Notes on gall-midges from Israel and their parasites

by

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BODENHEIMER (10), in his check-list of the animals of Palestine, mentions 34 species of gall midges (Diptera: Cecidomyidae) with their respective hosts, occurring in this country. Later, BYTINSKI-SALZ and STERNLICHT (11) added another two species to the list, namely *Contarinia subulifex* Kieffer and *Arnoldia szepligeti* Kieffer, which they found on *Quercus ithaburensis* Boiss., stating that there were still a few other unidentified species of the genus *Arnoldia* that produce galls on this plant.

The gall midges of economic importance in Israel were recently reviewed by AVIDOV and HARPAZ (3). The present paper contains faunistic notes on several cecidomyids, most of which are new to this country, and on their hymenopterous parasites. The species new to the fauna of Israel are marked with an asterisk in the following list.

PHYTOPHAGOUS SPECIES

1. (*) *Apiomyia bergenstammi* Wachtl

Woody galls on pear twigs were obtained from Mr. Michael COHEN, of the Israel Ministry of Agriculture, who collected them at Sasa, Upper Galilee, near the Lebanese border, in late April 1967. During the first week of May, 117 adult *A. bergenstammi* emerged from the galls, 66 (56%) of them being females. A few days later a number of pteromalid parasites emerged. These were identified by Dr. Z. BOUČEK of Prague as *Oxyglypta rugosa* Ruschka.

This appears to be a recent penetration of the pest into Israel from the Lebanon. The species has already been reported from several Mediterranean countries, including the Lebanon (8).

2. (*) *Asphondylia trabuti* Marchal

Several specimens of this midge were obtained at Rehovot, July 25, 1955, and at Yiron, August 19, 1964, both from potato fruit berries, which are the host whence MARCHAL (13) originally described this species.

3. (*) *Contarinia tritici* (Kirby), Lemon wheat-blossom midge

Hitherto, the southernmost localities whence this midge has been recorded (2) were Tunisia, Persia and Japan. The present record (Rehovot, April 1, 1951, males only, caught on wheat), lying somewhat farther south, marks another point on the line delineating the southern fringe of the geographical distribution of *C. tritici*. In more northern countries this pest is known to cause severe damage to wheat. In Israel, however, *C. tritici* has no economic significance, apparently due to the arid conditions.

4. (*) *Dasyneura papaveris* (Winnertz)

Larvae of this species were obtained from the seed capsules of *Papaver* spp., during April and May, at and near Rehovot. As many as 20—30 larvae were found per capsule.

This appears to be the first record of *D. papaveris* from outside Europe.

Table 1. Plant hosts, localities, collection dates and parasites of Mycodiplosis larvae obtained from various rusts and mildews.

Plant host	Fungus host	Locality	Month collected	Parasites
Anchusa sp.	Puccinia aegilopis Maire	Giv'at Ada	I	
Avena byzantina C. Koch	Puccinia coronata Cda.	Bet She'an	I	Synopeas ciliatus Thomas
Avena sterilis L.	Erysiphe graminis D.C. f. sp. avenae	Nes Ziyyona	IV - V	
Bromus sp.	Unidentified	Miqwe Yisra'el	II	Aphanogmus fulmeki Szel.
Carthamus tinctorius L.	Puccinia carthami Cda.	Rehovot	IV	
Cynara scolymus L.	Oidiopsis taurica Lev.	Nir Banim	V	
Dactylis glomerata (L.)	Puccinia coronata Cda.	Jerusalem	II	
Digitaria sanguinalis (L.) Scop.	Puccinia paspalicola (Henning) Arth.	Gan Efrayim	VIII-IX	
Eragrostis bipinnata (L.) Muschl.	Unidentified	Ra'ananna	VI-VIII	
Eremostachys laciniata (L.) Bge.	Puccinia phlomidis Thuemen	Beer Mashash	III	
Euphorbia sp.	Melampsora sp.	Yaqum	VII-VIII	
Helianthus annuus L.	Puccinia helianthi Schw.	Rehovot	VII	
Hordeum vulgare L.	Puccinia hordei Ott.	Bene Ziyyon, Ammiad	I - II	
Inula viscosa L.	Coleosporium inulae Rabenhorst	Udim, Kefar Netter	VIII-IX	Synopeas ciliatus Thomas
Lolium temulentum L.	Puccinia sp.	Qiryat Gat	IV	
Populus alba L., P. nigra L.	Melampsora sp.	Rehovot	VII-IX	
Prunus sp.	Tranzschelia pruni-spinosae (Pers.) Diet.	Rehovot	XI	Synopeas ciliatus Thomas
Rosa sp.	Phragmidium sp.	Yiftah	V	Aph. fulmeki Szel., A. microneurus Kief.
Rubus sanguineus Friv.	Phragmidium violaceum (Schultz) Wint.	Nebi Rubin	V	Leptacis sp.
Setaria verticillata (L.) P.B.	Uromyces setariae italicae (Diet.) Yosh.	Many localities along coastal plain	VII-IX	Aphanogmus sp., Synopeas ciliatus Thomas
Trifolium alexandrinum L.	Uromyces trifolii (Hedw.) Lev.	Rehovot	V	
Zea mays L.	Puccinia sorghi Schw.	Gan Shemu'el	X	Synopeas ciliatus Thomas

5. *Dasyneura oleae* (F. Loew)

Avidov and Harpaz (3) discussed this pest of olives and its leaf galls. They also found an unidentified *Platygaster* sp. to parasitize this midge.

During the present survey two parasites were reared from *D. oleae,* namely *Platygaster apicalis* Thomas, and *P. oleae* Szel. (Proctotrupoidea: Platygasteridae). Both were obtained from galled olive leaves, Jerusalem, March 1962.

Mycophagous Species

6. (*) *Heteropeza pygmaea* Winnertz

Gravid females of this paedogenic midge were obtained from a rotting log at Nes Ziyyona, March 1964.

7. *Mycodiplosis* spp.

Most species of *Mycodiplosis* are plant-rust or mildew feeders, though some were recorded as preying on scale insects (6), or on mites (7). Much of the available information concerning the plant-rust feeders was summarized by Anderson (1). Golenia (12) has suggested that the larvae of *Mycodiplosis* may limit the spread of rusts.

During the present investigation, rusts on many plants were found to harbour these small, reddish larvae, which usually feed on the uredospores. Field-collected larvae were reared in the laboratory on cultures of the deuteromycetic fungus *Diplodia,* growing on potato-dextrose-agar slants. Pupation of the midges took place on, or in, the mycelium. The emergent adults, as well as occasional parasites, were subsequently collected.

As the taxonomic status of these *Mycodiplosis* species is uncertain (see section on *Lestodiplosis*), it is deemed best to briefly summarize the pertinent observations in tabular form (Table 1). It may be noted that *Mycodiplosis* spp. are present in many localities in Israel, and probably, the enumerated records are but a small part of the fauna. It is also evident that the prevalent parasites, *Synopeas ciliatus* and *Aphanogmus* spp., have a round-the-year supply of hosts.

Though it is quite evident that these larvae feed on rust spores, no evidence could be obtained as to their actually limiting the spread of rusts.

Predatory species

8. *Gersonomyia filifera* Nijveldt

This species, presumably predaceous on citrus scale insects, was recently described by Nijveldt (14). The midges were reared by Dr. David Rosen.

G. filifera appears to be one of a complex of species (or genera), locally associated with citrus scale insects, and currently assigned to the genus *Lestodiplosis.*

9. *Lestodiplosis* spp.

Lestodiplosis is a large, cosmopolitan genus, predaceous throughout its larval stages. Most species prey on other gall-midge larvae (4), others on aphids (5), on scale insects (6), on mites, or on hymenopterous larvae (15).

Two groups of *Lestodiplosis* specimens were obtained during this research.

Members of the first group prey on other gall-midge larvae, such as *Aphidoletes* (= *Phaenobremia*) *aphidimyza* (Rondani) (3), or *Mycodiplosis* spp. (see preceding section). Members of the other group were obtained, mostly by Dr. ROSEN, from many species of citrus scale-insects.

The taxonomic position of the species of this genus is rather confused. According to NIJVELDT (Personal communication, 1963): "The present state of our knowledge of the genera *Lestodiplosis* and *Mycodiplosis* compels us to be very careful in describing new species without a thorough knowledge of their range of prey, which may affect the morphological characters. A revision... is highly desirable... [until this is done] I hesitate in identifying species of these genera".

High humidity is usually considered essential for the pupation and emergence of gall-midge adults. However, it was observed that larvae of *Lestodiplosis* (as well as those of other predaceous genera, e.g. *Therodiplosis, Trisopsis* and *Aphidoletes*) could complete their development on the bottom of dry, empty jars, without special humidity arrangements.

10. (*) *Therodiplosis persicae* Kieffer

This is a well-known predator of red spider mites (7). In Israel it was often found in colonies of this pest, feeding on all its stages. It was collected at Rehovot, January 1963, on *Bidens tripartita* L.; at Even Yehuda, April 1963, on *Solanum villosum* (L.) Lam.; at Rehovot, May 1963, on *Citrus limetta* Risso, and in March 1965 on *Ageratum* sp.

Larvae of *T. persicae* were often parasitized by *Aphanogmus fulmeki* Szelenyi (Proctotrupoidea: Ceraphronidae). The parasite emerges when the cecidomyid larva completes spinning its cocoon. At times the parasite was quite efficient. In a sample of densely cocooned citrus leaves (Rehovot, May 1963), no midges emerged, all cocoons yielding parasites only.

11. (*) *Trisopsis tyroglyphi* Barnes

Specimens of this mite-eating midge (9) were occasionally (Rehovot, throughout 1965) obtained from laboratory rearings of armoured scale-insects contaminated by tyroglyphid mites. Males predominated in the collections of this midge.

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Promotie Dr. R. H. Cobben. Bij het persklaar maken van het vorige nummer was het mij uiteraard niet bekend, dat Dr. Cobben het predicaat „cum laude" verleend zou worden, een onderscheiding, die, zoals Prof. de Wilde mij meedeelde, in Wageningen zelden verleend wordt. Ik vermeld dit daarom alsnog gaarne. — Lpk.

Over Hommel-koninginnen in het voorjaar. In een ongeveer 40-jarig slecht groeiend grove dennenbos in het Nationale Park „De Hoge Veluwe" (bodem grotendeels bedekt met bladmossen), vervolgde ik enige hommelkoninginnen (*Bombus terrestris*), die hier kennelijk aan het zoeken waren naar nestholten. De bodem van dit bos is zeer rijk aan gangen van *Apodemus sylvaticus* (L.), in tegenstelling tot b.v. die van de Plijmen, eveneens in het nationale park. Ongeveer 3—4 cm boven de grond vlogen ze rond, telkens kleine lussen en bogen beschrijvend, terwijl ze dan weer, meestal in een zijdelingse vlucht, een iets grotere afstand aflegden. Zo nu en dan lieten ze zich neer op de dorre naalden en het mos en deden even een poging in de strooisellaag te dringen. Ik geloof dat dit meer was op te vatten als een poging om te ontdekken of hieronder soms een gang zat. Hieruit zou men dan kunnen concluderen, dat het zoeken naar nestholten langs visuele weg geschiedt en dat de dieren dus niet afgaan op de geur die uit zo'n muizegat komt. Het is me overigens niet erg duidelijk waaraan de dieren zouden zien dat er een gang is. Soms verdwenen ze in een donker gat, dat een enkele keer bovendien nog was gemarkeerd door een ring van licht zand op het mos. Maar ook zag ik een koningin verdwijnen in een gang die onder een dikke laag rul opgestapelde dennenaalden lag. De gang was voor mij pas te zien, toen ik de naalden weghaalde en een gat met een diameter van ongeveer 4 cm vrijkwam.

Was het gat gevonden, dan ging de hommelkoningin er in. Maar steeds zag ik dat ze na kortere of langere tijd weer te voorschijn kwam (soms bij een tweede opening een eind verder; ze inspecteerde dus de gang). Geur van muizen speelt misschien een rol, misschien niet. De aantrekkelijkheid van het nestmateriaal wordt niet vergroot door toevoeging van enkele kristallen van acetamide, een stof die voor de mens een muizengeur afgeeft.

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