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A new species of *Hadrodactylus* Foerster (Hymenoptera: Ichneumonidae, Ctenopelmatinae, Euryproctini) from Britain and mainland Europe, with a review of material of the genus in the National Museums of Scotland

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Synopsis

The British and wider Palaearctic material belonging to the ichneumonid genus *Hadrodactylus* in the National Museums of Scotland (NMS) is detailed. One species is newly described on the basis of specimens in NMS, the Zoological Institute, St Petersburg (ZISP) and the Natural History Museum, London (BMNH), and a new key to the species group to which it belongs is provided. Two further species are recorded from Britain for the first time.

Key words: Hymenoptera, Ichneumonidae, Ctenopelmatinae, *Hadrodactylus*, *idari* sp. nov, distribution, Britain, mainland Europe, Palaearctic.

Introduction

The Holarctic genus *Hadrodactylus* Foerster contains about 40 species, more than half of them occurring in the western Palaearctic region (Aubert, 2000; Yu, van Achterberg & Horstmann, 2005). They are solitary koinobiont endoparasitoids of sawfly larvae, in all known cases of the tribe Dolerini (Hymenoptera: Tenthredinidae). As this host group, whose larvae feed on Poaceae, Cyperaceae, Juncaceae and Equisetaceae, is generally common in grasslands, adult specimens of *Hadrodactylus* are easily obtained by sweeping or hand-netting and, being of moderately large size (forewing length *ca* 6–10 mm), they are often retained and consequently tend to be well-represented in collections. The precise host relations of species remain almost completely unelucidated, however, and much of value could be learned from the deliberate and carefully controlled rearing of wild-collected larvae of Dolerini.

Hadrodactylus can be separated from other ichneumonids by the following combination of characters:

upper apical margin of fore tibia with a small tooth (typical for Ctenopelmatinae); clypeus apically thick, rounded, and usually with coarse punctures; face and clypeus usually yellow; forewing with areolet; tarsal claws rather large, simple; 5th

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hind tarsal segment often enlarged and usually longer than 3rd; first metasomal segment straight, slender, without glymmae, its spiracles close to its mid length, its petiole narrow and rather long; second tergite also elongate; metasoma at least partly red.

Idar (1979; 1981) published a well-illustrated key to and diagnosis of the European species, following much preliminary nomenclatural work to establish types and provide re-descriptions (Idar, 1974*a*; 1974*b*; 1975*a*; 1975*b*). However, in the '*H. tiphae* [variously *typhae*] group' (cf. Idar, 1974*a*; 1979), comprising species with the lower tooth of the mandible wider and longer than the upper tooth and the malar space narrower than the maximum width of the third segment of the maxillary palpus, there is a sub-group of species in which taxonomic problems have remained. These are the species with the prepectal carina only weakly raised that run to couplet 4 in Idar's (1979) key.

Here we present a new key to the European species of this group, which we will refer to as the *H. gracilipes*-subgroup: *H. gracilipes* Thomson, *H. indefessus* (Gravenhorst) (= *tarsator* Thomson), *H. nigrifemur* Thomson and a new species, *H. idari* sp. nov., which we describe below. Idar (1974*b*) extensively re-described and illustrated the first three of these from the lectotype specimens he had previously designated (Idar, 1974*a*), but his concept of *H. gracilipes* included two species. Thus in his key, Idar (1979) attributes yellow markings of the middle coxae to *H. gracilipes*, but this coloration occurs only in the new species described below. In the true *H. gracilipes*, as defined by the lectotype, the middle coxae are black, and the last segment of the hind tarsus is shorter than in other species (slightly shorter than segment 3); that both these characters are present has been kindly confirmed by Dr Roy Danielsson (pers. comm.) who recently studied the lectotype of *H. gracilipes* on our behalf. In his arrangement of the BMNH collection, J. F. Perkins had correctly recognized *H. gracilipes* in the sense of the lectotype, and kept specimens of the new species removed from that name, but Idar, despite having designated the lectotype, subsequently determined specimens of the new species in the BMNH as *H. gracilipes* together with the true *H. gracilipes*. Other recent works on the genus include Horstmann's (2000; 2007) notes on the taxonomy of some species and a paper on Chinese *Hadrodactylus* (Sheng & Chang, 2004) with a key to three species.

In addition to describing the new species, we summarise the Palaearctic *Hadrodactylus* material held in the National Museums of Scotland (NMS) collection, providing distributional and phenological data.

Key to European species of the *gracilipes*-subgroup of *Hadrodactylus*

1 Mid coxa yellow or at least apical 0.3 predominantly yellowish. Metapleurum scabrous, usually without distinct punctures. Hypopygium often reddish (rarely black). Pterostigma uniformly brown (except pale at extreme base and apex). Hind femur 5.0 or more times as long as wide. Segment 5 of hind tarsus as long as segment 3. Tergite 2 usually black, tergite 5 red or predominantly red. First tergite about 5.0 times as long as wide ..... ***idari*** sp. nov.

– Mid coxa predominantly blackish. Metapleurum usually with distinct punctures (at least anteriorly). Hypopygium usually black. Other characters not entirely as above 2

2 Segment 5 of hind tarsus slightly shorter than segment 3 and 1.6–1.7 times as long as segment 4. Hind femur about 5.5 times as long as wide, reddish and usually weakly fuscous at apex. Second tergite entirely red or usually with blackish markings on about its apical 0.7. Sternite 6 of female (hypopygium) black. Pterostigma pale brown with dark brown anterior and posterodistal margins ..... ***gracilipes*** Thomson

– Segment 5 of hind tarsus usually longer than segment 3 (or sub-equal to segment 3), or other characters not entirely as above 3

3 Hind femur black or entirely red (not darkened at apex), about 4.6–5.0 times as long as wide in female. Hind tibia either largely red (as femur) or infuscate grading to a paler base. Prepectal carina ventrally not distinctly higher than its lateral parts. Tergite 2 entirely red or usually with a blackish transverse spot at about apical 0.75 and with blackish lateral stripes. Pterostigma brownish, usually not or only slightly paler basally ..... ***nigrifemur*** Thomson

– Hind femur red, distinctly fuscous at apex, about 4.2–4.8 times as long as wide. Hind tibia infuscate with pale area at base. Prepectal carina higher ventrally than laterally. Tergite 2 black with reddish base, or sometimes almost entirely red but usually darkened at apical margin. Pterostigma brownish with basal 0.3–0.4 paler ..... ***indefessus*** (Gravenhorst)

Hadrodactylus idari sp. nov.

The new species differs from all other species of *Hadrodactylus* with very short genae and large lower tooth of the mandible (*tiphae*-group) in having the mid and fore coxae yellow (or predominantly yellow), and the fifth segment of the hind tarsus as long as the third segment or slightly longer (segment 5 distinctly shorter than segment 3 in *H. gracilipes*). *Hadrodactylus idari* is structurally rather similar to *H. gracilipes* (hind femora rather slender and prepectal carina ventrally low); it differs from *H. gracilipes* by characters provided in the key.

Female (holotype). Forewing 8.0 mm. Antenna with 43 flagellomeres, flagellum about 1.25 times as long as forewing; two basal flagellar segments combined 0.87 times as long as maximum diameter of eye. Head strongly narrowed behind the eyes; temples strongly narrowed downward to mandibles. Malar space about 0.08 times as long as basal width of mandible and about 0.25 times maximum width of 3rd segment of maxillary palpus. Lower tooth of mandible much longer and larger than upper tooth. Clypeus with moderately sparse punctures in basal half and with coarse and moderately dense punctures in lower half. Frons matt, scabrous, with distinct dense and moderately fine punctures. Temples matt, granulate, with fine indistinct punctures. Hypostomal carina beyond the mandible low, as high as occipital carina. Pronotum with epomia; dorsolateral parts of pronotum (beyond the epomia) scabrously granulate, without obvious punctures. Mesoscutum almost smooth, rather evenly, distinctly and moderately densely punctate, behind the centre with median scabrous area. Mesopleurum uniformly covered with coarse and dense punctures up to subtegular ridge; speculum polished. Prepectal carina

not raised ventrally in a lobe, only slightly higher than its lateral parts. Metapleurum scabrous, without distinct punctures; pleural carina distinct and complete. Propodeum with median dorsal carinae subparallel, rather weak, extending to apical area; apical area not bordered anteriorly by carinae and covered with irregular rugosity, but in median part of apical area with tendency of rugae to be longitudinal; lateral areas (except for their posterior part) finely granulate; pleural areas and hind parts of lateral areas finely scabrous. Radial cell in forewing 3.7 times as long as wide; distal part of radial vein strongly sinuate; areolet stalked with second recurrent vein in distal corner; nervulus postfurcal, distant from basal vein by 0.5 of its length; nervellus intercepted very slightly above the middle. Legs rather slender; hind coxa in profile 1.7 times as long as its maximum width; hind femur 5.2 times as long as its width; proportion of segments 1–5 in fore tarsus 2.40 : 1.40 : 1.05 : 0.65 : 1.50, in hind tarsus 3.90 : 2.35 : 1.90 : 1.20 : 1.90 (segment 5 as long as segment 3 and about 1.6 times as long as segment 4); claws rather narrow, in hind tarsus about 0.8 times as long as segment 4. First segment of metasoma about 5 times as long as wide at apex and 11 times as long at its narrowest width; petiole without dorsal longitudinal carinae, rather flat dorsally and with dorsolateral carinae from base to spiracle; postpetiole in its basal 0.4 (just beyond spiracles) constricted (narrow); petiole and basal part of postpetiole finely scabrous; postpetiole and second tergite finely granulate. Apex of first sternite lying at level of basal 0.3 of distance between spiracles and apex of tergite. Second tergite 1.8 times as long as wide posteriorly.

Head black with face, clypeus and palpi completely, mandibles (except for teeth), scape and pedicel ventrally yellow. Flagellum reddish yellow ventrally, brownish dorsally and completely so on about three apical segments. Thorax black, small spot in hind corner of pronotum reddish yellow; tegulae whitish yellow; tegulae of hindwings yellowish brown. Fore coxae yellow anteriorly, reddish posteriorly; mid coxa predominantly yellow in apical half with reddish and brown spots in basal half; hind coxa black with apical edge yellow. All trochanters whitish yellow (hind trochanter I slightly reddish dorsally). Fore and mid legs beyond the trochanters pale rufous with the three last segments of mid tarsus pale brownish. Hind femur light red, its apical 0.15 blackish dorsally and laterally. Hind tibia pale brownish with basal 0.1 light yellow dorsally and entirely dirty yellow ventrally; apical 0.25 with reddish brown tinge. Hind tarsus brownish, segments 2–4 pale at extreme base. Pterostigma dark brown, whitish yellow in basal 0.2. Metasomal tergites 1, 2 and 6–8 black, tergites 3–5 red; tergite 2 with a median elongate reddish spot in basal 0.5 and with a small obscure reddish spot apically; tergite 6 at base and laterally red. Sternites 2–4 yellow, sternites 5–6 entirely rufous. Ovipositor sheath brownish yellow.

Male. The male is similar to the female in the main structural features and in coloration, but the hind femur is usually slightly thicker (4.5–5.0 times as long as wide); flagellum of antenna sometimes darker at apex than in female; abdominal tergites often entirely blackish except for weak reddish markings at extreme base of tergites 3 and 4; sternites (5)6–8 black. Pterostigma darker than in female. Males of *H. idari* may be distinguished (besides the proportions in tarsal segments) from those males of *H. nigrifemur* with red femora in having the hind femur darkened apically and slightly slenderer (in males of *H. nigrifemur* usually 4.3–4.5 times as long as wide); from *H. gracilipes* it differs by its pale rather than black fore and mid coxae.

Variability. Forewing 6.0–8.5 mm; antenna with 39–45 flagellomeres; sculpture of metapleurum rather stable in British specimens (finely scabrous, without distinct punctures), but in material from the Kolar Peninsular often distinctly punctate; segment 5 of hind tarsus sometimes slightly longer than segment 3; coloration of mid coxa varies from predominantly yellow to (rarely) predominantly black with only the apical 0.4 yellowish ventrally or anteriorly; tergite 2 sometimes entirely black; hypopygium in most specimens from Russia reddish only in apical 0.3–0.5 and blackish basally. In one paratype from France (in BMNH), the metapleurum is also distinctly punctate and the hypopygium dark.

MATERIAL EXAMINED

Holotype ♀: [**England**] Savernake Forest, Wilts[hire] SU 214671, Mal[aise] trap, 31.v.–13.vi.[19]90 [*K. Porter*, in register], NMSZ 1993.033 (in National Museums of Scotland (NMS)).

Paratypes. [**England**] 1 ♀ with same data as holotype except 13.vi–4.vii.[19]90; 4 ♀, 3 ♂ as holotype except SU 229656 [with dates as follows] 2–22.v.[19]90 (2 ♂), 23.v.13.vi.[19]90 (1 ♀, 1 ♂), 13.vi–4.vii.[19]90 (3 ♀); 2 ♀ as holotype except SU 205676, 16.vi–7.vii.[19]93; 1 ♀, Wiltshire, Somerford Common, by stream SU 0286, 5.vi.2004 (*P. J. Chandler*); 1 ♀, Wychwood Forest, Oxon SP 343171, Mal. tr., 4–23.v.[19]90 (*K. Porter*, in register); 2 ♀, Abbots Moss, Cheshire SJ 5868, Malaise trap, *Quercus*/*Betula*/*Pinus*, 12–27.vi.[19]86 (*R. R. Askew*) NMSZ 1988.002. [**Scotland**] 1 ♂, Balerno, nr Edinburgh, 14.v.1981 (*A. D. Liston*); 2 ♂, Wallacebank Wood SWT [reserve], Larbert, Stirlingshire, NS 8484, 28.v.1987 (*S. I. Baldwin*); 1 ♀, White Loch, Galloway, 23.vi.1996 (*D. Phillips*) NMSZ 2005.043; 14 ♀, Paddockmuir Wood, Errol, Tayside, Malaise trap [with dates as follows] 26.vi–3.vii.[19]87 (1 ♀), 3–9.vii.[19]87 (1 ♀), 16–23.vii.[19]87 (1 ♀), 23–30.vii.[19]87 (1 ♀), 8–15.vii.[19]88 (1 ♀), 15–22.vii.[19]88 (1 ♀), 22–29.vi.[19]88 (2 ♀), 25.v–1.vi.[19]89 (1 ♀), 8–15.vi.[19]89 (2 ♀), 15–22.vi.[19]89 (2 ♀), 6–13.vii.[19]89 (1 ♀) (*D. Phillips*) NMSZ 2005.043; 6 ♀, Taynish NNR, Argyll NR 730845, Malaise trap, clearing in oak/alder wood [with dates as follows] 1–10.vi.[19]84 (4 ♀), 10–26.vi.[19]84 (1 ♀), 9.vii– 5.viii.[19]84 (1 ♀) (*I. C. Christie*) RSM 1984.048; 1 ♀, 1 ♂, Rassal NNR, W. Ross NG 845432 Mal. tr. [with dates as follows] 15–31.v.[19]91 (1 ♂), 12–22.vi.[19]91 (1 ♀) (*P.W. Brown*) NMSZ 1992.022; 1 ♀ [probably Scotland] W. B. R. Laidlaw det. 2459 1941, Laidlaw Coll. 1951.72 (all the foregoing in NMS); 1 ♀, 1 ♂, **British Isles** / Dsvgns. 68.52 / 1936 in B. M. Coll. under typhae Fourc / Hadrodactylus [with respective sex symbol] ?tarsator Thn J. F. Perkins det. viii.1936; 1 ♂, **British Isles** / Dsvgns 68.52 / 1936 in B. M. Coll. under M. vulneratus Zett. / Hadrodactylus typhae Fourc? J. F. Perkins det 193 / 461 / Hadrodactylus gracilipes Ths ♂ det. M. Idar 1973; 1 ♀, 9.vi.1912 South /. **British Isles** C. Morley Coll. B. M. 1952-159 / 543 / Hadrodactylus gracilipes Ths. ♀ det. M. Idar 1973; 1 ♂, [**England**] Staunton, GW. High Meadow Wds, 4.vi.1936 (*E. B. B*[*enson*] *& J. F. P*[*erkins*]) B. M. 1936-399; 1 ♀, **France**: Puy-de-Dôme, Le Mont-Dore, 24.vi–6.viii.1934 (*M. E. Mosely*) / 2.15.1 / Hadrodactylus gracilipes Ths ♀ det. M. Idar 1973; 1 ♀, 1 ♂, 59.101 **Germany** / M. typhae Fourcr. Grav. / Ruthe Coll. 59.101; 1 ♀, **Sweden**. SK. Ringsjö. 19.vi.1938 (*D. M. S. P*[*erkins*] *& J. F. P*[*erkins*]); 1 ♀, 1 ♂, **Sweden**. SK. Höör distr. [with dates as follows] 16.vi.1938 (1 ♂), 18.vi.1938 (1 ♀) (*D. M. S. P*[*erkins*] *& J. F. P*[*erkins*]) (all the foregoing in BMNH). **Russia** (all material in ZISP). Murmansk Province (*D. Kasparyan* leg., 1974) (this material was determined by M. Idar 1982 as '*Hadrodactylus gracilipes* Thoms.'): 2 ♀, Lavna river, W of Murmansk, 11.vii; 1 ♂, Verkhnetulomskij, 80 km SW of Murmansk, 17.vii; 1 ♀, Nikel, Shuoni river, 20.vii; 1 ♀, Kirovsk, Botanical garden, 1.viii. Karelia: 1 ♀, Petrozavodsk, Lake Onega, moorage Zimnik, Picea forest, 18.vii.1986 (*D. Kasparyan*). Leningrad Province: 1 ♀, Kobralovo-Semrino, 40–44 km S. of Saint-Petersburg, 29.vi.1980 (*D. Kasparyan*). Yaroslavl Province: 1 ♂, Berdizyno, near Yaroslavl, 23.vi.1891 (coll. of Kokujev); ? Yaroslavl (coll. of Kokujev): 2 ♀ 'Tukk.l.' and '52/II'. Tyumen Province, Yamalia Autonomous District (*D. Kasparyan* leg.): 1 ♀, Taz river, 50 km ESE. of Ratta, 31.vii.1972; Ob' river, 8 km N. of Labytnangi, 13.vii.1994. Altai Republic: 1 ♀, road from Abaj to Ust'-Kan, 25–26.vii.[18]97 (*Silantiev*). Krasnoyarsk

Territory: 1 ♀, Taimyr, Talnakh near Norilsk, 22.viii.1973 (*K. Gorodkov*). Primorskij Territory: 1 ♀, Golubinyj Utes, 10 km E. of railway st. Khasan, 28.v.1979 (*A. Zinovjev*).

Material of *Hadrodactylus* in the NMS collection

Hadrodactylus bidentulus Thomson, 1883. 1 ♀, Slovakia: Bratislava, Šúr reserve, 28.vi.1991 (*D. R. Kasparyan*). This species may not occur in the British Isles: specimens from Britain in BMNH standing over this name had been misidentified.

Hadrodactylus confusus (Holmgren, 1858). 1 ♀, Russia, West Siberia, Ratta, Taz river, 7.viii.1992 (*D. R. Kasparyan*); 1 ♀, Russia, Nikel, Murmansk district, 20.vii.1994 (*D. R. Kasparyan*).

Hadrodactylus faciator (Thunberg, 1824). 12 ♀, 9 ♂. England (V.C.s 22, 23, 27), Isle of Man (V.C. 71), Scotland (V.C. 83). Specimens collected in fens from vi.–vii.(viii.); presumably univoltine.

Hadrodactylus femoralis (Holmgren, 1857). 12 ♀, 3 ♂. England (V.C.s 7, 24, 27), Scotland (V.C.s 88, 96, 101, 105). Specimens collected from vi–vii(viii); presumably univoltine.

Hadrodactylus flavofacialis Horstmann, 2000 (= *flavifrontator* auctt.). 1 ♀, England, Wiltshire, Savernake Forest, SU 214671 (V.C. 7), Malaise trap 31.v–13.vi.1990 (*K. Porter*); 1 ♀, England, Cheshire, Abbots Moss, SJ 5868, Malaise trap 27.v–12.vi.1986 (*R. R. Askew*); 1 ♂, Scotland, Fife, Loch Leven (V.C. 85), 10.vi.1911 (*W. Evans*); 1 ♀, Scotland, Glasgow, Cadder Wilderness (V.C. 77), no date but probably < 1900 (*P. Cameron*).

Hadrodactylus fugax (Gravenhorst, 1829). 2 ♀, England, Norfolk, Santon Downham, TL 818883 (V.C. 28), Malaise trap 17–29.vi.1984 (*J. Field*); 1 ♂, Wales, Anglesey, Newborough Warren (V.C. 52), 23.v.1997 (*M. R. Shaw*); 2 ♀, Scotland, Perthshire, Coire Choille Chuilc, NN 3328 (V.C. 88), Malaise trap vi.1986 (1 ♀) and vii.1985 (1 ♀) (*I. MacGowan & R. M. Lyszkowski*); 1 ♀, Scotland, Angus, Craig Mellon (V.C. 90), 9.vii.1995 (*K. P. Bland*); 1 ♀, no data (*Greville*). Presumably univoltine.

Hadrodactylus gracilipes Thomson, 1883. 15 ♀, 2 ♂, England, Wiltshire, Savernake Forest, SU 229656, SU 225660, SU 209660 and SU 214671 (V.C. 7), Malaise trap with dates in v(vi) in 1990 and 1991 (*K. Porter*); 2 ♀, Scotland, Aberdeenshire, Morrone Birkwood (V.C. 92), Malaise trap 1–18.vi.1984 (*B. D. Batty*). Presumably univoltine.

Hadrodactylus gracilis (Stephens, 1835). 1 ♀, 1 ♂, Russia, Chuchur-Muran near Yakutsk, 1.viii.1970 (*D. R. Kasparyan*).

Hadrodactylus graminicola Idar, 1979. **New to Britain**. 2 ♀, 3 ♂, England, Wiltshire, Savernake Forest, SU 229656 and SU 214671 (V.C. 7), Malaise trap 23.v–13.vii.1990 (1 ♂) and 13.vi–4.vii.1990 (2 ♀, 2 ♂) (*K. Porter*); 1 ♂, England, Lyndhurst (V.C. 11), 2.vii.1979 (*B. Barr*); 1 ♂, England, Hampshire, Ashford Hill Meadow, SU 561620 (V.C. 12), Malaise trap 6–29.vi.1989 (*K. Porter*); 1 ♀, England, Berkshire, Silwood Park (V.C. 22), Malaise trap vi./vii.2002; 2 ♀, Scotland, Inverness-shire, Ben Macdui plateau (V.C. 92 or 94), immobilised on snow, 20.vi.1983 (*N. P. Ashmole*); 4 ♀, Scotland, Wester Ross, Rassal, NG 845432 (V.C. 105), Malaise trap 1–12.vi.1991 (1 ♀), 12–22.vi.1991 (1 ♀) and vii.1991 (2 ♀) (*P. W. Brown*); 1 ♂, Germany (Baden-Württemberg); 1 ♀, Ukraine, Donezk, Ol'khovatka SE. of Debalzevo, 11.v.1974 (*D. R. Kasparyan*). Presumably univoltine.

Hadrodactylus idari Kasparyan & Shaw, sp. nov. Holotype and paratypes as detailed above.

Hadrodactylus indefessus (Gravenhorst, 1820) (= *tarsator* Thomson, 1883). **New to Britain**. 19 ♀, 31 ♂. England (V.C.s 7, 22, 23), Scotland (V.C.s 72, 83, 88, 96, 99, 101, 102, 105), Ireland (V.C. H28), Switzerland (Grisons). British specimens collected from (iv)v–vii; presumably univoltine.

Hadrodactylus insignis Kriechbaumer, 1891. 1 ♀, Scotland, Glasgow, Possil Marsh (V.C. 99), 26.vi.1983 (*M. R. Shaw*); 1 ♀, 1 ♂, Scotland, Inverness-shire, Kincraig (V.C. 96), no date [*Harwood*].

Hadrodactylus nigrifemur Thomson, 1883. 31 ♀, 26 ♂ typical form (black hind femur), from just four localities. England, Wiltshire, Savernake Forest, SU 229656, SU 214671, SU 205676 and SU 209670 (V.C. 7), dates in 1990–1992 (*K. Porter*); England, Norfolk, Santon Downham, TL 818883 (V.C. 28), dates in 1983–1985 (*J. Field*); Scotland, Perthshire, Errol, Paddockmuir Wood (V.C. 89), 1989 (*D. Phillips*); Scotland, Nairn, Culbin Forest, NH 9458 (V.C. 96), 1992 (*I. MacGowan*). All specimens were collected by Malaise traps, from (v.)vi.–vii.(viii.); presumably univoltine. In addition there are 12 ♀, 10 ♂ with the hind femur red, principally from Savernake Forest (as above), but also from England, Hampshire, Lyndhurst (V.C. 11), 29.vi.1979 (*B. Barr*); Scotland, Wester Ross, Rassal, NG 845432 (V.C. 105), Malaise trap 15–31.v.1991 (*P. W. Brown*). Despite the apparently slightly earlier flight time of the latter form, from v–vii, we are treating it as conspecific.

Hadrodactylus orientalis Uchida, 1930. 1 ♀, Russia, Kurilien Islands, Dubovoe, south of Kunashir, 22.vii.1973 (*D. R. Kasparyan*).

Hadrodactylus paludicola (Holmgren, 1856). 1 ♀, Isle of Man, The Curraghs, Goshan, SC 359950, Malaise trap 20–30.vii.1995 (*S. M. Crellin*); 1 ♂, Russia, Yaroslavl, Gedenowo, Danilov district, 17.vii.1918 (*A. Shestakov*).

Hadrodactylus semirufus (Holmgren, 1858). 9 ♀, 21 ♂. England (V.C.s 22, 59), Wales (V.C.s 46, 49), Scotland (V.C.s 80, 83, 86, 90, 96, 97, 99, 101, 105, 110), Russia (Irkutsk). All but one of the specimens were collected from vi–vii; it seems unlikely that the singleton collected in viii/ix represents a regular second generation but perhaps the possibility should not be ruled out.

Hadrodactylus spiraculator Idar, 1979. 9 ♀. England (V.C.s 7, 29), Scotland (V.C.s 96, 97, 101, 105), France (Lot-et-Garonne). Specimens collected from v–vi(vii); presumably univoltine. Some were collected immobilised on mountain snow-beds where they are presumed to have been deposited by thermals.

Hadrodactylus tiphae (Geoffroy, 1785). 24 ♀. England (V.C.s 6, 27, 28, 29, 31), Scotland (V.C.s 86, 89, 92, ?94, 96, 105). Specimens collected from v–vii but mostly in vi; presumably univoltine. Although this is predominantly a wetland insect, 14 of the above specimens were collected on various occasions immobilised on snow-beds on the Cairngorms plateau, where they had probably been deposited by thermals.

Hadrodactylus villosulus Thomson, 1883. 7 ♀, Isle of Man, The Curraghs, Goshan, SC359950 (V.C. 71), Malaise trap dates from vi–vii(viii)1995 (*S. M. Crellin*); 1 ♂, Russia, Volgograd, Krasnoslobodsk, 16.vi.1977 (*D. R. Kasparyan*). Presumably univoltine.

Hadrodactylus vulneratus (Zetterstedt, 1838). 17 ♀, 24 ♂. Scotland (V.C.s 87, 88, 92, 98, 101, 105, 108). Specimens collected from v–ix; despite its apparently northern distribution in Britain, the fact that in one locality it has been collected

commonly in v and early vi, then again in viii and ix, strongly suggests that it is plurivoltine.

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