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### Grass-seed *Dasyneura* gall midges,

together with the descriptions of two new species.

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Many species of *Cecidomyiidae* prevent the satisfactory production of seed in grasses, and recently Tomaszewski (1931) and Barnes (1931) reviewed the subject. Since then several workers, e. g. Metcalfe (1933) and Jones (1936), have made further investigations. The former dealt with gall midges attacking *Dactylis glomerata* and *Lolium perenne*, while the latter made a survey of the gall midges affecting grass seed production in mid-Wales. There is however still much to be found out concerning the species concerned, their biologies and practical control measures. In all probability there are several species awaiting discovery.

The known species involved in this type of damage frequently belong to the genus *Contarinia* and, apparently, comparatively few species belonging to other genera are implicated. It is the object of this paper to draw attention to those species of *Dasyneura* whose larvae destroy grass seed and to describe two recently discovered species.

Including the two species to be described in this paper, there are six species of *Dasyneura* now known to destroy grass seed. Each species is restricted to a single genus of grass. The following grasses are involved: *Agrostis* spp., *Aira flexuosa*, *Alopecurus pratensis*, *Dactylis glomerata*, *Festuca rubra* var. *arenaria* and *Trisetum flavescens*. With the exception of *Dasyneura graminis* which lives on *Agrostis*, the specific names of the midges indicate the genus of grass which is attacked.

#### 1. *Dasyneura airae* (Kieffer) (1897).

This species was described from specimens found in Lorraine on *Aira flexuosa*. Nothing has been published concerning its biology, except that the larvae live in the spikelets of the grass. The present writer has not yet seen specimens.

#### 2. *Dasyneura alopecuri* (Reuter) (1895).

This species has long been known as a pest destroying the seeds of Meadow Foxtail grass (*Alopecurus pratensis*). It is north-European in distribution occurring in Finland, Denmark, Great Britain and Ireland and probably elsewhere in this area. It has also been recorded as a serious introduced pest in New Zealand. *D. alopecuri* has one generation a year. Its biology in England has been studied by Barnes (1930) who gives a list of references to the more important papers concerning this species.

#### *Dasyneura dactylidis* Metcalfe (1933).

This species was discovered by Miss M. E. Metcalfe on *Dactylis glomerata* on the Park Grass plots of Rothamsted Experimental Station. It also has one generation a year and the main features of its biology were worked out by its discoverer.

#### 4. *Dasyneura festucae* sp. n.

The larvae of this species were found in seed of Creeping Red Fescue (*Festuca rubra* var. *arenaria*) from Oxfordshire during the winter of 1930—1. Adult midges emerged in June 1931. The larvae were brick-red in colour as is usual in *Dasyneura* species. The description of the species follows.

*Dasyneura festucae* sp. n.

Male. Length about 1.5 mm. Antennae: 2+13, typical *Dasyneura* structure; neck of 3rd flagellar segment nearly three times as long as wide, slightly shorter than the node; neck of 5th flagellar segment about three times as long as wide, about equal in length to node; neck of 10th flagellar segment about four times as long as wide and slightly longer than the node. Palpi: basal segment quadrate, second about twice as long as wide, third about four times as long as broad, distinctly narrower than second, fourth and distal segment about five times as long as wide, same width as third (in one palp of the type the third and fourth segments are fused; in paratype Cecid. 2006 both the third and fourth segments are fused; in paratype Cecid. 1732 the second palp segment is swollen abnormally). Wings: 3rd vein reaching margin just before apex of the wing. Legs: scaled; claws with small basal tooth, empodium about as long as claws. Genitalia: basal clasp segment slightly more than twice as long as wide, not swollen, with long setae; distal clasp segment with a few setae, rather broad, narrowing slightly, 'oncle' well defined; dorsal lamella equilateral triangular emargination, each lobe rather narrow, roundly pointed distally, with a few medium lengthed setae; ventral lamella shorter, darker in colour, setose, deep V-shaped emargination, each lobe narrow, roundly pointed; harpes setose, about same length as ventral lamella but broader; style reaching just beyond harpes.

Type — Cecid. 2007.

Paratypes — Cecid. 2006, 1732.

Female. Length about 2 mm. Antennae: 2+12, in the specimens available the last two flagellar segments are fused and not separated, flagellar segments almost sessile, 3rd flagellar segment not twice as long as wide. Palpi: second segment swollen with dark inclusion just as in ♂ paratype 1732, proportions about as in male. Claws with basal tooth difficult to see but present. Ovipositor slender, greatly extensile, normal for *Dasyneura*, similar to that of *dactylidis* Metcalfe, dorsal chitinous bars not pronounced. Otherwise about as in male.

Type — Cecid. 1731.

Paratype — Cecid. 2008.

Larva. Cecid. 1515—18 inclusive and 1638.

Host Plant. *Festuca rubra* var. *arenaria*.

Locality. Oxfordshire, England.

5. *Dasyneura graminis* Felt (1908).

This species, which lives in *Agrostis* seed heads, was originally described from a specimen ovipositing on red-top or June grass in New

York State (Felt, 1915). What is thought to be the same species has been reared from common bentgrass in Yorkshire, England (Barnes, 1931). Little is known concerning its biology and up to the present it has not been recorded as a pest, although it might easily reach this status.

6. *Dasyneura triseti* sp. n.

This species has recently been studied by Dr. O. Watzl (1939) who found it attacking Yellow or Golden Oat-grass (*Trisetum flavescens*) in the Austrian Alps. I am grateful to Dr. Hans Sachtleben and Dr. B. Wahl for the opportunity of examining and describing this species. The ovipositor is not quite typical of the genus *Dasyneura* and is very reminiscent of that in English specimens of *D. graminis* (Cecid. 1548—50, 3348—51).

*Dasyneura triseti* sp. n.

Male. Length about 1.25 mm. Antennae: 2+13; typical *Dasyneura* structure; size of individual antennal segments is larger than in *festucae* although the midge on the whole is slightly smaller; neck of 3<sup>rd</sup> flagellar segment about four times as long as wide, nearly equal in length to the node; neck of 5<sup>th</sup> flagellar segment about five times as long as wide, slightly longer than the node; neck of 10<sup>th</sup> flagellar segment shorter and narrower than that of 5<sup>th</sup> but about five times as long as wide, about equal in length to node. Palpi: basal segment quadrate, second about twice as long and nearly twice as long as wide, third half again as long as second, narrower, about three times as long as wide, distal segment half again as long as third, about four times as long as wide. Wings: smaller and slightly narrower in proportion than in *festucae*; 3<sup>rd</sup> vein reaching margin more before apex than in *festucae*. Legs scaled, claws with basal tooth of moderate size, empodium about as long as claws. Genitalia: basal clasp segment broader than in *festucae*; terminal clasp segment with more setae, 'oncle' smaller; dorsal lamella widely emarginate, each lobe fairly large and wide, with a few setae distally, roundly tapering; ventral lamella shorter, shallow but wide emargination, each lobe approaching equilateral triangle in shape, roundly pointed; harpes distinctly smaller than in *festucae*, setose, irregular in shape distally; style reaching just beyond harpes.

Cotypes — Cecid. 3793—3805 inclusive.

Other specimens — Cecid. 3806—8 inclusive<sup>1</sup>).

Female. Length about 1.75 mm. Antennae: 2+12, flagellar segments almost sessile, 3<sup>rd</sup> flagellar segment about twice as long as wide. Palpi: about as in male. Ovipositor (very similar to that of *graminis*) more massive and yet more pointed than in *festucae*, dorsal chitinous bars very pronounced and heavily chitinised. Otherwise about as in in male.

Cotypes — Cecid. 3809—14 and 3859—63 inclusive.

Other Specimens — Cecid. 3864—6 inclusive <sup>1)</sup>.

Larva. Cecid. 3867—72 inclusive.

Host Plant. *Trisetum flavescens*.

Locality. Austrian Alps (Leutasch in Nordtirol).

These six species of *Dasyneura* which are known to destroy grass-seed can be arranged roughly according to general size (which corresponds to the size of the seeds and spikelets of the grasses on which the larvae feed) and also the number of their antennal segments. Thus *D. dactylidis* and *D. alopecuri* are the largest with 2+16 and 2+15 antennal segments in the males respectively, *D. festucae* and *D. triseti* come next with 2+13 each, and *D. airae* and *D. graminis* are the smallest with 2+12. The numbers of the segments vary with the size of the midge both from species to species and among individual specimens of the same species in this genus (Barnes, 1932). The normal or most frequent numbers are given above.

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<sup>1)</sup> Weiteres Material (♂♂, ♀♀ und Larven) vom gleichen Fundort in der Sammlung des Deutschen Entomologischen Instituts, Berlin-Dahlem.