Notes on Cecidomyidae, I

by

W. NIJVELDT

Institute of Phytopathological Research, Wageningen, The Netherlands

Clinodiplosis spp.

The genus *Clinodiplosis* was erected in 1894 by KIEFFER (7) with *cilicrus* as the generic type. It includes many species, morphologically very similar, which feed on decaying plant tissues or live as inquilines in galls and other deformities produced by gall midges and other insects.

Some authors considered the dorsal plate in the male genitalia an important character for the separation of species. In *Clinodiplosis cilicrus* (Rübs.) the dorsal plate is bilobed and each lobe is incised obliquely on the inner side (fig. 1). In *C. coriscii* Kieffer each lobe is divided apically into two smaller lobes (fig. 2). The dorsal plate of *C. leguminicola* Milne is deeply cleft, the lobes extending apically to smaller lobes on the outer side only (fig. 3). This species was described by MILNE (12) in 1960.

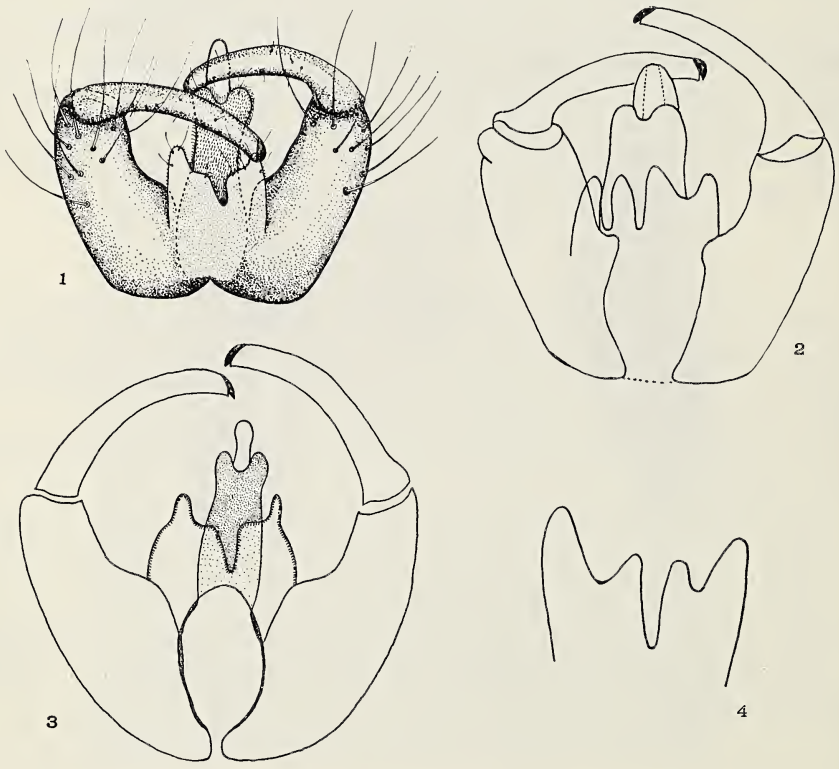

Fig. 1: hypopygium of *C. cilicrus*; fig. 2: hypopygium of *C. coriscii*; fig. 3: *hypopygium* of *C. leguminicola*; fig. 4: dorsal plate of *C. papaveris*, intermediate between group 1 and 2.

A study of the literature together with the slide material in my collection has enabled me to draft the following schedule for the males.

GROUP 1 — hypopygium with dorsal plate of the *C. cilicrus*-type.
C. biorrhizae Kieff. (from galls of *Biorrhiza pallida* on *Quercus robur* L.).
C. cerricola Rübs. (from galls of *Syndiplosis quercicola* Rübs. on *Quercus cerris* L.).
C. cilicrus Rübs. (from flowers of *Cirsium* spp. and *Centaurea* spp.).
C. impatientis Kieff. (from flowers of *Impatiens noli-me-tangere* L.).
C. kiefferiana Tölg. (origin unknown).
C. lathyri Rübs. (from pods of *Lathyrus odoratus* L.).
C. papaveris (Kjell.) (from seed capsules of *Papaver somniferum* L.).
C. pisicola Barnes (from galls of *Contarinia pisi* Winn. on *Pisum sativum* L.).
C. rosiperda Rübs. (from flower buds of *Rosa centifolia*).
C. sarothamni Kieff. (from galls of *Contarinia pulchripes* on *Sarothamnus scoparius* Koch. and *Genista pilosa* L.).
C. schlechtendali Rübs. (from flowers of *Convolvulus sepium* L.).
C. strobi Kieff. (from cones of *Picea excelsa* Lk.).
C. vitis Lüstn. (from decaying grapes).
C. sp. (from seed heads of *Allium cepa* L.).
C. sp. (from *Asparagus*-stems).
C. sp. (from galls of *Dasyneura leguminicola* Lintner on red clover flower heads).
C. sp. (from fruits of *Rubus idaeus* L.).
C. sp. (from stems of *Rubus idaeus* L., attacked by *Thomasiniana theobaldi* Barnes).
C. sp. (from *Trifolium ambiguum*).

GROUP 2 — hypopygium with dorsal plate of the *C. coriscii*-type.
C. coriscii Kieff. (from mines of *Coriscium brongniardellum* in oak-leaves).
C. papaveris (Kjell.) (from seed capsules of *Papaver somniferum* L.).
C. pisicola Barnes (from galls of *Contarinia pisi* Winn. on *Pisum sativum* L.).
C. rosiperda (Rübs.) (from flower buds of *Rosa centifolia*).
C. scorzonerae Rübs. (from flowers of *Scorzonera hispanica* L.).
C. sp. (from galls of *Dasyneura leguminicola* Lintner on red clover flower heads).

GROUP 3 — intermediate between groups 1 and 2 (fig. 4).
C. acinorum Rübs. (from decaying grapes).
C. papaveris (Kjell.) (from seed capsules of *Papaver somniferum* L.).
C. pisicola Barnes (from galls of *Contarinia pisi* Winn. on *Pisum sativum* L.).
C. rhynchitou Rübs. (from leaf rolls, produced by *Rhynchites betuleti* on *Vitis vinifera* L.).
C. sp. (from galls of *Dasyneura leguminicola* Lintner on red clover flower heads).
C. sp. (from stems of *Rubus idaeus* L., attacked by *Thomasiniana theobaldi* Barnes).

GROUP 4 — hypopygium with dorsal plate of the *C. leguminicola*-type.
C. leguminicola Milne (from red clover flower heads).

It can be seen from the schedule that *C. papaveris,* which was originally described in group 1 (9), occurs in group 1, 2 and 3, as does *C. pisicola,* also originally described in group 1 (1), and the undescribed species from galls of *Dasyneura leguminicola* in red clover flower heads. *C. rosiperda,* originally described in group 1 (16), occurs in groups 1 and 2, and the undescribed species from raspberry canes, attacked by *Thomasinia theobaldi,* belongs to groups 1 and 3. This demonstrates that the male genitalia are useless for separating these species. It is possible, however, that they are monophagous in which case the host plant can serve as a character for their identification. To investigate this possibility I started breeding experiments with *C. rosiperda.* The species was collected from unopened, decaying flower buds of cultivated roses on September 3rd, 1965, near Wanroy in the Netherlands. The flower buds were placed in plastic emergence cages, half full of damp horticultural fibre, kept at a temperature of about 24° C. The midges started emerging on October 26th of the same year. They were released in a breeding cage containing decaying onion plants, which had been kept indoors for a long time and were free from any gall midge infestation. Egg laying was observed on and between the outer scales and after four days the first larvae hatched. On December 21st the adults started emerging. An examination of the male genitalia showed that they belong to group 1. Thus it was demonstrated that *C. rosiperda* is not restricted to rose buds and that it can live on the scales of decaying onion plants under experimental conditions. It would be interesting to discover how the other species behave. More breeding experiments are needed to establish their host plant ranges and to find out their relationships. The validity of the species at present described in the genus *Clinodiplosis* could probably then be decided.

Giraudiella inclusa (Frauenfeld, 1862)

The galls of *Giraudiella inclusa* (5) are commonly found on Common Reed in Europe. But in 1961, Ir. W. D. J. Tuinzing gave me some stems of *Phragmites* which had been collected in Iraq that year, and showed the signs of attack by *G. inclusa* (fig. 5). I succeeded in rearing six males and one female from this material. This is the first record of the occurrence of *Giraudiella inclusa* in Asia.

Haplodiplosis equestris (Wagner, 1871), the Saddle Gall Midge.

In 1840 von Roser (15) found saddle-shaped galls on the stems of barley in Württemberg (Germany) (fig. 6). He succeeded in breeding the midges and described them as *Diplosis marginata.* Another gall midge, causing similar galls on wheat near Fulda, was described in 1871 by Wagner (20). He named it *Diplosis equestris.* In 1900 Kieffer (8) transferred this species to the genus *Clinodiplosis.* Finally, Rübsaamen (17) examined Wagner's type material and erected the genus *Haplodiplosis* with *equestris* as the type-species.

Saddle-shaped galls were also found in 1874 by Nowickii (13) on barley and wheat in Poland. He described the larvae from both host plants as red and he stated that an exact identification of these larvae could only take place after examination of the adults. Later, Wagner wrote to him that the larvae, picked from barley, should belong to *Diplosis marginata* and in 1894 Marchal (11)

Fig. 5: stem of *Phragmites* from Iraq, attacked by *G. inclusa*; fig. 6: wheat stem with galls and larvae of *H. marginata*; fig. 7: male catkin of *Salix amygdalina,* infested by *R. heterobia.*

stated erroneously that this was his conclusion after examinating the adults.

I have studied the description of the galls, larvae and adults by ROSER, WAGNER and NOWICKII and conclude that it is impossible to distinguish *Diplosis marginata* from *Haplodiplosis equestris.* I have also made field observations and breeding experiments at the Institute of Phytopathological Research at Wageningen which showed that the saddle gall midge lives on both barley and wheat and the galls produced by its larvae on these plants, are similar. The correct scientific name of the saddle gall midge should therefore be *Haplodiplosis marginata* (Roser).

Rhabdophaga heterobia (H. Loew, 1850), the Button Top Midge of Basket Willows (10)

DOCTERS VAN LEEUWEN (4) noted in a discussion on the alternation of generations in insects that the larvae of the spring generation of *Rhabdophaga heterobia* develop in the male willow catkins (they also develop in the female ones). The infestation causes swelling at the proximal ends of the catkins which are white and woolly in appearance (fig. 7). The larvae of the summer generation cause small rosette galls at the extremities of the shoots and this infestation causes an excessive branching (fig. 8).

Sometimes catkins are formed late in summer and in this case they may be infested together with the terminal buds by the summer generation, so that two types of galls may appear at the same time on the same host plant. In addition, DOCTERS VAN LEEUWEN records that the larvae of the spring generation have been described as yellow and those of the summer generation as orange red.

Fig. 8: red clover flower head, infested by *T. trifolii*; fig. 9: rosette gall, produced by *R. heterobia* on *Salix amygdalina.*

BARNES (2), who studied the bionomics of *R. heterobia* in detail, mentioned another type of gall produced by this midge, namely swollen lateral buds or lateral rosettes; in addition he reported that all types of galls contain several orange red larvae.

Field observations and breeding experiments, carried out by the author at the Institute of Phytopathological Research at Wageningen, demonstrated that in each case the galls contained larvae which are yellow in the immature stages, but orange red when they are full grown.

Neither the spring generation, nor the summer generations are limited to one special gall type; the females of all generations will infest catkins, terminal buds and lateral buds if these are available in a suitable condition for oviposition. Thus the stage of development of the host plant during the flight periods of the midge and the rate of growth of the attacked plant parts will determine the type of gall formation. This phenomenon cannot be compared with the alternation of generations which so often occurs in the small Hymenoptera of the family Cynipidae.

Tricholaba trifolii (Rübsaamen, 1917)

Tricholaba trifolii was described by RÜBSAAMEN (18) from leaf galls caused by *Dasyneura trifolii* on white clover in Germany in 1917. According to JAAP (6), *T. trifolii* was also found in folded leaflets on red clover. STELTER (19) bred many adults from similar leaf galls in Germany and presumed that *T. trifolii* would not only live as inquilines in the galls of *D. trifolii,* but that it could also produce galls, independent of other gall making insects. Biological tests, carried out by BORG (3) during the summer of 1958 at the Branch Station at Skara of the Swedish State Plant Protection Institute, confirmed this surmise.

MILNE (12) bred many midges from malformed flower heads of red clover in England. He described them as *Tricholaba barnesi,* and separated this species from *T. trifolii* on morphological and biological characters. NIJVELDT (14) examined fifty males and twenty females of a *Tricholaba* species, which was bred from flower heads of red clover in the Netherlands. I could not separate this species from *T. barnesi* and *T. trifolii* on morphological characters.

In the summer of 1965 I collected many malformed flower heads of red clover in the Netherlands (fig. 9). These flower heads contained numerous *Tricholaba*-larvae. After some weeks many adults emerged. They were transferred to a breeding cage with a non flowering red clover plant. After two weeks many larvae could be observed, feeding and causing small necrotic spots on the outside of the leaf stalks (fig. 10). It also proved that leaf galls, similar to those of *Tricholaba trifolii,* were produced (fig. 11). Pupation took place in the soil and some weeks later the first adults emerged.

Fig. 10: larvae of *T. trifolii,* feeding on the leaf stalks of red clover; fig. 11: leaf gall on red clover, caused by *T. trifolii* from lower galls.

These breeding experiments demonstrated that the *Tricholaba* species living in red clover heads in the Netherlands, can be separated neither from *Tricholaba trifolii* Rübs. nor from *Tricholaba barnesi* on biological or morphological characters. The name *T. trifolii* is preferred for the present on account of its priority.

Breeding experiments with *Tricholaba* species from different countries and from different host plants are desirable to find out the relationship and the validity of these species.

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