the most recent, however, being a single locality in southernmost Sweden (see below). The occurrence in Finnish Karelia, far off from continental localities, is surprising and suggests either an unusual life style difficult to detect or a recent introduction from the south. This theme is further elaborated upon below.

Material & method

Micridium specimens were caught during a monitoring project of saproxylic beetles of dead and dying aspen trees (*Populus tremula*) in xerotherme habitats in 2013 in the South Karelia province (Ka = Karelia australis) of southeastern Finland (see below), not far from the Russian border. Specimens were collected by a window-trap affixed to a hollow aspen in the sun-exposed, south-faced upper part of a sloping clear-cut of some 8-10 years of age, recently replanted with Norway spruce *Picea abies* (Fig. 1). The rather small, narrow, elongate hollow entrance was situated close to the base of the aspen trunk (Fig. 2). One further specimen was similarly collected in the same spot in the year after. Later, the tree hollow was invaded by ants (*Formica* sp.) and no more specimens were found.

Re-examination of an aberrant *Micridium* specimen from Hevossalo island in the province of boreal Savolax [Sb], ca 150 km north of the Vesikivi locality and preliminarily identified by the senior author (MS) as belonging to the more widely distributed *Micridium halidaii* (Matthews, 1868), also turned out to belong to *M. angulicolle*; cfr. Martikainen (2009). This specimen, a female, was sampled in 2008 by a trunk-window trap affixed to an aspen snag (height: 6 m; diameter: 75 cm) of decay stage 2, rather recently dead, with ca 60% left of remaining bark, and situated in a shady part of the forest. This snag was very rich in saproxylic species, with ca 100 beetle species recorded, including many rarities, though few aspen specialists. Thus, another rare beetle species could be added to the North European guild of insect species tied to rich aspen habitats, still partly an unexploited gold mine of high insect biodiversity deserving attention in a European (and northern hemisphere) conservation perspective.

Below, all specimens of *M. angulicolle* seen

and studied are listed. In addition, all known literature records and their references are provided. As far as I know, Swedish material of *Micridium angulicolle* originates from collections made by renowned coleopterists Rickard Baranowski (Baranowski 1977), Ambjörn Carlsson and Willy Kronblad in the late 1970s and early -80s. The collections of RB and AC are now housed in the entomological collections of the Zoological Museum of the University of Lund (ZMUL).

Acronyms
cBA = coll. Bengt Andersson (Nybro, Sweden)
cJV = coll. Jussi Vilén (Hämeenkoski, Finland)
cMS = coll. Mikael Sörensson (Lund, Sweden)
cPC = coll. Peter Cederström (Eslöv, Sweden)
cPM = coll. Petri Martikainen (Joensuu, Finland)
cTC = coll. Tom Clayhills (Pargas, Finland)
cWK = coll. Willy Kronblad (Vetlanda, Sweden)
ZMUL = Zoological Museum of the University of Lund (Sweden)

Material examined: FINLAND: **Sb**: Leppävirta munic., Hevossalo island, 16.vi.-16.vii.2008 leg. P. Martikainen, 1 female in window-trap on dead aspen stump (cPM); **Ka**: Joutseno munic., Kuurmanpohja, Vesikivi (61.06601°N 28.72530°E) 21.v.-13.vi. 2013 leg. T. Clayhills, 6 ex (cJV, cMS, cTC); Joutseno, Vesikivi 11.v.-9.vi.2014 leg. T. Clayhills, 1 ex (cTC); SWEDEN: **Skåne** [Scania], Hallands Väderö 4.ix.1977 leg. R. Baranowski, 14 ex (ZMUL, cBA, cMS, cPC, cTC), 17.ix.1977 leg. R. Baranowski, 6 ex (ZMUL, cMS), 21.iii.1981 leg. A. Carlsson, 8 ex (ZMUL, cMS), 20.v.1982 leg. A. Carlsson, 8 ex (ZMUL, cMS), 1.x.1983 leg. W. Kronblad, 1 ex (cWK).

Literature records: AUSTRIA: Laxenburger Park (Niederösterreich) 29.ix.1967 leg. C. Besuchet, 6 ex "*aus der Mulm einer abgestorbenen alten Ulme gesiebt*" (Franz 1970); Leithagebirge (Burgenland), Tiergarten bei St. Georgen 31.v.1968 leg. H. Franz, 2 ex "*morsche Eichen*" (Franz 1970); see also Besuchet (1976); Horion (1949). FRANCE: Fontainebleau (Seine-et Marne; type locality); *vide* Darby (2017); Servoz (Haute-Savoie); Lorgues (Var), Les Maures (Var); *vide* Sörensson (2014). «Pyrenäen» (?) (Flach 1889). ITALY: Castelfeder (Alto-Adige) 26.iv.1970 leg. M. Kahlen, "*in Anzahl in Eichenmulm*" (Kahlen 1987). Locality not specified (Bertolini 1899-1904; Besuchet 1976, Horion 1949, 1951, Porta 1926, Poggi 1995). SLOVAKIA: Gemer region (Roubal 1926, 1930); Kosiče (Fleischer 1927-30).

Figure 2. Aspen with elongate, narrow hollow at Vesikivi (closest in view), a probable host tree for *Micridium angulicolle*. Wood-peckers left traces after searching and foraging on larvae and pupae of the buprestid *Poecilonota variolosa*. Photo: T. Clayhills.

I förgrunden syns en ihålig asp med smalt, avlångt, basalt ingångshål, och troligt värdträd för *Micridium angulicolle*. Trädet bär färska spår av hackspettar som letat larver och puppor av aspprakbagge *Poecilonota variolosa*. Foto: T. Clayhills.

Systematics

For long, the genus *Micridium* Motschulsky, 1869 was considered a species-poor taxon, only comprising three Palaearctic species and two Nearctic. Recently reviewing the genus, Darby (2017) described a number of new species from South America and Madagascar, simultaneously synonymizing the Trinidadian genus *Micridina* Johnson, 1969 with *Micridium* whilst applying a broad concept of the genus. In this work, he gave a brief redescription of *M. angulicolle*

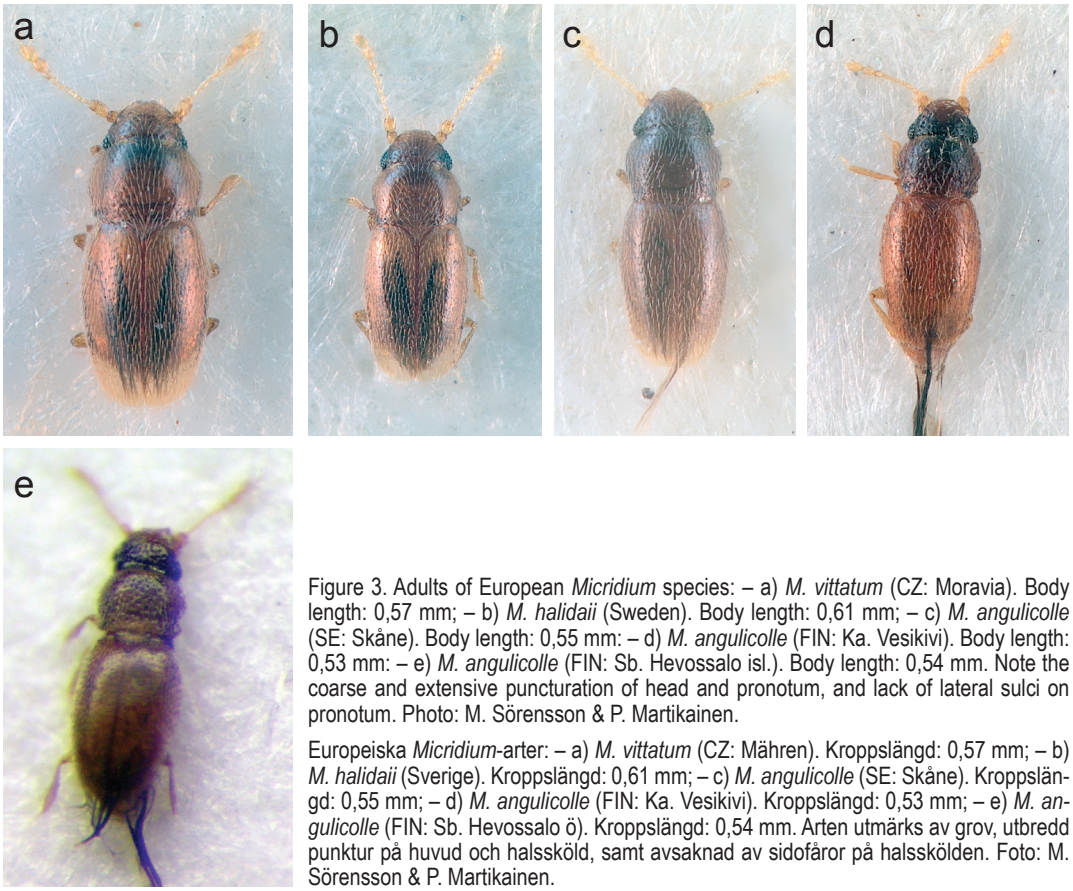

Figure 3. Adults of European *Micridium* species: – a) *M. vittatum* (CZ: Moravia). Body length: 0,57 mm; – b) *M. halidaii* (Sweden). Body length: 0,61 mm; – c) *M. angulicolle* (SE: Skåne). Body length: 0,55 mm: – d) *M. angulicolle* (FIN: Ka. Vesikivi). Body length: 0,53 mm: – e) *M. angulicolle* (FIN: Sb. Hevossalo isl.). Body length: 0,54 mm. Note the coarse and extensive puncturation of head and pronotum, and lack of lateral sulci on pronotum. Photo: M. Sörensson & P. Martikainen.

Europeiska *Micridium*-arter: – a) *M. vittatum* (CZ: Mähren). Kroppslängd: 0,57 mm; – b) *M. halidaii* (Sverige). Kroppslängd: 0,61 mm; – c) *M. angulicolle* (SE: Skåne). Kroppslängd: 0,55 mm; – d) *M. angulicolle* (FIN: Ka. Vesikivi). Kroppslängd: 0,53 mm; – e) *M. angulicolle* (FIN: Sb. Hevossalo ö). Kroppslängd: 0,54 mm. Arten utmärks av grov, utbredd punktur på huvud och halssköld, samt avsaknad av sidofåror på halsskölden. Foto: M. Sörensson & P. Martikainen.

based on a presumed syntype preserved in the Matthews-collection of the Natural History Museum, London. Neither *M. angulicolle*, nor *M. vittatum* (Motschulsky, 1845) were included in the species key. Johnson (2012) and Darby (2012) transferred *Micridium* from tribus Ptiliini to Ptinellini while Darby (2017) retransferred *Micridium* back into Ptiliini.

Species recognition and key

Micridium angulicolle is the smallest among the European species (Fig. 3c-e). It is closely related to the larger and highly variable *M. halidaii* (Fig. 3b), and may be hard to distinguish from that species by external facies. Body outline and general habitus, dorsal pubescence, sculpture and colour are similar. In addition, the mesocoxae are close, almost continuous in both species, the mesoventral process posteriorly continues briefly onto the metaventrum by a very short, narrow keel, the mesoscutellar basal furrow possesses a few coarse, deep punctures, the compound eyes are not reduced, the menta are broadened anterad, the female spermathecae are lightly sclerotized, and the male penis apices are prolonged and asymmetrically built (Fig. 4a-d).

On either side of the pronotal midline, *Micridium halidaii* usually exhibits two sharp, deep longitudinal, slightly oblique, basal furrows, which very rarely are missing or only vaguely indicated. In those latter instances they resemble other *Micridium* species lacking furrows, in particular *M. angulicolle* (Fig. 3c-e). Already in the original description of *M. angulicolle*, Fairmaire (1858:733-4) highlighted the lack of pronotal sulci (furrows) [*'impressionibus nul-*

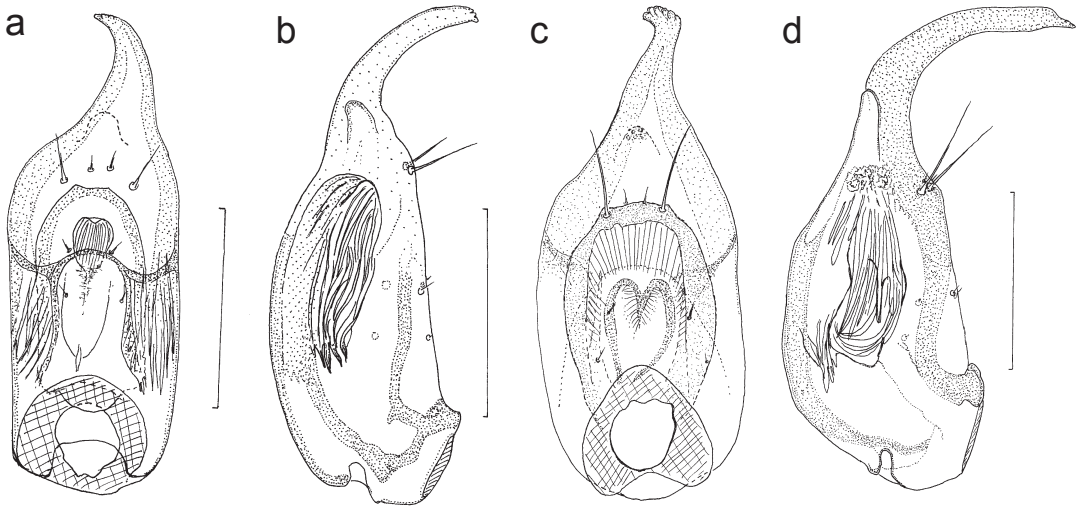

Figure 4. Male *Micridium* species, penis. Scale bars: 0.05 mm: – a) *M. angulicolle*, ventral view; – b) *M. angulicolle*, lateral view; – c) *M. halidaii*, ventral view; – d) *M. halidaii*, lateral view.

Penis hos *Micridium*-arter. Skalstreck: 0,05 mm: – a) *M. angulicolle*, ventralvy; – b) *M. angulicolle*, sidovy; – c) *M. halidaii*, ventralvy; – d) *M. halidaii*, sidovy.

lis']. *Micridium angulicolle* may be constantly distinguished from *M. halidaii* by the characters given in the key (see below). In addition, coarse punctures usually cover a larger area of the posterior part of the head in *M. angulicolle* than in *M. halidaii*; cfr. Fig. 3e.

The most constant and unambiguous differences are found in the primary and secondary sexual characters of the male (Fig. 4a, b). In *M. halidaii* (Fig. 4c, d), the asymmetrical penis is larger than in *M. angulicolle* (Fig. 4a, b) and possesses a much prolonged, distinctly fringed apex which in lateral view is strongly curved by an angle of ca 90°; cfr. Reisdorf *et al*. (2016:120) (parenthetically, the key illustration in Darby (2012:352) shows a broken, incomplete penis apex of *M. halidaii*). In addition, the main (distal) pair of apical phallic setae are longer than in *M. angulicolle*. In *M. halidaii*, the comb-like male intermetacoxal lamina (thin, sharp edge between hind coxae) is broad and richly fringed, bearing ca 21 fringes (Fig. 5b), as compared to only ca 15 fringes in the narrower 'comb' of *M. angulicolle* (Fig. 5a).

The female genitalia of both species are

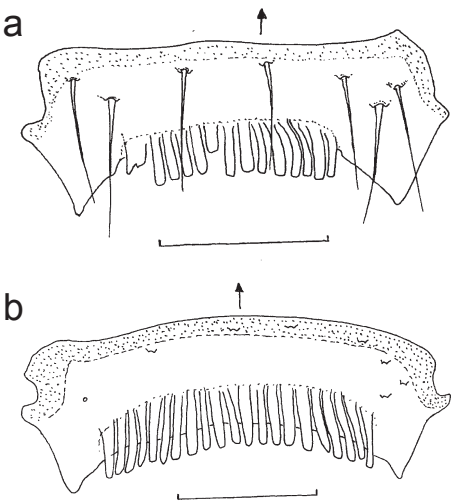

Figure 5. Secondary male characteristics of *Micridium* species; intermetacoxal lamina, ventral view. Arrow points anterad. Scale bars: 0.03 mm: – a) *M. angulicolle*. – b) *M. halidaii*.

Sekundära könskaraktärer hos hanar av *Micridium*-arter; bakbröstets bakkantsmitt (mellan bakhöfterna), sedd underifrån. Pil pekar framåt i kroppens längdriktning. Skalstreck: 0,03 mm: – a) *M. angulicolle*. – b) *M. halidaii*.

lightly sclerotized, very fragile and difficult to handle. Although not pictured here, they closely resemble each other (MS pers. obs.); cfr. Darby (2012, 2017) and Reisdorf *et al*. (2016).

Key to European species of *Micridium* Motschulsky

Abbreviations:
BL = body length in dry mounted specimens (head front to elytral hind margin).
PL = penis length (base to apex) in wet mount (lateral view).
Characters (e.g. body colour) refer to mature, adult beetles.

1. Eyes small, much reduced, dorsoventrally narrowed in lateral view, with ca 8-13 coarse facets. Pronotum evenly tapering posterad, not cordiform. Head and pronotum dorsally very finely punctate, shining, basilateral pronotal sulci lacking. Body uniformly light yellowish-brown. Medium-sized species (Fig. 3a). BL: 0.55-0.58 mm.....*vittatum* (Motsch.)
–. Eyes larger, of normal size (ca 20-30 fine facets), dorsoventrally oval in lateral view. Pronotum cordiform, constricted posterad, sides curved. Head posteriorly coarsely punctate. Pronotum at least dorsomedially distinctly and coarsely irregularly punctate, very faintly to distinctly laterosulcate. Body colour variable, usually darker, brown to yellowish-brown, often slightly bicoloured with anterior half darker.....2

2. Smaller species: BL: 0.51-0.56 mm (Fig. 3c-e). Basilateral sulci of pronotum absent or only vaguely, irregularly indicated by separate punctures, then converging anterad. Elytra shining, very finely microreticulate and sparsely micropunctate, stippled punctures which at most form vague transverse rows. ♂: Penis smaller (PL: 0,12 mm), more slender; apex shorter, gently curved in lateral view (Fig. 4a, b). Intermetacoxal lamina with ca 15 fringes (Fig. 5a).....*angulicolle* (Fairm.)
–. Larger species: BL: 0.55-0.64 mm (Fig. 3b). Basilateral sulci of pronotum present, usually regularly sharp, distinct, parallel or slightly converging anterad, covering 1/3-3/5 of pronotal base. Elytra somewhat less shining, distinctly microreticulate and punctate, stippled punctures at least partly forming distinct transverse rows. ♂: Penis larger (PL: 0,14 mm), thicker; apex prominent, longer, strongly curved, almost angled in lateral view (Fig. 4c, d). Intermetacoxal lamina with ca 21 fringes (Fig. 5b).....*halidaii* (Matth.)

Ecology

Very little is known about the ecology of *Micridum angulicolle*. The affinity to old, hollow trees was noted already by Fairmaire (1858:734) who originally stated that "*a few specimens....were found at Fontainebleau in an old beech tree (Fagus sylvatica) with ants*" [our translation]. Several finds were made in mulm in tree hollows. Originally a German word, 'mulm' (Eng. mulch) designates a mixture of rotting wood fragments, fungi, decaying leaves and nest material slowly and continuously accumulating in tree hollows during decades. Kahlen (1987) reported finds from mulm in old oaks (*Quercus* sp.) and Baranowski (1977) sifted many specimens in early September from mulm of old, hollow beech trees in shady sites of an old beech forest (Sweden: Hallands Väderö). In a similar way, it was later recovered by him and other collectors in other hollow beeches in the same locality. Franz (1970) sifted specimens from a rotten oak, while Besuchet (Franz 1970) sifted mulm of a dead, rotting elm tree (*Ulmus* sp.). The novel finds on Finnish aspen stumps and snags (*Populus tremula*), albeit conducted by window-trapping, suggest a broader range of deciduous host tree taxa, possibly (but theoretically not) excluding coniferous tree species. This seems reasonable since saproxylic, micro-mycetophagous ptiliid beetles primarily depend on abiotic factors, like degree of humidity and wood degradation, type of rot and microfungi, rather than tree taxon choice. The Finnish window-trap finds indicate specimens caught in flight, actually the first observation of its kind. This accords with the general macroptery of species of *Micridium*.

Recent observations of the lack of ants in trees and tree hollows inhabited by *Micridium angulicolle* (Sweden, Finland) suggest that a connection to ants is accidental and mainly due to partly overlapping habitats between ants and beetles. This is true also for other *Micridium* species, e.g. the uncommon *M. halidaii*, a species with a broad taxon range, occurring in rotting wood of coniferous and deciduous trees, occasionally in company with ants (Burakowski *et al*. 1978, Darby 2012, Hansen 1968, Horion 1949, Jałoszyński *et al*. 2015, Lundberg *et al*. 1987, Nakladal & Sörensson 2008, Reisdorf *et al*. 2016, Sörensson 1994, 2014).

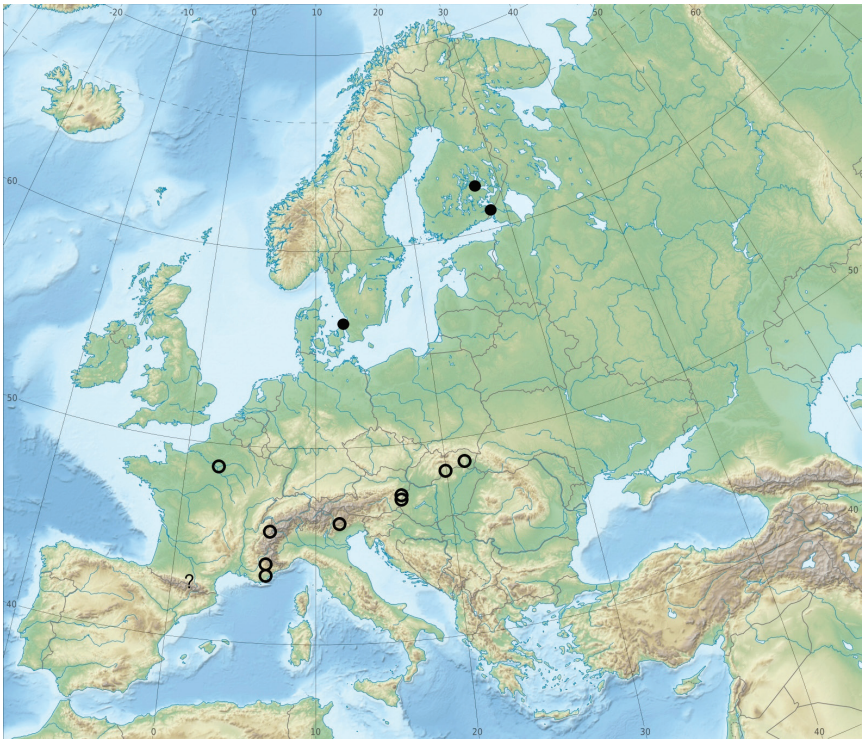

Figure 6. European distribution map of *Micridium angulicolle* based on collection and literature records. Filled circles = recent records (>1974). Unfilled circles = older records (<1975).

Utbredningskarta för *Micridium angulicolle*. Fyllda cirklar = fynd efter 1974. Ofyllda cirklar = fynd gjorda t.o.m. 1974.

There are not many observations of annual adult activity of *M. angulicolle* so far. Yet, the meagre number of finding dates (March-July, September-October) suggests a more or less continuous period of annual adult activity during spring, summer and autumn. In fact, this is much the same pattern as displayed in other ptiliid genera which breed more or less continuously all year around (De Coninck & Coessens 1981, Dybas 1976). The main driving force behind this breeding strategy is the slow female egg production, only producing a single, 'giant' egg at a time, hence, theoretically requiring a longer, continuous breeding season in order to secure a proper degree of egg and larval instar survival.

Distribution

The revised distribution map of *Micridium angulicolle* (Fig. 6) implies a much wider distribution area than indicated by previous authors (Horion 1949, Besuchet 1971, 1976, Sörensson 2015). The recent finds extend the known distribution from southern Central Europe to Finland, traversing northwards well into the boreonemoral zone. The map also suggests probable presence in many still unrecorded areas of the Central European nemoral zone. The presumably heavily fragmented distribution pattern could be explained in various ways, either as recent, secondary introduction in Finland, or as a result of severe undersampling. It could, however, also be interpreted as a real trait roughly reflecting the current strained situation caused by modern industrial forestry, still expanding and applied over large areas in Europe. Repeated tree harvest efficiently interrupts natural ageing, initiation, growth and development of tree hollows containing mulm. If true, presence of *M. angulicolle* in relict forests and similar areas of naturally ageing trees will turn out to be statistically over-represented as compared to a null-hypothesis of an expected random distribution pattern. Put simply, *M. angulicolle* is probably confined to mature trees and forests in Europe, a species-rich habitat type often severly fragmented in our time, worth caring and protection.

The idea of a recent introduction cannot be

ruled out completely, although the very specific choice of habitat, including mature trees and forest stands speak against this. Due to undersampling caused by the beetle's extreme smallness and hidden life style, its true occurrence and distribution in Europe in reality remains to be settled. Sharp eyes and sustained attention when sorting future samples from mature saproxylic habitats may hopefully produce further records of this most interesting European rarity.

Red Lists

Micridium angulicolle belongs to a smaller group of very rare tree hollow species which are regularly listed in various national Red Lists, e.g. Austria (Kahlen 1994), Italy (Biscaccianti & Audisio 2014) and Sweden (ArtDatabanken 2015). Its connection with deciduous tree hollows, usually of trees of older age classes situated in comparatively slow-growing and stable habitats, combined with few over-all finds and general 'rarity', makes it a typical target species for Red Lists and conservation action plans.

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References

ArtDatabanken. 2015. Rödlistade arter i Sverige 2015. – ArtDatabanken, SLU, Uppsala.

Baranowski, R. 1977. Intressanta skalbaggsfynd 2 (Coleoptera). – Entomologisk Tidskrift 98: 133-140.

Bertolini, S. de. 1899-1904. Catalogo dei Coleotteri d'Italia. Edito dalla" Rivista Italiana de Scienze Naturali". – Tip. e Lit. Sordo-Muti di L. Lazzeri, Siena.

Besuchet, C. 1971. 21. Familie: Ptiliidae. – In: Freude, H., Harde, K. W. & Lohse, G. A. (eds.). Die Käfer Mitteleuropas. Vol. 3, Adephaga 2, Palpicornia, Histeroidea, Staphylinoidea 1: 311-334. Goecke & Evers, Krefeld.

Besuchet, C. 1976. Contribution a l'étude des Ptiliides paléarctiques (Coleoptera). – Bulletin de la Société Entomologique Suisse 49: 51-71.

Biscaccianti, A.B. & Audisio, P. 2014. Ptiliidae. – In: Audisio, P., Baviera, C., Carpaneto, G.M., Biscaccianti, A.B., Battistoni, A., Teofili, C. & Rondinini, C. (eds.). Lista Rossa IUCN dei Coleotteri saproxilici Italiani: 119-120. Comitato Italiano IUCN e Ministero dell'Ambiente e della Tutela del Territorio e del Mare. Stamperia Romana, Roma.

Burakowski, B., Mroczkowski, M. & Stefańska, J. 1978. Katalog Fauny Polski. Catalogus faunae Poloniae. Część XXIII, tom 5. Chrząszcze. Coleoptera. Histeroidea i Staphylinoidea prócz Staphylinidae. – Muzeum i Instytut Zoologii PAN, Warszawa.

Darby, M. 2012. Ptiliidae Erichson. – In: Duff, A. (ed.). Beetles of Britain and Ireland. Volume 1: Sphaeriusidae to Silphidae: 332-371. A.G. Duff, West Runton, Norfolk.

Darby, M. 2017. Taxonomic review of the genera *Micridium* Motschulsky, 1869 and *Micridina* Johnson, 1969 (Coleoptera: Ptiliidae) with eleven new species including the first records from South America and Madagascar. – Zootaxa 4242(2): 233-254.

De Coninck, E. & Coessens, R. 1981. Life cycle and reproductive pattern of *Acrotrichis intermedia* (Coleoptera: Ptiliidae) in experimental conditions. – Journal of Natural History 15: 1047-1055.

Dybas, H.S. 1976. The larval characters of featherwing and limulodid beetles and their family relationships in the Staphylinoidea (Coleoptera: Ptiliidae and Limulodidae). – Fieldiana: Zoology 70(3): 29-78.

Fairmaire, L. M. 1858. Miscellanea entomologica. Deuxième partie (2). – Annales de la Société Entomologique de France (Serie 3) 5: 725-745.

Flach, C. 1889. Bestimmungstabelle der Trichopterygidae des europäischen Faunengebietes. – Verhandlungen der Kaiserlich-Königlichen zoologisch-botanischen Gesellschaft in Wien 39: 481-532, pls 10-14.

Fleischer, A. 1927-30. Přehled brouků fauny Československé republiky. Moravské museum zemské, ročník XXV.-XXVII. Tiskem akciové Moravské knihtiskárny. – Nákladem Mor. musea zemského, Brno.

Franz, H. 1970. Die Nordost-Alpen im Spiegel ihrer Landtierwelt. Eine Gebietsmonographie umfassend: Fauna, Faunengeschichte, Lebensgemeinschaften und Beeinflussung der Tiere durch den Menschen. Band III. Coleoptera 1. Teil, umfassend die Familien Cicindelidae bis Staphylinidae (bearbeitet v. H. Franz). – Universitätsverlag Wagner, Innsbruck-München.

Hansen, V. 1968. Danmarks Fauna 77. Biller. XXV. Ådselbiller, stumpbiller m.m. 2. Stærkt omarbejdede udgave. – G.E.C. Gads Forlag, København.

Horion, A. 1949. Faunistik der mitteleuropäischen Käfer unter Mitarbeit zahlreicher Koleopterologen. Band II. – Vittorio Klostermann, Frankfurt am Main.

Horion, A. 1951. Verzeichnis der Käfer Mitteleuropas (Deutschland, Österreich, Tschechoslovakei) mit kurzen faunistischen Angeben. 1. Abteilung: Caraboidea, Palpicornia, Staphylinoidea, Malacodermata, Sternoxia, Fossipedes, Macrodactylia, Brachymera. – Alfred Kernen Verlag, Stuttgart.

Jałoszyński, P., Marczak, D. & Konwerski, S. 2015. 681. Potwierdzenie występowania *Micridium halidaii* (Matthews, 1868) (Coleoptera: Ptiliidae) w Polsce. – Wiadomości Entomologiczne [Poznań] 34(1): 45-46.

Johnson, C. 2012. Ptiliidae. – In: Duff, A.G. (ed.). Checklist of Beetles of the British Isles. Second edition. 28-30, 114. – Pemberley Books, Iver.

Kahlen, M. 1987. Nachtrag zur Käferfauna Tirols. Ergänzung zu den bisher erschienenen faunistischen Arbeiten über die Käfer Nordtirols (1950, 1971 und 1976) und Südtirols (1977). – Tiroler Landesmuseum Ferdinandeum, Innsbruck.

Kahlen, M. 1994. Ptiliidae. – In: Kahlen M., Hellrigl, K. & Schwienbacher, W. Rote Liste der gefährdeten Käfer (Coleoptera) Südtirols, p. 213. In: Gepp J. (ed.). Rote Liste gefährdeter Tierarten Südtirols. Abteilung für Landschafts- und Naturschutz Autonome Provinz Bozen/Südtirol.

Lundberg, S., Palm, T. & Trottestam, O. 1987. Skalbaggsstudier på Siciliens nordkust. I. Ekskog vid Gibilmanna. – Entomologisk Tidskrift 108: 45-54.

Martikainen, P. 2009. Savuniemen, Kipansalon ja Hevossalon kovakuoriaisselvitys 2008. [Final report to Metsähallitus 24.1.2009.] – Etelä-Suomen Luontopalvelut, Vaara-Karjala, Metsähallitus.

Nakládal, O. & Sörensson, M. 2008. New records of the Ptiliidae (Coleoptera) from the Czech Republic. – Klapalekiana 44: 35-41.

Poggi, R. 1995. Famiglia Ptiliidae. In: Angelini, F., Audisio, P., Castellini, G., Poggi, R., Vailate, D., Zanetti, A. & Zoia, S. Checklist delle species della fauna Italiana (Minelli, A., Ruffo, S. & La Posta, S. eds.). Fascicolo 47: 7-9. Coleoptera Polyphaga II (Staphylinoidea escl. Staphylinidae). – Edizioni Calderini, Bologna.

Porta, A. 1926. Fauna Coleopterorum Italica. Vol. II. Staphylinoidea. Staphylinidae, Pselaphidae, Clavigeridae, Scydmaenidae, Silphidae, Liodidae, Clambidae, Leptinidae, Platypsyllidae, Corylophidae, Sphaeriidae, Trichopterygidae, Hydroscaphidae, Scaphidiidae, Histeridae. – Stabilimento Tipografico Piacentino, Piacenza.

Rassi, P., Karjalainen, S., Clayhills, T., Helve, E., Hyvärinen, E., Laurinharju, E., Malmberg, S., Mannerkoski, I., Martikainen, P., Mattila, J., Muona, J., Pentinsaari, M., Rutanen, I., Salokannel, J., Siitonen, J. & Silfverberg, H. 2015. Kovakuoriaisten maakuntaluettolo 2015. Provincial list of Finnish Coleoptera 2015. – Sahlbergia 21. Supplement 1. 1-166 pp.

Reisdorf, P., Zagatti, P., Degallier, N., Sörensson, M. & Tamisier, J.-P. 2016. Le Coléoptérome du Marais de Montabé. Chapitre 6: notes techniques, tableau de bord 2014 et présentation des Histeridae, Ptiliidae, Leiodidae, Scaphidiinae, Dasycerinae, Pselaphinae, Scydmaeninae et Silphidae (avec une espèce nouvelle pour la France). – Le Coléoptériste 19(2): 108-135.

Roubal, J. 1926. O některých význačných Ptilinech na Slovensku. – Časopis Československé společnosti entomologické 22(5-6): 104-105.

Roubal, J. 1930. Katalog Coleopter (Brouků) slovenska a podkarpatska na základě bionomickém a zoogeografickém a spolu systematický doplněk Gangelbauerovných "Die Käfer von Mitteleuropa" a Reitterovy "Fauna Germanica". Svazek 3. Praha: Učené Společnosti Šarfaříkovy v Bratislavé. Vytiskla státní tiskárna v Praze.

Silfverberg, H. 2010. Enumeratio renovata Coleopterorum Fennoscandiae, Daniae et Baltiae. – Sahlbergia 16(2): 1-144.

Sörensson, M. 1994. New provincial records of Swedish Featherwing beetles (Coleoptera, Ptiliidae) with additional notes on rare species. – Entomologisk Tidskrift 115: 165-172.

Sörensson, M. 2014. Ptiliidae Erichson, 1845-48 (45), pp. 198-208. – In: Tronquet, M. (ed.) Catalogue des Coléoptères de France. Supplement au Tome XXIII. R.A.R.E. Association Roussillonnaise d'Entomologie, Perpignan.

Sörensson, M. 2015. Family Ptiliidae Erichson, 1845. – In: Löbl, I. & Löbl, D. (eds.). Catalogue of Palaearctic Coleoptera. Hydrophiloidea-Staphylinoidea. Revised and updated edition. Vol. 2/1: 162-177. Brill, Leiden, Boston.

Sörensson, M. 2016. The Palaearctic catalogue of Ptiliidae (Insecta, Coleoptera) - corrections and additions to nomenclature and distribution records, with notes on taxic diversity and distribution patterns. – Studies and Reports. Taxonomical Series 12(1): 251-286.

Sammanfattning
Fjädervingen *Micridium angulicolle* (Fairmaire) (Fig. 3c-e) är en över hela Europa mycket sällsynt art som nyligen överraskande påträffades på två platser i Finland, dels i Norra Savolax år 2008, dels i Södra Karelen, alldeles nära ryska gränsen, år 2013-14. Båda fynden gjordes med hjälp av fönsterfällor uppsatta på högstubbar eller ihåliga stammar av asp (Fig. 1, 2), ett nytt trädslag för arten. Den var tidigare endast känd från bok, ek och alm. Senaste dokumentation i Europa härrör från Hallands Väderö i Skåne år 1983. I övrigt är mest äldre förekomster från Centraleuropa kända (Fig. 6), en del 100 år eller äldre. Senaste fynd i Centraleuropa härrör från 1967-70 och gjordes i Norditalien och i det angränsande Österrike. Man kan på goda grunder anta att arten p.g.a. litenhet och undangömt levnadssätt är förbisedd. Den är dock knappast en sentida inkomling i Finland (och Sverige), eftersom den främst tycks vara bunden till hålträd i mogna lövträdsbestånd på värmegynnade lokaler. I sådana har den oftast träffats vid sållning av mulm och vedsmul. De finska individerna är de första kända som (sannolikt) fångats flygande. Arten är svår att skilja från den närstående *M. halidaii* (Matthews) (Fig. 3b). Förutom på primära och sekundära könskaraktärer (Fig. 4, 5) skiljes den på mindre storlek (0,51-0,56 mm), avsaknad av skarpa, streckliknande sidofåror på halsskölden, kraftig, utbredd huvudpunktur och glänsande täckvingar med ytterst svag och otydlig punktur och mikroretikulation, samt kort täckvingebehåring, vars enskilda hår inte överlappar varandra. På grund av få kända förekomster och specialiserat levnadsätt är arten en het kandidat för europeiska nationers rödlistor.

Stipendier från Entomologiska föreningen i Stockholm

Flera stipendier på tillsammans ca 100 000 kronor kan sökas av framför allt yngre entomologer, men även doktorander, äldre amatörer, o s v. Stipendierna är främst avsedda för självständiga undersökningar rörande insekter, men även andra projekt, såsom naturvårdsinsatser och insektpedagogiska aktiviteter. Detaljerad plan över projektet ska bifogas, med kostnadskalkyl. Mer information finns på http://www.ento.se/stipendier/, och frågor kan besvaras av Bert Gustafsson, tel 08-5195 4089, email bert.gustafsson@nrm.se

Fullständig ansökan ska vara inne hos föreningen per post eller email senast 1 maj 2018.

Bert.Gustafsson@nrm.se
Entomologiska föreningen
Naturhistoriska riksmuseet
Box 50007
104 05 Stockholm

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Eventuella frågor besvaras av Stefan Eriksson tel. 018-501559, e-post: stefaneriksson@eurofins.se

Ansökan skall vara föreningen tillhanda senast den 30 april 2018. Adress: Entomologiska föreningen i Uppland, c/o Stefan Eriksson, Järsta Lugnet 141, 743 93 Vattholma.

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