

# Diptera from rich fens and other habitats in eastern part of Innlandet, southeastern Norway. I. Dolichopodidae (Empidoidea)

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Jonassen, T. & Andersen, T. 2020. Diptera from rich fens and other habitats in eastern part of Innlandet, southeastern Norway. I. Dolichopodidae (Empidoidea). *Norwegian Journal of Entomology* 67, 101–124.

Records of 85 species of Dolichopodidae from eastern part of Innlandet County, southeastern Norway, are presented based partly on material collected in 2016 and 2017 during a survey of insects inhabiting rich fens in the region, partly on older material. Two species, *Achalcus nigropunctatus* Pollet & Brunhes, 1996 and *Medetera alpicola* Naglis & Negrobov, 2014 are recorded for the first time from Norway and the records of *Argyra magnicornis* (Zetterstedt, 1838) and *Dolichopus zetterstedti* Stenhammar, 1852 represent the first Norwegian records in more than 150 years. Of the remaining species most are recorded for the first time from the eastern part of Innlandet. A total of 49 species of Dolichopodidae were collected on the rich fens, of which twelve were taken exclusively on rich fens. Most of the material was collected in eight Malaise traps situated on different rich fens and collecting continuously from early spring to late autumn 2016. A total of 1519 specimens of 48 species of Dolichopodidae were collected in these traps, of which *Dolichopus nigricornis* Meigen, 1824 was the most abundant species constituting 47.7% of the total material, *Medetera infumata* Loew, 1857 ranged second with 20.3% and *Dolichopus stenhammari* Zetterstedt, 1843 third with 5.5% of the material.

Key words: Rich fens, Diptera, Empidoidea, Dolichopodidae, new records, Innlandet County, Norway.

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## Introduction

Worldwide, Europe is the continent with the largest proportional loss of mires and peatlands (Joosten & Tanneberg 2017). Of the remaining peatlands in Europe about half are degraded primarily due to agriculture. In countries such as the Netherlands not one single bog or fen has been saved from draining, cutting, burning, farming or building, and much of the original peatland area has been lost. The TELMA project was the first international program devoted explicitly to the conservation of peatland ecosystems. The project was initiated by the International Union for Conservation of Nature (IUCN) in 1966 and was

designed to “encourage international cooperation in the conservation of peatland for scientific research and education, and for the protection of their wildlife” (see Bellamy & Pritchard 1973). The project was a response to concerns that many important sites for peatland research were being damaged or destroyed.

In Norway, mire conservation has a long and strong scientific base (Moen *et al.* 2017). The Norwegian National Plan for Mire Nature Reserves was initiated in 1969 under the auspices of the Ministry of the Environment and resulted in a high number of primary reports describing more than 1.000 localities up until 1985 (Moen *et al.* 2011). Today, more than 300 mire nature reserves

have been established. In addition, a large number of important mires are protected in wetland reserves and in the national parks. However, the selection of mire reserves has traditionally been based on botanical criteria and do not necessarily represent the insect fauna on these mires (see e.g. Andersen 1982).

In 2016 the project "Insects on rich fens in Hedmark, eastern Norway" was initiated aiming to increase the knowledge of the insect fauna on mires in Norway (see Artsdatabanken 2016, Andersen & Hagenlund 2019). Rich fens are among our most vulnerable and threatened nature types. Five types of lowland rich fens are listed in the Norwegian Red List of Nature Types (Lindegaard & Henriksen 2011). These fens are rich in calcium and usually fed by ground water and a number of rare and red-listed flowers grow on these fens.

During the project insects were collected in nearly 100 localities in the eastern part of Innlandet County. The insect fauna on rich fens were the main target. However, insects were also collected in a number of other habitats to get a better understanding of the habitat preferences of the different species. Below we present a list of the Dolichopodidae species from the eastern part of Innlandet identified during the project. The list is mainly based on the insects collected during the project, but we have also sorted through and identified older material from the area housed in the entomological collections at the Natural History Museum, University of Oslo and in the Department of Natural History, University Museum of Bergen.

In a recent molecular phylogeny of the superfamily Empidoidea Wahlberg & Johanson (2018) recognize five families: Atelestidae, Dolichopodidae, Empididae, Hybotidae and Ragadidae. They found the former family Brachystomatidae (see Sinclair & Cumming 2006, Moulton & Wiegmann 2007) to be nested within Empididae and treat it as a subfamily, Brachystomatinae, within Empididae. Ragadinae was formally established as a subfamily within Empididae by Sinclair (2016). Wahlberg & Johanson (2018) give it status as a separate family, Ragadidae, and include two subfamilies,

Ragadinae and Iteaphilinae. According to Wahlberg & Johanson (2018) Dolichopodidae is monophyletic and form the sistergroup to Ragadidae and Empididae. The phylogeny within Dolichopodidae has been outlined based on both molecular and morphological data in several studies, including Brooks (2005), Wang *et al.* (2007), Lim *et al.* (2010) and German *et al.* (2011).

Dolichopodidae is ranging in size from minute to medium-sized (1–9 mm). They have characteristically long and slender legs, and their posture is often stilt-like standing high on their legs, with the body almost erect. Most species have a green or blue metallic luster, but some are also dull yellow, brown or black (Oosterbroek 2006).

Most adults of Dolichopodidae occur along the margins of streams or lakes on wet mud, moss or on the foliage of vegetation, other live in grassy places and in shrubbery (Robinson & Vockeroth 1981, Hedtröm 1997). The adults are predators, feeding on small invertebrates including Collembola, aphids, and the larvae of Oligochaeta. Species of the genus *Dolichopus* commonly prey on the larvae of Culicidae. The larvae occupy a wide range of habitats. Many are predators of small invertebrates and generally live in moist environments such as soil, moist sand, or rotting organic matter. Genera such as *Medetera* live as predators under tree bark or in the tunnels of bark beetles.

## Material and methods

Fieldwork was conducted during 2016 and 2017. The main part of the material was collected in Malaise traps, but adult Diptera were also collected with other methods like sweep-nets, window traps, light traps and yellow pan traps in 94 different localities in the eastern part of Innlandet County (Table 1). All localities visited during the project are given a HeLoc number, which is used in the species list. Although the fieldwork was focused on rich fens, a number of other habitats were also explored. In Table 1 the rich fen localities are marked with an asterisk after

**TABLE 1.** List of the localities in eastern part of Innlandet County. All localities are situated in the former Hedmark County and we use southern Hedmark (HES) and northern Hedmark (HEN) as biogeographical regions following the "Strand-system" as revised by Økland (1981). Localities marked with an asterix indicate that they are rich fens.

Locality no.	Region	Municipality	Locality	Coordinates		Altitude (m a.s.l.)
HeLoc01	HES	Ringsaker	Presttjernet	61.203850°N	10.746840°E	885
HeLoc02	HES	Løten	Sandåker	60.793889°N	11.458637°E	218
HeLoc03	HES	Våler	Blåenga	60.665587°N	11.717476°E	515
HeLoc04	HES	Våler	Blåsut	60.956978°N	12.171054°E	509
HeLoc05	HES	Våler	Orrtjernsmyra	60.664286°N	11.710686°E	553
HeLoc06	HES	Våler	Støa	60.714783°N	11.783118°E	170
HeLoc07	HES	Våler	Vindslåttmyra	60.925632°N	12.138017°E	376
HeLoc08	HES	Elverum	Halåa	61.039260°N	12.093200°E	500
HeLoc09	HES	Elverum	Lindberg	60.802324°N	11.679304°E	167
HeLoc10	HES	Elverum	Strandfossen	60.913940°N	11.529968°E	189
HeLoc11	HEN	Trysil	Bruvoll	61.262629°N	12.831747°E	413
HeLoc12	HEN	Trysil	Gjetsjøen	61.269943°N	12.464299°E	535
HeLoc13	HEN	Trysil	Sjøenden	61.104079°N	11.986658°E	444
HeLoc14	HEN	Trysil	Storkjølen*	61.430720°N	12.075704°E	597
HeLoc15	HEN	Åmot	Haug	61.171868°N	11.483002°E	214
HeLoc16	HEN	Åmot	Julussa	61.141926°N	11.494474°E	249
HeLoc17	HEN	Åmot	Kildesaga*	61.178778°N	11.402167°E	290
HeLoc18	HEN	Åmot	Osmund	61.303472°N	11.775766°E	443
HeLoc19	HEN	Åmot	Prestsjøen	61.136029°N	11.376505°E	213
HeLoc20	HEN	Åmot	Risskogmyrene*	61.185162°N	11.421440°E	293
HeLoc21	HEN	Åmot	Stavali*	61.209416°N	11.446660°E	357
HeLoc22	HEN	Åmot	Tverrena Bru	61.325373°N	11.872409°E	487
HeLoc23	HEN	Stor-Elvdal	Bjørnsjøen	61.692381°N	10.760926°E	651
HeLoc24	HEN	Stor-Elvdal	Evenstad, demningen	61.424787°N	11.105196°E	276
HeLoc25	HEN	Stor-Elvdal	Evenstad, Settefiskanlegget	61.424213°N	11.101121°E	256
HeLoc26	HEN	Stor-Elvdal	Gustulia	61.533631°N	11.065319°E	284
HeLoc27	HEN	Stor-Elvdal	Hørøa bru	61.902970°N	10.102560°E	726
HeLoc28	HEN	Stor-Elvdal	Imsroa, Gammelstu	61.470335°N	11.027983°E	258
HeLoc29	HEN	Stor-Elvdal	Kjemsjøen	61.564585°N	11.088558°E	425
HeLoc30	HEN	Stor-Elvdal	Messelt	61.448089°N	11.039527°E	278
HeLoc31	HEN	Stor-Elvdal	Mørbeekktjøenna	61.516681°N	11.131809°E	692
HeLoc32	HEN	Stor-Elvdal	Nabbtjern*	61.378417°N	11.191750°E	251
HeLoc33	HEN	Stor-Elvdal	Nesset	61.449260°N	11.047526°E	254
HeLoc34	HEN	Stor-Elvdal	Ottestad	61.297111°N	11.277147°E	239

TABLE 1. continued.

Locality no.	Region	Municipality	Locality	Coordinates		Altitude (m a.s.l.)
HeLoc35	HEN	Stor-Elvdal	Rasta	61.399254°N	11.144010°E	254
HeLoc36	HEN	Stor-Elvdal	Rørtjørna*	61.511735°N	11.149241°E	712
HeLoc37	HEN	Stor-Elvdal	Skardmyra*	61.544943°N	10.998025°E	476
HeLoc38	HEN	Stor-Elvdal	Stai	61.483830°N	11.053410°E	272
HeLoc39	HEN	Stor-Elvdal	Svanedammen	61.430526°N	11.250611°E	588
HeLoc40	HEN	Stor-Elvdal	Svenskebrakka	61.429227°N	11.203360°E	566
HeLoc41	HEN	Stor-Elvdal	Søstu Messelt	61.455820°N	11.033918°E	260
HeLoc42	HEN	Stor-Elvdal	Trytjørna	61.617000°N	10.755189°E	903
HeLoc43	HEN	Rendalen	Bjørhølet, Storsjøen	61.689784°N	11.195784°E	253
HeLoc44	HEN	Rendalen	Fjøstjønna	61.772231°N	11.578475°E	642
HeLoc45	HEN	Rendalen	Jøgåsmyra*	61.774556°N	11.593472°E	640
HeLoc46	HEN	Rendalen	Renåvangen	61.725743°N	11.384351°E	612
HeLoc47	HEN	Rendalen	Sekserbua NE*	61.556056°N	11.168556°E	520
HeLoc48	HEN	Rendalen	Åkrestørømmen bru	61.696373°N	11.198039°E	254
HeLoc49	HEN	Engerdal	Bjørbekkåsen*	61.771660°N	11.739930°E	720
HeLoc50	HEN	Engerdal	Bjørnåsmoan	61.846758°N	12.065544°E	759
HeLoc51	HEN	Engerdal	Blokkodden	61.884380°N	12.023182°E	675
HeLoc52	HEN	Engerdal	Elgå	62.167280°N	11.940623°E	664
HeLoc53	HEN	Engerdal	Elvbrua	61.772654°N	11.630522°E	600
HeLoc54	HEN	Engerdal	Engerdalssætra	61.815612°N	11.914448°E	597
HeLoc56	HEN	Engerdal	Engerdaltunet	61.762910°N	11.954209°E	548
HeLoc57	HEN	Engerdal	Haugbåtstøa	61.811174°N	11.707786°E	627
HeLoc58	HEN	Engerdal	Johnsgård	62.146341°N	11.618706°E	709
HeLoc59	HEN	Engerdal	Jonasvollen	62.231437°N	11.874940°E	687
HeLoc60	HEN	Engerdal	Kvemskjølen*	61.935590°N	12.011480°E	710
HeLoc61	HEN	Engerdal	Lørjefloan	62.010343°N	11.711375°E	648
HeLoc62	HEN	Engerdal	Midtre Sorken	61.971054°N	11.943438°E	686
HeLoc63	HEN	Engerdal	Moen, Elgå	62.157650°N	11.948301°E	684
HeLoc64	HEN	Engerdal	Risbakken*	61.825169°N	11.933692°E	689
HeLoc65	HEN	Engerdal	Skinnarodden	61.939385°N	11.940908°E	664
HeLoc66	HEN	Engerdal	Småsjøelva*	62.047016°N	12.072970°E	734
HeLoc67	HEN	Engerdal	Småsjøvollen*	62.043870°N	12.072830°E	727
HeLoc68	HEN	Engerdal	Solstad	61.802944°N	11.700541°E	639
HeLoc69	HEN	Engerdal	Storsundodden, Vurrusjøen	61.878947°N	12.093375°E	687
HeLoc70	HEN	Engerdal	Tjernli*	61.875504°N	12.146184°E	666
HeLoc71	HEN	Engerdal	Ulvåkjølen – Sundsetra*	61.836556°N	11.791250°E	660
HeLoc72	HEN	Engerdal	Vestre Sorken	61.972127°N	11.939166°E	666

TABLE 1. *continued.*

Locality no.	Region	Municipality	Locality	Coordinates		Altitude (m a.s.l.)
HeLoc73	HEN	Engerdal	Volbrenna, Stormyra*	61.837300°N	11.858827°E	678
HeLoc74	HEN	Engerdal	Åsen*	61.885861°N	11.782833°E	700
HeLoc75	HEN	Tolga	Bjørvollen*	62.387028°N	11.118861°E	770
HeLoc76	HEN	Tolga	Kvennan*	62.370164°N	10.898807°E	492
HeLoc77	HEN	Tolga	Nedre Follstadtrøa	62.347779°N	10.878433°E	489
HeLoc78	HEN	Tynset	Brydalskjølen*	62.255444°N	10.907250°E	780
HeLoc79	HEN	Tynset	Hugudalsåsen	62.259727°N	10.889549°E	780
HeLoc80	HEN	Tynset	Lauvåstjønnen*	62.254297°N	10.923185°E	791
HeLoc81	HEN	Tynset	Stormyra, Fåset*	62.253998°N	10.674273°E	481
HeLoc82	HEN	Alvdal	Mellommyra*	62.123021°N	10.704036°E	832
HeLoc83	HEN	Folldal	Langmyre*	62.181177°N	9.775176°E	846
HeLoc84	HEN	Folldal	Nyhus	62.135258°N	9.960538°E	710
HeLoc85	HEN	Folldal	Spælen	62.145237°N	9.907469°E	717
HeLoc86	HEN	Os	Abborodden, Narsjøen	62.343861°N	11.499353°E	737
HeLoc87	HEN	Os	Grubbvollen, Sætersjøen	62.563751°N	11.181784°E	810
HeLoc88	HEN	Os	Kvennhusfossen, Siksjøen	62.311488°N	11.671801°E	717
HeLoc89	HEN	Os	Langhaugen, Sætersjøen	62.534992°N	11.150624°E	850
HeLoc90	HEN	Os	Langhåen*	62.365527°N	11.454711°E	770
HeLoc91	HEN	Os	Litjnørbrua	62.333569°N	11.541494°E	747
HeLoc92	HEN	Os	Narbuvoll*	62.355806°N	11.462174°E	767
HeLoc93	HEN	Os	Narvollan	62.365717°N	11.476618°E	741
HeLoc94	HEN	Os	Røst*	62.531005°N	11.151450°E	807

the name of the locality. All material was preserved in 75–80% ethanol, brought to the Department of Natural History, University of Bergen, and sorted to family level. The Dolichophodidae species were all identified by the first author.

In addition, material collected in the eastern part of Innlandet County by Gudrun Bakkerud, Asle Bruserud, Marit Hagenlund, Lars Ove Hansen, Kjell Magne Olsen, Eirik Rindal, Arnstein Staverløkk, Karsten Sund, Geir E. Søli and Anders Thylén, and housed in the entomological collections at the University Museum of Bergen and the Natural History Museum, University of Oslo, were sorted through and identified and is listed as "Additional material" in the species list.

The former counties Oppland and Hedmark

were merged into Innlandet County on the 1 January 2020. None of the municipalities in Hedmark were, however, altered or merged and the municipality boundaries are still as before 2020. All fieldwork was performed in the eastern part of Innlandet, i.e. the former Hedmark County, and we have used the biogeographical regions southern Hedmark (HES) and northern Hedmark (HEN) following the "Strand-system" as revised by Økland (1981).

Most of the material is preserved in 75–80% ethanol, only a few specimens are pinned. All material from the project and much of the additional material is stored in the entomological collection at the Department of Natural History, University Museum of Bergen. The remaining

additional material is in the Natural History Museum, University of Oslo (ZMO). A few specimens are also housed in Terje Jonassen's private collection.

### The Malaise traps

The main part of the material was collected in Malaise traps situated on eight different rich fens in 2016 (Figure 1). The traps used 80% ethanol for preservation of the material and were emptied bi-weekly from the snow melted in April–May until the winter started in late October.

The fens were selected using Naturbase (Miljødirektoratet 2017) which give a thorough description of the different fens. The fens are of different sizes and structure and we tried to get a gradient from lowland fens to upland fens. Several of the fens are a mosaic of different nature types with areas of comparatively poor to extremely rich fens. The fens might have firm substrate or there are areas with fen carpet and mud bottom, and they are to a various degree covered with shrubs and forest. In some of the fens there are springs and spring-brooks, in other fens streams or brooks are running through the fen, and there are also pools or ponds on some of the fens.

**Kildesaga, Åmot** (Malaise trap no. 1). Extremely rich wood and scrub-covered lowland fen with firm substrate. The fen is small (6.8 daa) and partly covered with willows (*Salix*) and pine (*Pinus*) trees and surrounded by birch (*Betula*) and spruce (*Picea*) forest. Sedges like the large yellow-sedge (*Carex flava*) and broad-leaved cottongrass (*Eriophorum latifolium*) and orchids like common twayblade (*Neottia ovata*), coralroot (*Corallorhiza trifida*), common spotted orchid (*Dactylorhiza fuchsii*) and broad-leaved helleborine (*Epipactis helleborine*) are growing on the fen.

**Nabbtjern, Stor-Elvdal** (Malaise trap no. 2). Rich (intermediate) carpet / mud bottom lowland fen. Medium large (117 daa), open fen with interspersed flarks and a small stream situated close to a small lake. The borders have old drainage ditches and the fen is surrounded by spruce forest. Plants like pale sedge (*Carex*

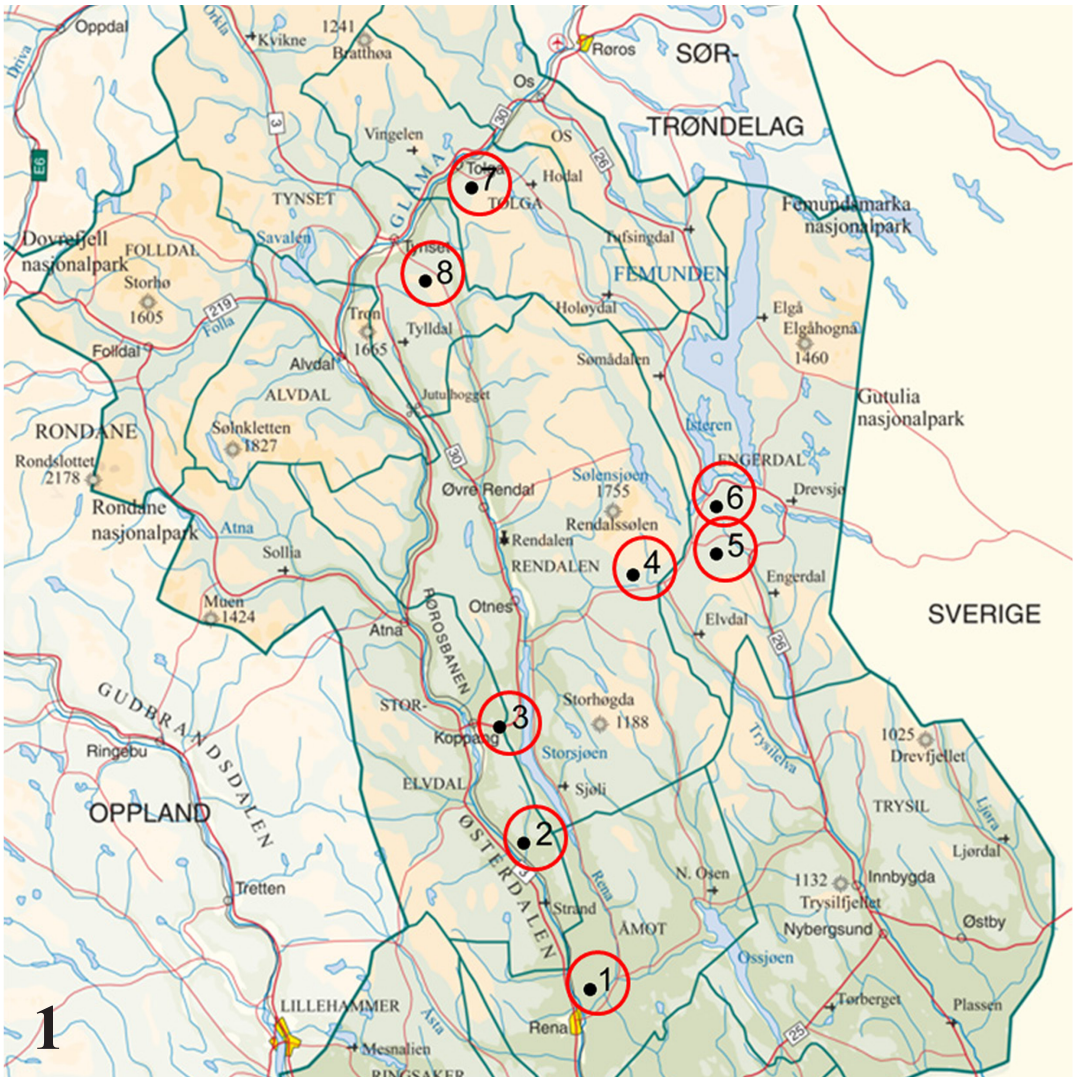
*livida*), moor rush (*Juncus stygius*), brown beak-sedge (*Rhynchospora fusca*), white beak-sedge (*R. alba*), bog orchid (*Malaxis paludosa*) and early marsh-orchid (*Dactylorhiza incarnata*) are growing on the fen.

**Sekserbua NØ, Rendalen** (Malaise trap no. 3). Rich (intermediate) wood and scrub-covered fen with firm substrate. Medium large (64 daa) and partly covered with shrubs and trees and surrounded by semi open mixed forest. A stream is passing through the south end of the fen and lake Storsjøen is situated nearby. Of interesting plant species, club spikemoss (*Selaginella selaginoides*), the marsh horsetail (*Equisetum palustre*), dioecious sedge (*Carex dioica*), broad-leaved cottongrass, alpine bulrush (*Trichophorum alpinum*), Scottish asphodel (*Tofieldia pusilla*), alpine meadow rue (*Thalictrum alpinum*), early marsh-orchid and coralroot are growing on the fen.

**Jøgåsmyra, Rendalen** (Malaise trap no. 4) (Figure 2). Extremely rich fen with mainly firm substrate. Large (694 daa) rich to extremely rich fen with a mosaic of firm substrate and loose mats. There are several flarks and two ponds with common reed (*Phragmites australis*). Plants like hair-like sedge (*Carex capillaris*), capitate sedge (*C. capitata*), bird-foot sedge (*C. ornithopoda*), fewflower spikerush (*Eleocharis quinqueflora*), brown bog-rush (*Schoenus ferrugineus*), arctic sweet coltsfoot (*Petasites frigidus*) and early marsh-orchid grow on the fen.

**Ulvåkjølen-Sundsetra, Engerdal** (Malaise trap no. 5). Large (2403 daa) fen complex with poor to rich fens. The Malaise trap was situated in one of the richest parts, with gently sloping terrain and a seep from a nearby spring running close to the trap. Sedges like little green sedge (*Carex jemtlandica*), capitate sedge, lesser tussock-sedge (*C. diandra*), fibrous tussock-sedge (*C. appropinquata*), and fewflower spikerush; willows like snow willow (*Salix reticulata*), mountain willow (*S. arbuscula*), and whortle-leaved willow (*S. myrsinites*); and orchids like early marsh-orchid and twayblade grow on the fen.

**Åsen, Engerdal** (Malaise trap no. 6). Extremely rich fen in upland area. Small (18



**FIGURES 1–3.** 1. Map of eastern part of Innlandet County showing the Malaise trap localities. 1 = Kildesaga, 2 = Nabtbjern, 3 = Sekserbua NØ, 4 = Jøgåsmyra, 5 = Ulvåkjølen-Sundsetra, 6 = Åsen, 7 = Bjørvollen, 8 = Brydalskjølen. 2. The Malaise trap at Jøgåsmyra, Rendalen. (Photo: Linn K. Hagenlund). 3. The Malaise trap at Bjørvollen, Tolga. (Photo: Linn K. Hagenlund).

daa), fragmented fen close to a larger rich fen. At the sampling site the fen is gently sloping with springs and spring brooks and is grown with a mix of scattered conifers and deciduous trees. Several plants typical for rich fens, like bristle sedge (*Carex microglochin*), shortleaved sedge (*C. fuliginosa*), chestnut rush (*Juncus castaneus*) and flecked marsh orchid (*Dactylorhiza incarnata* subsp. *cruenta*) grow on the fen.

**Bjørvollen, Tolga** (Malaise trap no. 7) (Figure 3). Extremely rich fen in upland area. Medium large (335 daa), heterogenous fen with intermediate to extremely rich parts. The fen is partly covered with mixed forest and has mostly firm substrate, in places with exposed stones, but there are also smaller areas with fen carpet and mud bottom. At the sampling site the fen is gently sloping with some small flarks. The small rapid River Bjørå passes through the fen. Several plants typical for rich fens, like the sedges shortleaved sedge, few seeded bog sedge, capitate sedge and chestnut rush and the orchids flecked marsh orchid and Lapland marsh orchid (*Dactylorhiza lapponica*) grow on the fen.

**Brydalskjølen, Tynset** (Malaise trap no. 8). Extremely rich fen in upland area. Large (990 daa) fen complex with intermediate to extremely rich parts. Mostly open fen with firm substrate, but also areas with fen carpet and some areas are covered with mixed forest of birch and pine. There are several springs and small streams on the fen and the small Lake Lauvåstjønna is situated at the south end of the fen. Plants like large yellow-sedge, star sedge (*Carex echinata*), hair sedge, shortleaved sedge, three-hulled rush (*Juncus triglumis*), chestnut rush, northern green rush (*J. alpinoarticulatus*), alpine bulrush, purple moor-grass (*Molinia caerulea*), matgrass (*Nardus stricta*), crimson-tipped lousewort (*Pedicularis oederi*), alpine fleabane (*Erigeron borealis*), alpine meadow rue, fragrant orchid (*Gymnadenia conopsea*) and Lapland marsh orchid grow on the fen.

## Results

### The species

#### *Achalcus cinereus* (Haliday, 1851)

**Material.** HeLoc17, 28 April–11 May 2016, 1♀, Malaise trap; HeLoc32, 29 April–14 May 2016, 1♀; 26 May–9 June 2016, 1♀; 9–23 June 2016, 1♂; 17 August–2 September 2016, 1♂, Malaise trap.

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l., 22 June–10 July 2003, 1♂, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Vikar, Vikeråa, 60.202567°N 12.450709°E, 276 m a.s.l., 28 April–26 May 2007, 1♂1♀, Malaise trap, leg. K. Sund (ZMO); Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l., 22 April–14 June 2004, 1♂, Malaise trap, leg. K. Sund (ZMO).

#### *Achalcus nigropunctatus* Pollet & Brunhes, 1996

**Material.** HeLoc47, 21 July–4 August 2016, 1♂, Malaise trap; HeLoc71, 21 July–4 August 2016, 1♂, Malaise trap.

**Remarks.** Collected on rich fens between 500 and 660 m a.s.l. The species is described based on specimens from Switzerland (Pollet 1996). It has since been recorded from much of Europe, including Sweden. The species is not previously recorded from Norway.

#### *Achalcus vaillanti* Brunhes, 1987

**Material.** HeLoc75, 21 July–4 August 2016, 1♂, Malaise trap.

**Remarks.** The single male was collected on a rich fen at 770 m a.s.l. It was first recorded from Norway by Hansen & Falck (2000) from Lake Østensjøvannet in Oslo (AK) and has later also been taken on Ostøya in Bærum (AK) and at Underlia in Drammen (BØ).

#### *Argyra auricollis* (Meigen, 1824)

**Material.** HeLoc35, 29–31 July 2016, 1♂, light trap; HeLoc78, 23 June–11 July 2016, 7♂♂; 11–21 July 2016, 7♂♂2♀♀; 21 July–4 August 2016, 2♂♂, Malaise trap; HeLoc87, 26 July 2017, 1♂2♀♀, sweep net.

**Remarks.** The species was collected both on



rich fens and in other habitats. In the Malaise trap catches it was the ninth most abundant species constituting 1.2% of the total material.

***Argyra diaphana* (Fabricius, 1775)**

**Material.** HeLoc78, 11–21 July 2016, 1♂, Malaise trap.

**Remarks.** The single male was collected on a rich fen at 780 m a.s.l.

***Argyra magnicornis* (Zetterstedt, 1838)**

**Material.** HeLoc78, 11–21 July 2016, 1♂, Malaise trap.

**Remarks.** The single male was collected at Brydalskjølen at 780 m a.s.l. Siebke (1877) recorded this species from Norway based on a specimen collected in Tromsø in 1821. Siebke's specimen(s) have not been checked, but should his identification be correct, then the male from Tynset represents the first Norwegian record of this species in almost 200 years. The species is listed as data deficient (DD) in the Norwegian Red List for Species (Gammelmo *et al.* 2015).

***Campisicnemus armatus* (Zetterstedt, 1849)**

**Material.** HeLoc71, 27 April–13 May 2016, 2♂♂, Malaise trap; HeLoc78, 2–16 September 2016, 1♂, Malaise trap.

**Remarks.** Only collected on rich fens between 660 and 780 m a.s.l.

***Campisicnemus compeditus* Loew, 1857**

**Material.** HeLoc32, 26 May–9 June 2016, 1♂; 23 June–11 July 2016, 1♂, Malaise trap; HeLoc45, 24 June–11 July 2016, 3♂♂; 11–21 July 2016, 2♂♂1♀, Malaise trap.

**Remarks.** Only collected on rich fens between 250 and 650 m a.s.l. In the British Isles the species appears to be a specialist inhabitant of acid mires, most often found in areas with well-developed *Sphagnum* lawns (Boyce 2004).

***Campisicnemus curvipes* (Fallén, 1823)**

**Material.** HeLoc24, 15 August 2016, 1♂, sweep net; HeLoc74, 13–26 May 2016, 1♂, Malaise trap; HeLoc75, 26 May–9 June 2016, 1♂, Malaise trap; HeLoc78, 29 September–13 October 2016, 1♂, Malaise trap.

**Additional material.** HES, Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l., 1–31 July 1992, 2♂♂1♀, Malaise trap, leg. G. Bakkerud.

***Campisicnemus scambus* (Fallén, 1823)**

**Material.** HeLoc09, 22 July 2017, 1♂, sweep net; HeLoc24, 15 August 2016, 1♂, sweep net; HeLoc26, 18 September 2017, 1♂, sweep net; HeLoc32, 17 September 2016, 1♂, sweep net; HeLoc34, 21 June–20 July 2017, 1♂, light trap.

**Additional material.** HES, Ringsaker: Helgøya, Eiksåsen, 60.736872°N 10.994616°E, 285 m a.s.l., 1–30 June 1990, 1♂, Malaise trap, leg. A. Bruserud.

***Chrysotus angulicornis* Kowarz, 1874**

**Additional material.** HES, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l., 22 June–9 July 2005, 1♂, Malaise trap, leg. K. Sund (ZMO).

**Remarks.** The species has been treated as a synonym of *C. gramineus* (Fallén, 1823) by various authors (see e.g. Pollet 2013). Negrobov & Chandler (2006) have, however, demonstrated that *C. angulicornis* is a valid species, a view that Pollet has subsequently accepted in the revised list of Swedish Dolichopodidae (Persson *et al.* 2019).

***Chrysotus cilipes* Meigen, 1824**

**Material.** HeLoc06, 23 July 2017, 1♂, sweep net; HeLoc19, 21 July 2017, 1♀, sweep net; HeLoc32, 23 June–11 July 2016, 1♀, Malaise trap; HeLoc34, 21 June–20 July 2017, 1♀, light trap.

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l., 10 July–10 August 2003, 2♂♂11♀♀, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l., 14 August–6 September 2005, 1♀, Malaise trap, leg. K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l., 21 June–18 July 2006, 1♂, Malaise trap, leg. K. Sund (ZMO). Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l., 10 July 1991, 1♂, sweep net, leg. G. Bakkerud.

***Chrysotus gramineus* (Fallén 1823)**

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 10 July–10 August 2003, 12♂♂22♀♀, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Fjørsjøen, 60.176827°N 12.435088°E, 225 m a.s.l, 2 July–3 August 2015, 1♂, Malaise trap, leg. K. Sund (ZMO); Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l, 8 August–29 October 2004, 4♂♂11♀♀, Malaise trap, leg. K. Sund (ZMO). Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l, 1–31 July 1992, 3♀♀, Malaise trap, leg. G. Bakkerud.

***Chrysotus neglectus* (Wiedemann, 1817)**

**Material.** HeLoc34, 21 June–20 July 2017, 3♂♂1♀, light trap.

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 10 July–10 August 2003, 8♂♂1♀, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 14 August–6 September 2005, 1♂5♀♀, Malaise trap, leg. K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l, 21 June–18 July 2006, 1♂, Malaise trap, leg. K. Sund (ZMO); Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l, 14 June–8 August 2004, 3♂♂1♀; 8 August–20 October 2004, 3♂♂3♀♀, Malaise trap, leg. K. Sund (ZMO).

***Chrysotus obscuripes* Zetterstedt, 1838**

**Material.** HeLoc08, 22 July 2017, 1♀, sweep net; HeLoc45, 24 June–11 July 2016, 1♀; 11–21 July 2016, 1♀, Malaise trap; HeLoc73, 28 July 2016, 1♂, sweep net.

**Additional material.** HES, Kongsvinger: Fjørsjøen, 60.176827°N 12.435088°E, 225 m a.s.l, 2 July–3 August 2015, 1♂4♀♀, Malaise trap, leg. K. Sund (ZMO). Ringsaker: Næroset, Nøsterbergvika, 60.981789°N 10.773859°E, 340 m a.s.l, 10 July 1991, 1♂, sweep net, leg. G. Bakkerud.

***Chrysotus pulchellus* Kowarz, 1874**

**Material.** HeLoc34, 21 June–20 July 2017, 1♀, light trap.

**Additional material.** HES, Kongsvinger:

Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 22 June–9 July 2005, 1♂1♀, Malaise trap, leg. K. Sund (ZMO); Fjørsjøen, 60.176827°N 12.435088°E, 225 m a.s.l, 2 July–3 August 2015, 1♂, Malaise trap, leg. K. Sund (ZMO).

***Dolichopus caligatus* Wahlberg, 1850**

**Material.** HeLoc32, 4–17 August 2016, 1♀, Malaise trap; HeLoc34, 20 July–6 August 2017, 1♂, light trap.

***Dolichopus claviger* Stannius, 1831**

**Material.** HeLoc34, 21 June–20 July 2017, 1♂; 20 July–6 August 2017, 2♂♂, light trap.

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 10 July–10 August 2003, 1♂, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO). Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l, 1–31 July 1992, 7♂♂9♀♀, Malaise trap, leg. G. Bakkerud.

***Dolichopus fraterculus* Zetterstedt, 1843**

**Material.** HeLoc04, 22 July 2017, 1♀, sweep net; HeLoc07, 22 July 2017, 1♀, sweep net; HeLoc08, 22 July 2017, 2♂♂3♀♀, sweep net; HeLoc32, 23 June–11 July 2016, 1♀, Malaise trap; HeLoc45, 24 June–11 July 2016, 4♂♂3♀♀; 11–21 July 2016, 3♂♂7♀♀; 21 July–4 August 2016, 3♂♂4♀♀, Malaise trap; HeLoc70, 25 July 2016, 1♀, sweep net; HeLoc71, 23 June–11 July 2016, 1♀; 21 July–4 August 2016, 1♀, Malaise trap; HeLoc74, 21 July–4 August 2016, 3♂♂1♀, Malaise trap; HeLoc75, 23 June–11 July 2016, 1♀, Malaise trap; HeLoc78, 15–23 July 2016, 1♀, yellow pan trap; HeLoc91, 24–25 July 2017, 1♂, yellow pan trap.

**Additional material.** HES, Kongsvinger: Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l, 8 August–29 October 2004, 1♀, Malaise trap, leg. K. Sund (ZMO).

**Remarks.** The species was collected both on rich fens and in other habitats. In the Malaise trap catches it was the eight most abundant species constituting 2.1% of the total material. One of the males collected on Jøgåsmyra 11–21 July 2016 represents a “demasculinized” male with a reduced hypopogium and several female traits.

This is a condition brought on by nematodes, and has led previous authors to describe this form as a separate species, *D. micropygus* Wahlberg, 1850 (see Kahanpää 2008).

### *Dolichopus lepidus* Staeger, 1842

**Material.** HeLoc04, 27 July 2017, 1♂, sweep net; HeLoc07, 22 July 2017, 1♂, sweep net; HeLoc12, 21 July 2017, 1♂, sweep net; HeLoc17, 26 May–9 June 2016, 1♂1♀; 9–23 June 2016, 1♀, Malaise trap; HeLoc32, 26 May–9 June 2016, 2♀♀; 9–23 June 2016, 1♂3♀♀; 23 June–11 July 2016, 1♂5♀♀; 11–21 July 2016, 1♂1♀; 4–17 August 2016, 2♀♀, Malaise trap; HeLoc34, 21 June–20 July 2017, 2♀♀, light trap; HeLoc45, 24 June–11 July 2016, 3♂♂7♀♀; 11–21 July 2016, 4♀♀; 21 July–4 August 2016, 2♂♂6♀♀; 4–17 August 2016, 1♂, Malaise trap; HeLoc47, 23 June–11 July 2016, 1♀, Malaise trap; HeLoc73, 28 July 2016, 1♂1♀, sweep net; HeLoc75, 23 June–11 July 2016, 1♂2♀♀; 21 July–4 August 2016, 1♂, Malaise trap; HeLoc78, 23 June–11 July 2016, 6♂♂4♀♀; 11–21 July 2016, 2♂♂2♀♀; 21 July–4 August 2016, 1♂4♀♀, Malaise trap; HeLoc86, 24–25 July 2017, 1♂, yellow pan trap.

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 22 June–10 July 2003, 2♂♂1♀, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 22 June–9 July 2005, 1♂, Malaise trap, leg. K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l, 21 June–18 July 2006, 1♂2♀♀, Malaise trap, leg. K. Sund (ZMO); Fjørsjøen, 60.176827°N 12.435088°E, 225 m a.s.l, 6 June–2 July 2015, 4♂♂6♀♀, Malaise trap, leg. K. Sund (ZMO); Viker, Vikeråa, 60.202567°N 12.450709°E, 276 m a.s.l, 26 May–29 June 2007, 4♂♂3♀♀, Malaise trap, leg. K. Sund (ZMO); Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l, 14 June–8 August 2004, 5♂♂6♀♀, Malaise trap, leg. K. Sund (ZMO).

**Remarks.** The species was collected both on rich fens and in other habitats. In the Malaise trap catches it was the fourth most abundant species constituting 4.4% of the total material.

### *Dolichopus linearis* Meigen, 1824

**Material.** HeLoc43, 24 July 2017, 1♀, sweep net.

**Additional material.** HES, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 22 June–9 July 2005, 1♀, Malaise trap, leg. K. Sund (ZMO). Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l, 1–31 July 1992, 2♂♂3♀♀, Malaise trap, leg. G. Bakkerud.

### *Dolichopus longicornis* Stannius, 1831

**Material.** HeLoc19, 21 July 2017, 3♀♀, sweep net; HeLoc32, 4–17 August 2016, 1♂, Malaise trap; HeLoc34, 21 June–20 July 2017, 1♂, light trap.

**Additional material.** HES, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 14 August–6 September 2005, 1♂, Malaise trap, leg. K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l, 21 June–18 July 2006, 2♂♂1♀, Malaise trap, leg. K. Sund (ZMO); Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l, 14 June–8 August 2004, 1♂, Malaise trap, leg. K. Sund (ZMO). Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l, 1–31 July 1992, 1♂1♀, Malaise trap; 10 July 1991, 1♂1♀, sweep net, leg. G. Bakkerud.

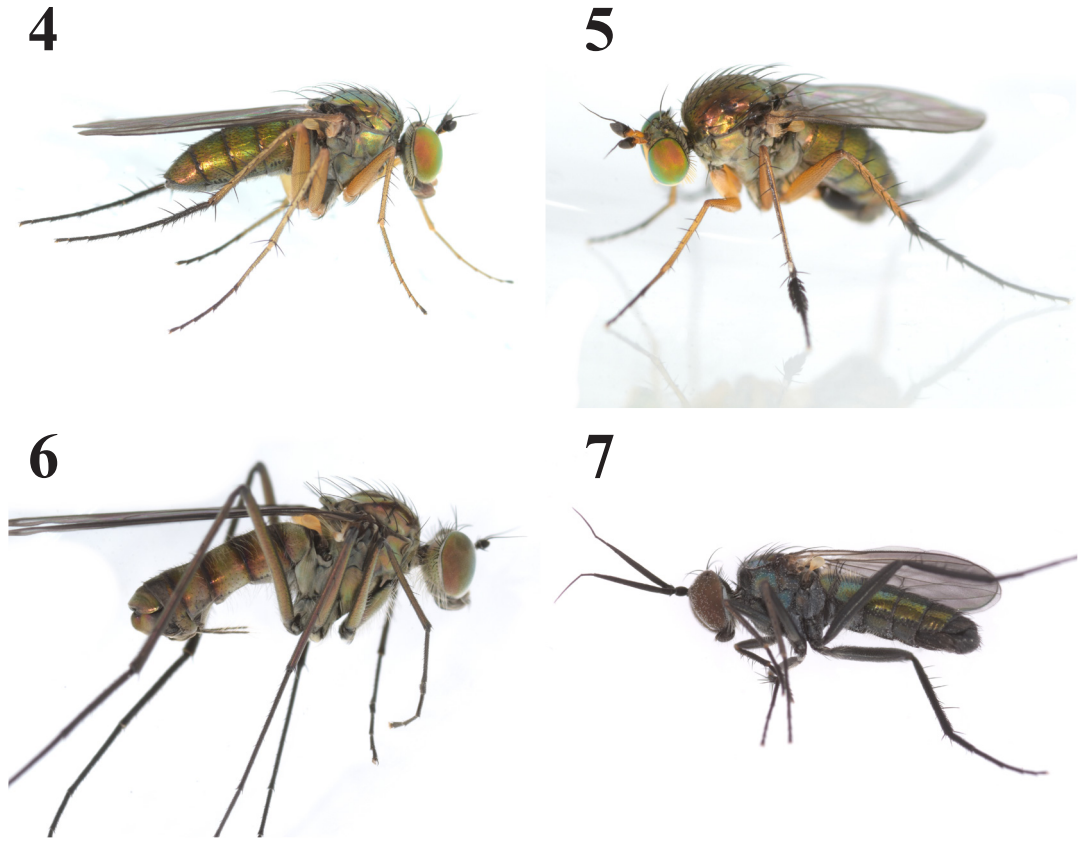
### *Dolichopus maculipennis* Zetterstedt, 1843

**Material.** HeLoc74, 9–23 June 2016, 1♂, Malaise trap.

**Additional material.** HES, Ringsaker: Nærøset, Nøsterbergvika, 60.981789°N 10.773859°E, 340 m a.s.l, 10 July 1991, 1♀, sweep net, leg. G. Bakkerud.

### *Dolichopus nigricornis* Meigen, 1824 (Figure 4)

**Material.** HeLoc01, 20 July 2017, 1♂, sweep net; HeLoc04, 22 July 2017, 2♀♀, sweep net; HeLoc05, 23 July 2017, 1♀, sweep net; HeLoc07, 22 July 2017, 2♂♂, sweep net; HeLoc08, 22 July 2017, 1♀, sweep net; HeLoc11, 21 July 2017, 1♀, sweep net; HeLoc12, 21 July 2017, 5♂♂2♀♀, sweep net; HeLoc13, 21 July 2017, 6♀♀, sweep net / light trap; HeLoc17, 9–23 June 2016, 2♂♂2♀♀; 23 June–11 July 2016, 5♂♂10♀♀; 11–21 July 2016, 1♂6♀♀; 21 July–4 August 2016, 2♂♂12♀♀; 4–17 August 2016, 1♀, Malaise trap;



**FIGURES 4–7.** 4. *Dolichopus nigricornis* Meigen, 1824 was collected both in southern and northern Hedmark and was the most abundant species in the Malaise trap catches on the rich fens. (Photo: Morten Angard Mjelde). 5. *Dolichopus plumipes* (Scopoli, 1763) was collected both in southern and northern Hedmark. (Photo: Morten Angard Mjelde). 6. *Liancalus virens* (Scopoli, 1763) was collected only in the southern part Hedmark county. (Photo: Morten Angard Mjelde). 7. *Rhaphium longicorne* (Fallén, 1823) was collected both in southern and northern Hedmark. (Photo: Morten Angard Mjelde).

HeLoc19, 21 July 2017, 1♀, sweep net; HeLoc32, 26 May–9 June 2016, 1♂; 9–23 June 2016, 6♂♂16♀♀; 23 June–11 July 2016, 7♂♂60♀♀; 11–21 July 2016, 6♂♂34♀♀; 4–17 August 2016, 4♂♂8♀♀; 17 August–2 September 2016, 3♂♂, Malaise trap; 15–17 July 2017, 2♀♀, yellow pan trap; HeLoc34, 3–21 June 2017, 1♂4♀♀; 21 June–20 July 2017, 47♂♂102♀♀; 20 July–6 August 2017, 11♂♂37♀♀; 6 August–10 September 2017, 3♂♂2♀♀, light trap; HeLoc37, 27 July 2016, 4♂♂2♀♀, sweep net; HeLoc38, 26 June 2016, 1♀, sweep net; HeLoc45, 24 June–11 July 2016, 1♀; 21 July–4 August 2016, 3♀♀, Malaise trap; HeLoc47, 23 June–11 July 2016, 3♂♂15♀♀;

11–21 July 2016, 5♂♂18♀♀; 21 July–4 August 2016, 2♂♂11♀♀; 4–17 August 2016, 2♂♂9♀♀; 17 August–2 September 2016, 1♂4♀♀; 2–16 September 2016, 2♂♂, Malaise trap; HeLoc57, 15 August 2016, 1♂, sweep net; HeLoc70, 25 July 2016, 2♀♀, sweep net; HeLoc71, 23 June–11 July 2016, 1♂7♀♀; 11–21 July 2016, 10♂♂20♀♀; 21 July–4 August 2016, 15♂♂32♀♀; 4–17 August 2016, 2♂♂9♀♀; 17 August–2 September 2016, 2♂♂3♀♀, Malaise trap; HeLoc73, 28 July 2016, 1♀, sweep net; HeLoc74, 23 June–11 July 2016, 15♂♂31♀♀; 11–21 July 2016, 23♂♂38♀♀; 21 July–4 August 2016, 30♂♂47♀♀; 4–17 August 2016, 7♂♂18♀♀; 17 August–2 September 2016,

5♂♂2♀♀, Malaise trap; HeLoc75, 23 June–11 July 2016, 1♀; 11–21 July 2016, 2♂♂6♀♀; 21 July–4 August 2016, 6♀♀, Malaise trap; HeLoc78, 23 June–11 July 2016, 6♂♂7♀♀; 11–21 July 2016, 11♂♂30♀♀; 21 July–4 August 2016, 8♂♂23♀♀; 4–17 August 2016, 3♀♀, Malaise trap.

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 22 June–10 July 2003, 15♂♂24♀♀, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 14 August–6 September 2005, 2♂♂1♀, Malaise trap, leg. K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l, 21 June–18 July 2006, 10♂♂21♀♀, Malaise trap, leg. K. Sund (ZMO); Fjørsjøen, 60.176827°N 12.435088°E, 225 m a.s.l, 6 June–2 July 2015, 22♂♂47♀♀, Malaise trap, leg. K. Sund (ZMO); Vikar, Vikeraa, 60.202567°N 12.450709°E, 276 m a.s.l, 29 June–12 August 2007, 2♂♂6♀♀, Malaise trap, leg. K. Sund (ZMO); Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l, 14 June–8 August 2004, 14♂♂36♀♀; 8 August–29 October 2004, 8♂♂10♀♀, Malaise trap, leg. K. Sund (ZMO). Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l, 1–31 July 1992, 4♂♂12♀♀, Malaise trap, leg. G. Bakkerud. Eidskog: Magnor, Veksåsen, 59.94342°N 12.25456°E, 5 May–15 June 2015, 1♂, Malaise trap, leg. A. Staverløkk. Våler: Gjerdåskoia, Nordre Bølsjøen, 60.85139°N 12.10317°E, 396 m a.s.l, 7 July–6 August 2009, 16♀♀; 6 August–28 October 2009, 6♀♀, Malaise trap, leg. E. Rindal & G. Sæli (ZMO); Kaskonsbekken, Nordre Bølsjøen, 60.85639°N 12.08927°E, 390 m a.s.l, 7 July–6 August 2009, 5♂♂20♀♀; 6 August–28 October 2009, 1♂3♀♀, Malaise trap, leg. E. Rindal & G. Sæli (ZMO). HEN, Åmot: Deifjellia, 61.2843°N 11.505°E, 515 m a.s.l, 5 May–6 July 2018, 4♂♂4♀♀, Malaise trap, leg. K.M. Olsen.

**Remarks.** The species was collected both on rich fens and in other habitats. In the Malaise trap catches it was the most abundant species constituting 47.7% of the total material.

### *Dolichopus nitidus* Fallén, 1823

**Additional material.** HES, Kongsvinger: Åranstorpet, 60.202808°N 12.434014°E, 300 m

a.s.l, 14 June–8 August 2004, 1♂, Malaise trap, leg. K. Sund (ZMO).

### *Dolichopus notatus* Staeger, 1842

**Additional material.** HES, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 22 June–9 July 2005, 1♀, Malaise trap, leg. K. Sund (ZMO); Vikar, Vikeraa, 60.202567°N 12.450709°E, 276 m a.s.l, 29 June–12 August 2007, 1♀, Malaise trap, leg. K. Sund (ZMO).

### *Dolichopus pennatus* Meigen, 1824

**Additional material.** HES, Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l, 10 July 1991, 1♂, sweep net, leg. G. Bakkerud.

### *Dolichopus picipes* Meigen, 1824

**Material.** HeLoc17, 23 June–11 July 2016, 2♂♂, Malaise trap; HeLoc32, 9–23 June 2016, 1♀, Malaise trap; HeLoc47, 23 June–11 July 2016, 2♂♂; 11–21 July 2016, 1♀, Malaise trap; HeLoc71, 11–21 July 2016, 1♂1♀, Malaise trap; HeLoc74, 23 June–11 July 2016, 1♂; 11–21 July 2016, 1♂3♀♀; 21 July–4 August 2016, 1♀, Malaise trap; HeLoc75, 23 June–11 July 2016, 1♀, Malaise trap; HeLoc78, 23 June–11 July 2016, 8♂♂7♀♀; 11–21 July 2016, 9♂♂6♀♀; 21 July–4 August 2016, 11♀♀, Malaise trap; HeLoc87, 26 July 2017, 1♀, sweep net; HeLoc91, 24–25 July 2017, 3♂♂, yellow pan trap.

**Remarks.** The species was mostly collected on rich fens. In the Malaise trap catches it was the seventh most abundant species constituting 3.7% of the total material. Although taken on lowland fens it was most numerous in upland areas between 770 and 780 m a.s.l.

### *Dolichopus planitarsis* Fallén, 1823

**Material.** HeLoc75, 9–23 June 2016, 2♂♂, Malaise trap; HeLoc78, 9–23 June 2016, 12♂♂1♀; 23 June–11 July 2016, 36♂♂5♀♀; 11–21 July 2016, 3♂♂4♀♀, Malaise trap.

**Remarks.** The species was only collected on rich fens in upland areas between 770 and 780 m a.s.l. In the Malaise trap catches it was the sixth most abundant species constituting 4.2% of the total material.

***Dolichopus plumipes* (Scopoli, 1763)** (Figure 5)

**Material.** HeLoc12, 21 July 2017, 3♂♂, sweep net; HeLoc34, 21 June–20 July 2017, 2♀♀; 6 August–10 September 2017, 1♀, light trap; HeLoc75, 23 June–11 July 2016, 1♀; 11–21 July 2016, 1♂, Malaise trap; HeLoc78, 21 July–4 August 2016, 1♀, Malaise trap; HeLoc86, 24 July 2017, 1♂, sweep net.

**Additional material.** HES, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l., 22 June–9 July 2005, 1♀, Malaise trap, leg. K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l., 11 May–21 June 2006, 1♂, Malaise trap, leg. K. Sund (ZMO); Fjørsjøen, 60.176827°N 12.435088°E, 225 m a.s.l., 3 August–16 October 2015, 1♀, Malaise trap, leg. K. Sund (ZMO). Ringsaker, Næroset, Nøstebergvika, 60.981789°N 10.773859°E, 10 July 1991, 1♀, sweep net, leg. G. Bakkerud; Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l., 1–31 July 1992, 3♂♂2♀♀, Malaise trap; 10 July 1991, 2♀♀, sweep net, leg. G. Bakkerud.

***Dolichopus popularis* Wiedemann, 1817**

**Material.** HeLoc34, 21 June–20 July 2017, 1♂, light trap; HeLoc47, 23 June–11 July 2016, 2♀♀, Malaise trap.

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l., 10 July–10 August 2003, 1♂, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l., 14 June–8 August 2004, 2♂♂3♀♀, Malaise trap, leg. K. Sund (ZMO). Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l., 1–31 July 1992, 5♂♂4♀♀, Malaise trap, leg. G. Bakkerud.

***Dolichopus rupestris* Haliday, 1833**

**Material.** HeLoc08, 22 July 2017, 2♂♂, sweep net; HeLoc32, 23 June–11 July 2016, 1♀; 21 July–4 August 2016, 1♀; 17 August–2 September 2016, 1♂, Malaise trap.

**Additional material.** HES, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l., 14 August–6 September 2005, 4♂♂3♀♀, Malaise trap, leg. K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l., 21 June–18 July 2006, 11♂♂8♀♀, Malaise trap, leg. K. Sund

(ZMO); Fjørsjøen, 60.176827°N 12.435088°E, 225 m a.s.l., 6 June–2 July 2015, 1♂, Malaise trap, leg. K. Sund (ZMO).

***Dolichopus simplex* Meigen, 1824**

**Material.** HeLoc34, 21 June–20 July 2017, 1♂, light trap.

**Additional material.** HES, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l., 22 June–9 July 2005, 2♂♂2♀♀, Malaise trap, leg. K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l., 21 June–18 July 2006, 1♂1♀, Malaise trap, leg. K. Sund (ZMO). Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l., 1–31 July 1992, 2♀♀, Malaise trap; 10 July 1991, 1♀, sweep net, leg. G. Bakkerud.

***Dolichopus stenhammari* Zetterstedt, 1843**

**Material.** HeLoc17, 26 May–9 June 2016, 1♂; 21 July–4 August 2016, 1♀, Malaise trap; HeLoc32, 23 June–11 July 2016, 1♀, Malaise trap; HeLoc45, 24 June–11 July 2016, 1♀, Malaise trap; HeLoc47, 26 May–9 June 2016, 1♀, Malaise trap; HeLoc71, 26 May–9 June 2016, 1♂; 9–23 June 2016, 2♂♂6♀♀; 23 June–11 July 2016, 2♂♂7♀♀; 11–21 July 2016, 7♀♀, Malaise trap; 7 June 2016, 1♂, sweep net; HeLoc74, 26 May–9 June 2016, 3♂♂1♀; 9–23 June 2016, 8♂♂3♀♀; 23 June–11 July 2016, 10♂♂19♀♀; 11–21 July 2016, 3♂♂4♀♀; 21 July–4 August 2016, 1♂, Malaise trap; HeLoc75, 11–21 July 2016, 1♀, Malaise trap; HeLoc78, 23 June–11 July 2016, 1♀, Malaise trap; HeLoc86, 24–25 July 2017, 1♀, yellow pan trap; HeLoc91, 24–25 July 2017, 1♂, yellow pan trap.

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l., 22 June–10 July 2003, 1♂, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l., 22 June–9 July 2005, 1♀, Malaise trap, leg. K. Sund (ZMO); Fjørsjøen, 60.176827°N 12.435088°E, 225 m a.s.l., 6 June–2 July 2015, 1♀, Malaise trap, leg. K. Sund (ZMO); Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l., 22 April–14 June 2004, 4♂♂2♀♀; 14 June–8 August 2004, 1♀, Malaise trap, leg. K. Sund (ZMO). Eidskog: Magnor, Veksåsen, 59.94342°N 12.25456°E, 5 May–15

June 2015, 1♀, Malaise trap, leg. A. Staverløkk. Våler: Gjerdåskoia, Nordre Bølsjøen, 60.85139°N 12.10317°E, 396 m a.s.l, 7 July–6 August 2009, 1♀, Malaise trap, leg. E. Rindal & G. Søli (ZMO).

**Remarks.** The species was collected both on rich fens and in other habitats. In the Malaise trap catches it was the third most abundant species constituting 5.5% of the total material.

#### *Dolichopus subpennatus* d'Assis-Fonseca, 1976

**Material.** HeLoc06, 23 July 2017, 1♀, sweep net; HeLoc34, 20 July–6 August 2017, 1♂, light trap; HeLoc35, 29–31 July 2016, 1♂, light trap.

#### *Dolichopus trivialis* Haliday, 1832

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 10 July–10 August 2003, 3♂♂1♀, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l, 14 June–8 August 2004, 1♂; 8 August–29 October 2004, 1♂2♀♀, Malaise trap, leg. K. Sund (ZMO). Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l, 1–31 July 1992, 2♂♂2♀♀, Malaise trap, leg. G. Bakkerud.

#### *Dolichopus unguilatus* (Linnaeus, 1758)

**Material.** HeLoc12, 21 July 2017, 1♂, sweep net; HeLoc17, 23 June–11 July 2016, 2♂♂2♀♀, Malaise trap; HeLoc34, 21 June–20 July 2017, 17♂♂16♀♀, light trap; HeLoc35, 29–31 July 2016, 1♂, light trap.

**Additional material.** HES, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 22 June–9 July 2005, 1♂4♀♀, Malaise trap, leg. K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l, 21 June–18 July 2006, 1♂2♀♀, Malaise trap, leg. K. Sund (ZMO); Fjørsjøen, 60.176827°N 12.435088°E, 225 m a.s.l, 2 July–3 August 2015, 1♂1♀, Malaise trap, leg. K. Sund (ZMO); Vikar, Vikaråa, 60.202567°N 12.450709°E, 276 m a.s.l, 26 May–29 June 2007, 2♀♀, Malaise trap, leg. K. Sund (ZMO); Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l, 14 June–8 August 2004, 4♂♂4♀♀, Malaise trap, leg. K. Sund (ZMO). Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l, 1–31 July 1992, 1♂, Malaise trap, leg. G. Bakkerud.

#### *Dolichopus urbanus* Meigen, 1824

**Material.** HeLoc73, 28 July 2016, 1♀, sweep net; HeLoc74, 23 June–11 July 2016, 1♂1♀; 11–21 July 2016, 2♂♂3♀♀; 21 July–4 August 2016, 12♂♂13♀♀; 4–17 August 2016, 2♂♂, Malaise trap; HeLoc75, 11–21 July 2016, 1♀, Malaise trap; HeLoc78, 23 June–11 July 2016, 2♂♂4♀♀; 11–21 July 2016, 3♂♂9♀♀; 21 July–4 August 2016, 11♀♀, Malaise trap; HeLoc86, 24–25 July 2017, 1♀, yellow pan trap; HeLoc87, 26 July 2017, 3♂♂, sweep net.

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 10 July–10 August 2003, 2♂♂, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO). Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l, 1–31 July 1992, 1♀, Malaise trap, leg. G. Bakkerud.

**Remarks.** The species was collected both on rich fens and in other habitats. In the Malaise trap catches it was the fifth most abundant species constituting 4.2% of the total material.

#### *Dolichopus zetterstedti* Stenhammar, 1852

**Material.** HeLoc75, 11–21 July 2016, 1♀, Malaise trap.

**Remarks.** The species is listed as Norwegian based on a specimen from Laurgård in Sel (ON) collected in 1861 (Siebke 1877). Consequently, the female from Bjørvollen constitute the first Norwegian discovery of the species in more than 150 years.

#### *Gymnopternus aerosus* (Fallén, 1823)

**Material.** HeLoc09, 22 July 2017, 1♂, sweep net; HeLoc17, 23 June–11 July 2016, 2♂♂1♀, Malaise trap; HeLoc34, 21 June–20 July 2017, 1♂, light trap.

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 22 June–10 July 2003, 1♀, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l, 21 June–18 July 2006, 2♂♂3♀♀, Malaise trap, leg. K. Sund (ZMO). Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l, 1–31 July 1992, 1♂, Malaise trap, leg. G. Bakkerud. Eidskog: Magnor motorcrossbane, 59.9535°N 12.1754°E, 135 m

a.s.l, 4 June–26 July 2018, 1♂, Malaise trap, leg. K.M. Olsen & A. Thylén.

***Gymnopternus brevicornis* (Staeger, 1842)**

**Material.** HeLoc07, 22 July 2017, 1♂, sweep net; HeLoc09, 22 July 2017, 13♂♂2♀♀, sweep net; HeLoc10, 22 July 2017, 1♂, sweep net; HeLoc13, 21 July 2017, 1♀, sweep net; HeLoc17, 23 June–11 July 2016, 1♀; 21 July–4 August 2016, 2♀♀, Malaise trap; HeLoc19, 21 July 2017, 3♂♂, sweep net; HeLoc24, 15 August 2016, 1♂, sweep net; HeLoc32, 23 June–11 July 2016, 1♂2♀♀; 11–21 July 2016, 3♀♀; 21 July–4 August 2016, 2♂♂2♀♀; 4–17 August 2016, 2♂♂1♀, Malaise trap; HeLoc34, 21 June–20 July 2017, 1♀; 20 July–6 August 2017, 1♂; 6 August–10 September 2017, 4♂♂, light trap; HeLoc35, 29–31 July 2016, 1♂1♀, light trap; HeLoc75, 21 July–4 August 2016, 1♂, Malaise trap.

**Additional material.** HES, Kongsvinger: Fjørsjøen, 60.176827°N 12.435088°E, 225 m a.s.l, 2 July–3 August 2015, 1♂, Malaise trap, leg. K. Sund (ZMO).

**Remarks.** The species was collected both on rich fens and in other habitats. In the Malaise trap catches it was the tenth most abundant species constituting 1.1% of the total material.

***Gymnopternus metallicus* (Stannius, 1831)**

**Material.** HeLoc34, 20 July–6 August 2017, 1♂, light trap.

**Additional material.** HES, Ringsaker: Sandvoll, 60.779455°N 10.787998°N, 147 m a.s.l, 1–31 July 1992, 1♂, Malaise trap, leg. G. Bakkerud.

***Hercostomus sahlbergi* (Zetterstedt, 1838)**

**Material.** HeLoc17, 4–17 August 2016, 1♀, Malaise trap; HeLoc34, 21 June–20 July 2017, 1♂; 20 July–6 August 2017, 1♂; 6 August–10 September 2017, 1♀, light trap; HeLoc75, 21 July–4 August 2016, 1♂, Malaise trap; HeLoc78, 4–17 August 2016, 1♀, Malaise trap.

**Additional material.** HEN, Åmot: Deifjellia, 61.2843°N 11.505°E, 515 m a.s.l, 5 May–6 July 2018, 2♂♂1♀, Malaise trap, leg. K.M. Olsen.

***Hydrophorus albiceps* Frey, 1915**

**Material.** HeLoc75, 26 May–9 June 2016, 1♂, Malaise trap.

**Remarks.** The single male was collected on a rich fen at 770 m a.s.l.

***Hydrophorus altivagus* Aldrich, 1911**

**Material.** HeLoc34, 21 June–20 July 2017, 1♂, light trap; HeLoc74, 26 May–9 June 2016, 1♂, Malaise trap.

**Remarks.** The species is listed as data deficient (DD) in the Norwegian Red List for Species (Gammelmo *et al.* 2015). However, in recent years the species has been collected in several localities and it is probably quite common in Norway.

***Hydrophorus borealis* Loew, 1857**

**Material.** HeLoc35, 2–3 June 2016, 1♂, sweep net.

***Hydrophorus nebulosus* Fallén, 1823**

**Material.** HeLoc71, 26 May–9 June 2016, 1♂, Malaise trap.

**Additional material.** HES, Kongsvinger: Femoen, 60.2033°N 12.3506°E, 206 m a.s.l, 24 August–21 October 2006, 1♀, Malaise trap, leg. K. Sund (ZMO).

***Liancalus virens* (Scopoli, 1763)** (Figure 6)

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 10 August–30 October 2003, 3♂♂, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO).

***Medetera abstrusa* Thunberg, 1955**

**Material.** HeLoc34, 21 June–20 July 2017, 1♂, light trap; HeLoc71, 11–21 July 2016, 1♂, Malaise trap.

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 22 June–10 July 2003, 2♂♂, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 14 August–6 September 2005, 1♂, Malaise trap, leg. K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l, 21 June–18 July 2006, 1♂, Malaise trap, leg. K. Sund (ZMO); Åranstorpet, 60.202808°N



12.434014°E, 300 m a.s.l, 8 August–29 October 2004, 1♂, Malaise trap, leg. K. Sund (ZMO). Ringsaker: Helgøya, Eiksåsen, 60.736872°N 10.994616°E, 285 m a.s.l, 1–31 August 1990, 1♂, Malaise trap, leg. A. Bruserud. **HEN**, Åmot: Deifjellia, 61.2843°N 11.505°E, 515 m a.s.l, 6 July–22 September 2018, 1♀ Malaise trap, leg. K.M. Olsen.

***Medetera acanthura* Negrobov & Thuneberg, 1970**

**Material.** HeLoc74, 17 August–2 September 2016, 1♂, Malaise trap.

**Additional material.** **HEN**, Åmot: Deifjellia, 61.2843°N 11.505°E, 515 m a.s.l, 5 May–6 July 2018, 1♂, Malaise trap, leg. K.M. Olsen.

***Medetera alpicola* Naglis & Negrobov, 2014**

**Additional material.** **HES**, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 14 August–6 September 2005, 1♂, Malaise trap, leg. K. Sund (ZMO).

**Remarks.** This species was recently described from Switzerland by Naglis & Negrobov (2014). The male from Kongsvinger is the first published record from Norway. However, Norwegian specimens from Tokke (TEI) and Kviteseid (TEI), collected by Kjell Magne Olsen and Øivind Gammelmo, have been known for a while.

***Medetera belgica* Parent, 1936**

**Additional material.** **HES**, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 10 July–10 August 2003, 5♂♂, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l, 8 August–29 October 2004, 2♂♂, Malaise trap, leg. K. Sund (ZMO). Våler: Gjerdåskoia, Nordre Bølsjøen, 60.85139°N 12.10317°E, 396 m a.s.l, 7 July–6 August 2009, 1♂, Malaise trap, leg. E. Rindal & G. Søli (ZMO).

***Medetera betulae* Ringdahl, 1949**

**Material.** HeLoc34, 6 August–10 September 2017, 1♂, light trap.

**Additional material.** **HES**, Kongsvinger: Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l, 14 June–8 August 2004, 1♂; 8 August–29

October 2004, 2♂♂1♀, Malaise trap, leg. K. Sund (ZMO).

***Medetera borealis* Thuneberg, 1955**

**Material.** HeLoc74, 4–17 August 2016, 1♂, Malaise trap.

**Additional material.** **HES**, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 14 August–6 September 2005, 1♂, Malaise trap, leg. K. Sund (ZMO); Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l, 14 June–8 August 2004, 1♂, Malaise trap, leg. K. Sund (ZMO). **HEN**, Åmot: Deifjellia, 61.2843°N 11.505°E, 515 m a.s.l, 5 May–6 July 2018, 1♂, Malaise trap, leg. K.M. Olsen.

***Medetera excellens* Frey, 1909**

**Additional material.** **HES**, Våler: Gjerdåskoia, Nordre Bølsjøen, 60.85139°N 12.10317°E, 396 m a.s.l, 6 August–28 October 2009, 4♂♂, Malaise trap, leg. E. Rindal & G. Søli (ZMO).

***Medetera infumata* Loew, 1857**

**Material.** HeLoc17, 26 May–9 June 2016, 3♂♂1♀; 9–23 June 2016, 2♂♂1♀, Malaise trap; HeLoc32, 26 May–9 June 2016, 81♂♂96♀♀; 9–23 June 2016, 26♂♂15♀♀; 23 June–11 July 2016, 21♂♂9♀♀, Malaise trap; 15 July–17 September 2017, 1♂2♀♀, window trap; HeLoc45, 9–24 June 2016, 1♂4♀♀; 24 June–11 July 2016, 2♂♂6♀♀, Malaise trap; HeLoc47, 26 May–9 June 2016, 10♂♂3♀♀; 9–23 June 2016, 7♂♂; 23 June–11 July 2016, 4♂♂; 21 July–4 August 2016, 1♂, Malaise trap; HeLoc71, 26 May–9 June 2016, 6♂♂1♀; 23 June–11 July 2016, 1♂, Malaise trap; HeLoc78, 23 June–11 July 2016, 1♂, Malaise trap.

**Additional material.** **HES**, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 22 June–10 July 2003, 8♂♂, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 22 June–9 July 2005, 5♂♂, Malaise trap, leg. K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l, 21 June–18 July 2006, 5♂♂, Malaise trap, leg. K. Sund (ZMO); Fjørsjøen, 60.176827°N 12.435088°E, 225 m a.s.l, 6 June–

2 July 2015, 4♂♂, Malaise trap, leg. K. Sund (ZMO); Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l, 22 April–14 June 2004, 8♂♂, Malaise trap, leg. K. Sund (ZMO). Ringsaker: Helgøya, Eiksåsen, 60.736872°N 10.994616°E, 285 m a.s.l, 1–30 June 1990, 1♂, Malaise trap, leg. A. Bruserud. Eidskog: Magnor motorcrossbane, 59.9535°N 12.1754°E, 135 m a.s.l, 4 June–26 July 2018, 1♂, Malaise trap, leg. K.M. Olsen & A. Thylén; Magnor, Veksåsen, 59.94342°N 12.25456°E, 5 May–15 June 2015, 2♂♂2♀♀, Malaise trap, leg. A. Staverløkk. Våler: Gjerdåskoia, Nordre Bølsjøen, 60.85139°N 12.10317°E, 396 m a.s.l, 7 July–6 August 2009, 22♂♂, Malaise trap, leg. E. Rindal & G. Søli (ZMO).

**Remarks.** The species was collected both on rich fens and in other habitats. In the Malaise trap catches it was the second most abundant species constituting 20.3% of the total material.

#### *Medetera jacula* (Fallén, 1823)

**Additional material.** HES, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 22 June–9 July 2005, 5♂♂, Malaise trap, leg. K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l, 14 August–6 September 2005, 24♂♂39♀♀, Malaise trap, leg. K. Sund (ZMO).

#### *Medetera melancholica* Lundbeck, 1912

**Material.** HeLoc45, 4–17 August 2016, 1♂, Malaise trap; HeLoc74, 9–23 June 2016, 1♂, Malaise trap.

**Additional material.** HES, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 22 June–9 July 2005, 1♂, Malaise trap, leg. K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l, 21 June–18 July 2006, 1♂, Malaise trap, leg. K. Sund (ZMO); Fjørsjøen, 60.176827°N 12.435088°E, 225 m a.s.l, 2 July–3 August 2015, 1♂, Malaise trap, leg. K. Sund (ZMO). Våler: Gjerdåskoia, Nordre Bølsjøen, 60.85139°N 12.10317°E, 396 m a.s.l, 7 July–6 August 2009, 10♂♂, Malaise trap, leg. E. Rindal & G. Søli (ZMO).

#### *Medetera nitida* (Macquart, 1834)

**Additional material.** HES, Ringsaker: Helgøya, Eiksåsen, 60.736872°N 10.994616°N,

285 m a.s.l, 1–31 July 1990, 1♂, Malaise trap, leg. A. Bruserud.

#### *Medetera obscura* (Zetterstedt, 1838)

**Additional material.** HES, Våler: Gjerdåskoia, Nordre Bølsjøen, 60.85139°N 12.10317°E, 396 m a.s.l, 7 July–6 August 2009, 3♂♂15♀♀, Malaise trap, leg. E. Rindal & G. Søli (ZMO).

#### *Medetera pseudoapicalis* Thunberg, 1955

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 22 June–10 July 2003, 1♂, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Fjørsjøen, 60.176827°N 12.435088°E, 225 m a.s.l, 6 June–2 July 2015, 1♂, Malaise trap, leg. K. Sund (ZMO). HEN, Åmot: Deifjellia, 61.2843°N 11.505°E, 515 m a.s.l, 6 July–22 September 2018, 1♂, Malaise trap, leg. K.M. Olsen.

#### *Medetera setiventris* Thunberg, 1955

**Material.** HeLoc32, 26 May–9 June 2016, 1♂, Malaise trap; HeLoc34, 21 June–20 July 2017, 1♂, light trap; HeLoc47, 26 May–9 June 2016, 1♂, Malaise trap; HeLoc71, 17 August–2 September 2016, 1♂, Malaise trap; HeLoc78, 17 August–2 September 2016, 1♂, Malaise trap.

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 22 June–10 July 2003, 1♂, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l, 11 May–21 June 2006, 1♂, Malaise trap, leg. K. Sund (ZMO); Viker, Vikeråa, 60.202567°N 12.450709°E, 276 m a.s.l, 26 May–29 June 2007, 1♂, Malaise trap, leg. K. Sund (ZMO). Våler: Gjerdåskoia, Nordre Bølsjøen, 60.85139°N 12.10317°E, 396 m a.s.l, 7 July–6 August 2009, 3♂♂; 6 August–28 October 2009, 1♂1♀, Malaise trap, leg. E. Rindal & G. Søli (ZMO).

#### *Medetera tristis* (Zetterstedt, 1838)

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 22 June–10 July 2003, 4♂♂, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Femoen, 60.2033°N 12.3506°E, 206 m a.s.l, 21 June–18 July 2006, 1♂, Malaise trap, leg. K. Sund (ZMO);

Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l., 22 April–14 June 2004, 4♂♂, Malaise trap, leg. K. Sund (ZMO). Våler: Gjerdåskoia, Nordre Bølsjøen, 60.85139°N 12.10317°E, 396 m a.s.l., 7 July–6 August 2009, 1♂, Malaise trap, leg. E. Rindal & G. Søli (ZMO).

### *Medetera vagans* Becker, 1917

**Material.** HeLoc32, 23 June–11 July 2016, 3♂♂2♀♀, Malaise trap; HeLoc47, 9–23 June 2016, 1♂; 11–21 July 2016, 1♂, Malaise trap; HeLoc71, 23 June–11 July 2016, 1♂; 11–21 July 2016, 1♂, Malaise trap.

**Additional material.** HES, Våler: Gjerdåskoia, Nordre Bølsjøen, 60.85139°N 12.10317°E, 396 m a.s.l., 7 July–6 August 2009, 2♂♂; 6 August–28 October 2009, 1♂, Malaise trap, leg. E. Rindal & G. Søli (ZMO).

### *Medetera veles* Loew, 1861

**Additional material.** HES, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l., 22 June–9 July 2005, 2♂♂, Malaise trap, leg. K. Sund (ZMO).

### *Microphor holosericeus* (Meigen, 1804)

**Material.** HeLoc47, 23 June–11 July 2016, 2♀♀, Malaise trap.

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l., 22 June–10 July 2003, 9♀♀, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l., 22 April–14 June 2004, 1♂, Malaise trap, leg. K. Sund (ZMO). Eidskog: Magnor, Veksåsen, 59.94342°N 12.25456°E, 5 May–15 June 2015, 1♂1♀, Malaise trap, leg. A. Staverløkk.

### *Neurigona abdominalis* (Fallén, 1823)

**Additional material.** HES, Kongsvinger: Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l., 14 June–8 August 2004, 1♀, Malaise trap, leg. K. Sund (ZMO). Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l., 1–31 July 1992, 1♂, Malaise trap, leg. G. Bakkerud.

### *Neurigona pallida* (Fallén, 1823)

**Additional material.** HES, Kongsvinger:

Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l., 22 June–10 July 2003, 19♂♂2♀♀, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Åranstorpet, 60.202808°N 12.434014°E, 300 m a.s.l., 14 June–8 August 2004, 6♂♂7♀♀, Malaise trap, leg. K. Sund (ZMO). Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l., 1–31 July 1992, 1♂1♀, Malaise trap, leg. G. Bakkerud; Helgøya, Eiksåsen, 60.736872°N 10.994616°E, 285 m a.s.l., 1–31 July 1990, 4♂♂, Malaise trap, leg. A. Bruserud; Helgøya, Eksberget, 60.735963°N 10.974627°E, 24 July 1992, 1♀, sweep net, leg. G. Bakkerud. HEN, Åmot: Deifjellia, 61.2843°N 11.505°E, 515 m a.s.l., 5 May–6 July 2018, 1♀, Malaise trap, leg. K.M. Olsen.

### *Neurigona quadrifasciata* (Fabricius, 1781)

**Additional material.** HES, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l., 22 June–9 July 2005, 1♂1♀, Malaise trap, leg. K. Sund (ZMO).

### *Neurigona suturalis* (Fallén, 1823)

**Additional material.** HES, Ringsaker: Helgøya, Eiksåsen, 60.736872°N 10.994616°E, 285 m a.s.l., 1–30 June 1990, 4♂♂, Malaise trap, leg. A. Bruserud.

### *Rhaphium crassipes* (Meigen, 1824)

**Material.** HeLoc34, 3–21 June 2017, 1♂; 21 June–20 July 2017, 1♂4♀♀, light trap; HeLoc35, June 2015, 1♂, Malaise trap; HeLoc71, 23 June–11 July 2016, 1♂1♀, Malaise trap; HeLoc74, 23 June–11 July 2016, 3♂♂; 11–21 July 2016, 1♂, Malaise trap; HeLoc75, 9–23 June 2016, 1♂; 23 June–11 July 2016, 1♂1♀, Malaise trap; HeLoc78, 26 May–9 June 2016, 2♂♂, Malaise trap.

### *Rhaphium elegantulum* (Meigen, 1824)

**Additional material.** HES, Kongsvinger: Fjørsjøen, 60.176827°N 12.435088°E, 225 m a.s.l., 6 June–2 July 2015, 1♂, Malaise trap, leg. K. Sund (ZMO); Viker, Vikeraa, 60.202567°N 12.450709°E, 276 m a.s.l., 29 June–12 August 2007, 1♂, Malaise trap, leg. K. Sund (ZMO). Ringsaker, Nærosset, Nøsterbergvika, 60.981789°N 10.773859°E, 10 July 1991, 1♀,

sweep net, leg. G. Bakkerud.

***Rhaphium fasciatum* Meigen, 1824**

**Additional material.** HES, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 22 June–9 July 2005, 1♀, Malaise trap, leg. K. Sund (ZMO).

***Rhaphium lanceolatum* Loew, 1850**

**Material.** HeLoc32, 23 June–11 July 2016, 1♂, Malaise trap.

**Remarks.** The single male was collected on a rich fen at 250 m a.s.l

***Rhaphium longicorne* (Fallén, 1823)** (Figure 7)

**Material.** HeLoc45, 24 June–11 July 2016, 3♂♂2♀♀; 11–21 July 2016, 1♀, Malaise trap.

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 26 May–22 June 2003, 1♀, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO); Fjørsjøen, 60.176827°N 12.435088°E, 225 m a.s.l, 6 June–2 July 2015, 1♂, Malaise trap, leg. K. Sund (ZMO).

***Rhaphium micans* (Meigen, 1824)**

**Material.** HeLoc35, June 2015, 1♂, Malaise trap; HeLoc75, 11–21 July 2016, 1♂, Malaise trap.

***Rhaphium patulum* (Raddatz, 1873)**

**Material.** HeLoc17, 26 May–9 June 2016, 1♂, Malaise trap.

**Remarks.** The single male was collected on a rich fen at 290 m a.s.l.

***Rhaphium riparium* (Meigen, 1824)**

**Material.** HeLoc34, 21 June–20 July 2017, 3♂♂, light trap.

***Rhaphium umbripenne* (Frey, 1915)**

**Material.** HeLoc45, 24 June–11 July 2016, 1♂, Malaise trap.

**Remarks.** The single male was collected on a rich fen at 640 m a.s.l.

***Sciapus wiedemanni* (Fallén, 1823)**

**Material.** HeLoc34, 21 June–20 July 2017, 3♂♂, light trap.

**Additional material.** HES, Kongsvinger: Dragonmoen, 60.19641°N 12.36511°E, 196 m a.s.l, 14 August–6 September 2005, 1♀, Malaise trap, leg. K. Sund (ZMO).

***Sympycnus aeneicoxa* (Meigen, 1824)**

**Additional material.** HES, Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l, 1–31 July 1992, 2♂♂1♀, Malaise trap, leg. G. Bakkerud.

***Sympycnus pulicarius* (Fallén, 1823)**

**Material.** HeLoc06, 23 July 2017, 4♂♂, sweep net; HeLoc13, 21 July 2017, 2♂♂, sweep net; HeLoc19, 21 July 2017, 1♂, sweep net; HeLoc24, 15 August 2016, 2♂♂, sweep net; HeLoc34, 21 June–20 July 2017, 2♂♂5♀♀, light trap; HeLoc35, 29–31 July 2016, 1♂, light trap; HeLoc36, 29 July 2017, 1♂, sweep net; HeLoc47, 4–17 August 2016, 1♂, Malaise trap; HeLoc87, 26 July 2017, 1♂, sweep net.

**Additional material.** HES, Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l, 10 July 1991, 3♂♂2♀♀, sweep net, leg. G. Bakkerud.

***Syntormon pumilum* (Meigen, 1824)**

**Additional material.** HES, Ringsaker: Sandvoll, 60.779455°N 10.787998°E, 147 m a.s.l, 10 July 1991, 2♂♂3♀♀, sweep net, leg. G. Bakkerud.

***Syntormon tarsatum* (Fallén, 1823)**

**Material.** HeLoc29, 24 July 2017, 1♀, sweep net; HeLoc71, 21 July–4 August 2016, 1♀, Malaise trap; HeLoc73, 28 July 2016, 1♂, sweep net.

***Systemus pallipes* (v. Roser, 1840)**

**Additional material.** HES, Kongsvinger: Abborhøgda, 60.183802°N 12.459788°E, 326 m a.s.l, 10 July–10 August 2003, 1♀, Malaise trap, leg. L.O. Hansen & K. Sund (ZMO).

**The Malaise trap catches**

A total of 1519 specimens of Dolichopodidae

belonging to 48 species were collected in the Malaise traps. There are large differences in the number of specimens taken on the different fens. Most specimens, 486, belonging to 16 species were collected at Nabbtjern; at Åsen 322 specimens belonging to 12 species were found; at Brydalskjølen 264 specimens belonging to 16 species; at Ulvåkjølen-Sundsetra 149 specimens belonging to 12 species, at Sekserbua 111 specimens belonging to 11 species, at Jøgåsmyra 87 specimens belonging to 10 species, at Kildesaga 63 specimens belonging to 11 species, and at Bjørvollen only 37 specimens belonging to 16 species were collected.

Only three species constituted 5% or more of the total catch (Table 2). The most abundant species, *Dolichopus nigricornis* (Figure 4), was taken in 724 specimens or 47.7% of the total catch. It ranged first at most localities except at Nabbtjern, where it ranged second with 187 specimens (38.5%) and at Jøgåsmyra where only 4 specimens (4.6%) were taken.

*Medetera infumata* ranged second with 308 specimens or 20.3% of the total catch. It ranged first at Nabbtjern with 248 specimens (51.0%), second at Sekserbua with 25 specimens (22.5%) and at Kildesaga with 6 specimens (9.5%) and third at Jøgåsmyra with 19 specimens (21.8%) and Ulvåkjølen-Sundsetra with 8 specimens (5.4%).

In the three traps situated above 700 m a.s.l. only one specimen was taken at Brydalskjølen at 780 m a.s.l.

*Dolichopus stenhammeri* ranged third with 84 specimens or 5.5% of the total catch. It is apparently most abundant between 650–700 m a.s.l. as it ranged second both at Ulvåkjølen-Sundsetra with 25 specimens (16.8%) and at Åsen with 52 specimens (16.2%), in the remaining traps only one or two specimens were collected.

Another seven species constituted between one and five percent of the total catch.

Four of these species were taken in most of the Malaise traps between 250 m and 770 m a.s.l, while *Dolichopus urbanus* was only taken above 700 m a.s.l, and *D. planitarsis* and *Argyra auricollis* above 770 m a.s.l.

The catches at Jøgåsmyra differ quite strongly from the catches at the other seven localities. At this locality *Dolichopus fraterculus* was the most abundant species with 24 specimens (27.6%), *Dolichopus lepidus* ranged second with 23 specimens (26.4%) while *Medetera infumata* ranged third with 19 specimens (21.8%).

## Discussion

During the project 85 species of Dolichopodidae

**TABLE 2.** Number of specimens of the most abundant Dolichopodidae species collected in the Malaise traps. Malaise trap no. 1 = Kildesaga, no. 2 = Nabbtjern, no. 3 = Sekserbua NØ, no. 4 = Jøgåsmyra, no. 5 = Ulvåkjølen-Sundsetra, no. 6 = Åsen, no. 7 = Bjørvollen, no. 8 = Brydalskjølen.

Species	Malaise trap no.								Total	Percent	Altitude m a.s.l.
	1	2	3	4	5	6	7	8			
<i>Dolichopus nigricornis</i>	41	187	72	4	101	216	15	88	724	47.66%	250–780
<i>Medetera infumata</i>	7	248	25	19	8	–	–	1	308	20.28%	250–780
<i>Dolichopus stenhammeri</i>	2	1	1	1	25	52	1	1	84	5.53%	250–780
<i>Dolichopus lepidus</i>	4	16	1	23	–	–	4	19	67	4.41%	250–780
<i>Dolichopus urbanus</i>	–	–	–	–	–	34	1	29	64	4.21%	700–780
<i>Dolichopus planitarsis</i>	–	–	–	–	–	–	2	61	63	4.15%	770–780
<i>Dolichopus picipes</i>	2	1	3	–	2	6	1	41	56	3.69%	250–780
<i>Dolichopus fraterculus</i>	–	1	–	24	2	4	1	–	32	2.11%	250–770
<i>Argyra auricollis</i>	–	–	–	–	–	–	–	18	18	1.18%	780
<i>Gymnopternus brevicornis</i>	3	13	–	–	–	–	1	–	17	1.12%	250–770

were identified. The family is more poorly studied in Hedmark than other parts of the country and most of the species are not recorded from the region before. One species, *Achalcus nigropunctatus*, has so far not been recorded from Norway. It was collected in the Malaise traps at Sekserbua and Ulvåkjølen-Sundsetra between 520 and 660 m a.s.l. Elsewhere in Europe it has also been collected in upland localities (Pollet 1996). The species is distributed over much of Europe, including Sweden. *Medetera alpicola* is also recorded for the first time from Norway, although it has been collected in Telemark earlier. In Norway *Argyra magnicornis* has previously only been recorded from Tromsø by Siebke (1877) based on a specimen collected in 1821. The male from Hedmark is thus the second known specimen of this species from Norway and the first discovery of the species in nearly 200 years. *Dolichopus zetterstedti* was recorded from northern Oppland by Siebke (1877) based on a specimen collected in 1861. The record from the rich fen in Hedmark is thus the second record of this species in Norway and the first in in more than 150 years.

A total of 49 species of Dolichopodidae were taken on the rich fens. Of these, twelve species were exclusively taken on rich fens, but most of these were only taken in one or a few specimens. With two exceptions the most abundant species on the rich fens were all rather common in other types of habitats too. However, *Dolichopus planitarsis* ranged as no. 6 with 4.2% of the total Malaise trap material and was only taken on two rich fens between 770–780 m a.s.l. *Dolichopus picipes* ranged as no. 7 (3.7%) and except for three specimens it was also exclusively taken on rich fens.

According to Pollet (1992) Dolichopodidae are well suited as bio-indicators. The dolichopodid communities of several habitat types in Belgium, including woodlands (Pollet & Grootaert 1991), reed marshes (Pollet 1992), coastal dune habitats (Pollet & Grootaert 1996) and grassland (Pollet 2001) have been studied to assess the conservation value of the different habitats. The present study outlines the Dolichopodidae fauna on rich fens in southeastern Norway. There are no previous studies specifically targeting the species composition,

ecology and distribution of peatland-dwelling dolichopodids in Norway and the knowledge of this fauna is very poor. It is generally assumed that the species richness of insects is highest in mires with high trophic status and that species richness generally declines from eutrophic to oligotrophic mires, as has been demonstrated for Tipuloidea (e.g. Salmela & Ilmonen 2005). It is also generally assumed that the species richness is higher in lowland mires than in mires in more upland areas. In the Malaise trap at Nabbtjern, situated at 250 m a.s.l., 486 specimens belonging to 16 species were collected; but also, the Malaise trap at Åsen, situated at 700 m a.s.l., yielded no less than 322 specimens belonging to 12 species. However, the number of species collected in the different Malaise traps varied strongly and probably reflects local differences between the fens. The fens varied both in size, structure and vegetation and on some of the fens there were springs or streams or ponds.

**Acknowledgements.** The project was funded by a grant from the Norwegian Taxonomy Initiative. The field work was set up in cooperation with Inland Norway University of Applied Sciences, Campus Evenstad: Harry P. Andreassen, Mari E. Hagenlund and Frode Næstad. We are further indebted to all the participants in the project, particularly Linn K. Hagenlund and Steffen Roth, both Bergen. We are also indebted to Lars Ove Hansen, Oslo, for sorting through and sending us material of Empidoidea from the insect collection at the Natural History Museum in Oslo and to Morten Angard Mjelde, Drangedal, for allowing us to use his Dolichopodidae photos.

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Received: 25 September 2020

Accepted: 16 October 2020