Tricholaba trifolii Rübs. (Dipt., Cecidomyidae) a gall-maker on red clover

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During the summer of 1954 and 1955 attacks by larvae of a gallmidge were seen on red clover in several places in Västergötland, western Sweden. The leaflets were folded along the midrib and discoloured. The gall agreed with that of *Dasyneura trifolii* F. Löw and as long as the larvae remained in the galls it was first assumed that the damage was caused by this species. The midges obtained from larvae, collected from red clover in different places and at various times did not, however, belong to *Dasyneura.*

During a visit of the author at Rothamsted Experimental Station, England, in the autumn of 1957 the well-known expert of gallmidges, Doctor H. F. Barnes, kindly determined the midge and found it to be a *Tricholaba,* probably *trifolii* Rübs. The larvae of this species are reported to live as inquilines in the galls of *Dasyneura trifolii* F. Löw (Rübsaamen 1917, Rübsaamen and Hedicke 1926, Barnes 1946).

From later emergences of larvae collected from red clover in Västergötland also no *Dasyneura* were obtained, but only midges of *Tricholaba.* For that reason I assumed that the larvae of the reared midges were primary pests of red clover and some biological tests with the species were carried out during the summer of 1958 at the Branch Station at Skara of the Swedish State Plant Protection Institute.

The earlier known pest on leaves of clover, *Dasyneura trifolii,* is reported to attack, inter alia, red- and white clover and is, according to Barnes (1946), widely distributed in Europe and in the U.S.A. In Sweden the species is reported to occur from Skåne to Uppland (Wahlgren 1922, 1944) and recently also in Västergötland on red clover (Wahlgren 1959). The last-mentioned record is based upon determination of the gall only, for which reason, as seen below, it may be open to doubt.

The midge of the genera *Tricholaba,* which the author has reared agrees in taxonomic characters with *T. trifolii* Rübs. (Rübsaamen 1917, Rübsaamen and Hedicke 1926). There may be some differences between *trifolii* Rübs. and the Swedish type in the colour of the antennae. According to Rübsaamen the antennae of the species are shining black. On the Swedish midges they are greyish and not especially glossy.

Until the two types have been compared the question whether the Swedish

Fig. 1. Red clover leaves infested by *Tricholaba trifolii* Rübs.

midge now obtained is identical with *T. trifolii* Rübs. or it is a new species is not definitively solved.

The colour of female abdomen is chiefly red-yellow. The abdomen of the male is more grey-yellow. Seven females (reared midges) measured from 2.0—3.0 mm, average length 2.7 mm. Generally the male is a little smaller than the female (one male measured 2.3 mm).

Galls with larvae of *T. trifolii* Rübs. occurred commonly in Västergötland in fields of red clover (*Trifolium pratense*) during the years of observations (1954—59) and were taken in Dalsland Sept. 8, 1959.

Biology

Up to now the author has seen attacks of *T. trifolii* on red clover only. The female lays its eggs in leaflets before they have expanded. The attacks of the young larvae cause the leaflets to remain folded along the midrib and a gall is formed. One, two or all three of the leaflets can be damaged. As long as the larvae remain in the gall some moisture is secreted in it. The attacked leaflets become discoloured at first chlorotic and yellow-green, later brownish. When the larvae have left the leaves to pupate in the soil, the galls dry up and the leaflets get brown, dead spots. Generally 2—5 larvae are to be found in one attacked leaflet. The gall is of the same type as that of *Dasyneura trifolii* (reproduced in colour by Folsom 1909, Plate I: 4) or for *D. onobrychidis* Bremi on Lucerne (in colour, see Gram, Bovien and Stapel 1956, Plate 43, F-G).

In emergences only *Tricholaba* has been obtained besides a parasite wasp in several specimens. In fields with red-, white- and Alsike clover attacks

Fig. 2. *Tricholaba trifolii* Rübs. (♀); (After Rübsaamen 1917).

were seen only on red clover. Lucerne growing in the immediate neighbourhood of attacked red clover plants was not injured by the midge.

In central Sweden clover crops are generally harvested at the end of June. Attacks of *T. trifolii* are very common on the regrowth of the clover from the first half of July and some weeks forward. In 1958 galls with larvae were seen as late as at the end of September. Thus at least two generations may occur in Sweden.

Biological tests with *T. trifolii* Rübs. on red clover

In order to find out whether the midge is a primary parasite or not biological experiments with newly emerged midges were carried out in the summer of 1958. The experiments were made in an insectary with about the same temperature and air humidity as outdoors.

Leaves with larvae were collected in fields with red clover July 8—11. Emerged midges were gathered July 19 (from one culture indoors) and August 2—8 (from cultures in the insectary). Females dominated among the emerged midges. These were inserted in cages each containing a plant of red clover. The females, which were used for the experiments, were examined in a microscope before being isolated. The shape of the last abdominal segments make a distinction between the *Tricholaba*- and *Dasyneura*-type conclusive. From galls, which were formed on the isolated test plants, larvae were collected for emergence. In this way a second generation of midges was obtained.

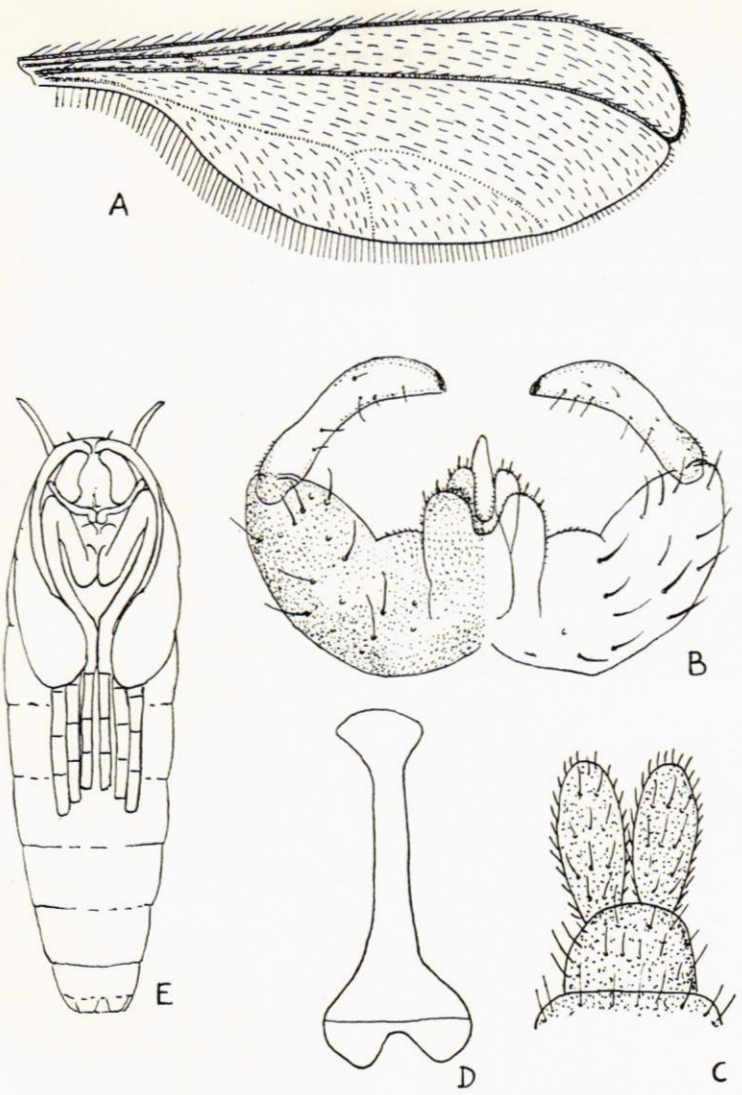

Fig. 3. *Tricholaba trifolii* Rübs.: A. Wing of the midge. B. Male genitalia. C. Dorsal view of tip of female abdomen. D. Sternal spatula of the larva. E. Pupa.

Experiments with T r i c h o l a b a on red clover:

(+++=typical gall with larvae of *Tricholaba* was formed on the isolated plant)

Culture No.	Parents	Test began	Result	Emerged offspring
1	4 ♀♀+1 ♂	July 19	+++	3 ♀♀ Aug. 22
2	3 ♀♀+2 ♂♂	Aug. 2	+++	21 ♀♀ Sept. 8—10
3	7 ♀♀+1 ♂	Aug. 4	+++	17 ♀♀+1 ♂ Sept. 8—10

The experiments have made it clear that the gallmidge of the genus *Tricholaba*, which was found on red clover in Västergötland, is a primary pest. The species is quite independent of other gall making insects.

Economic importance:

Generally *T. trifolii* Rübs. seems to be without practical importance, even though it may be very common in red clover crops. During July of the extraordinarily dry summer of 1955 it was observed, however, that the regrowth of attacked red clover was delayed. In general no chemical control of the midges should be necessary.

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