

PHYTOPHAGOUS INSECTS OBSERVED ON PARASITIC PHANEROGAMS OF  
THE GENERA *OROBANCHE* AND *CUSCUTA* IN 1968\*

M.B. LEKIC

In Yugoslavia investigations of the insects attacking parasitic phanerogams belonging to the genera *Orobanche* L. (fam. Orobanchaceae) and *Cuscuta* Tourn. (fam. Convolvulaceae) have shown that a considerable number of phytophagous insects live or can live on these plants (Lekic, 1968). In the following, only those species which, in 1968 were good control agents of these plants, are considered.

Results of Investigations

Dense populations of *Phytomyza orobanchia* (Dip., Agromyzidae) have been observed on *Orobanche cumana* Mutel (in sunflower fields) and on *Orobanche ramosa* L. (in tobacco, hemp and tomato fields). *P. orobanchia* is widespread throughout Yugoslavia and is to be found wherever these *Orobanche* species grow. The germinating period of the latter is very protracted, lasting from the beginning of May to the end of September. During the period, *P. orobanchia* can be found in all stages of development on *O. cumana* and *O. ramosa*. *P. orobanchia* has several generations (probably 3) which will be the subject for further research in the near future.

Female *P. orobanchia* lay their eggs in the immature seed-capsules or under the epidermis of the stalks. On emergence larvae feed on the seeds and on subepidermal tissues, sometimes penetrating into the stalks where they may feed or only pass through in order to reach another seed-capsule.

The development-cycle of *P. orobanchia* lasts for 25 - 30 days. At the end of September the larvae of the last generation descend to the epigeous or underground part of the *Orobanche* stalk where they pupate. Hibernation then takes place in the withered stalks, but a few pupae have also been found to hibernate in dried-up seed-capsules.

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Insufficient data are at present available to justify any statement about the part played by *P. orobanchia* in the control of *O. cumana* and *O. ramosa*. Investigations are to be continued. From observations made to date, it is apparent that *P. orobanchia* plays an important role in this respect. It must be mentioned, however, that in 1968 a high percentage of the larvae were parasitised (approx. 17%), a factor which may affect the efficiency of the insect. According to Haritonov (1955) this dipteran is also to be found throughout the USSR, particularly on *O. ramosa*. In Yugoslavia, populations of *P. orobanchia* are much denser on *O. cumana* than on *O. ramosa*.

Around Vojvodina, a dense population of *Scotia segetum* Schiff. (Lep., Noctuidae) larvae was observed on *O. cumana* in a sunflower field. Over 90% of the plants were attacked by 1 - 3 larvae and the sunflower plants had not been damaged by *O. cumana*.

*S. segetum* is polyphagous, and in Yugoslavia develops two generations per year. *O. cumana* was very heavily attacked by the first generation of caterpillars and again, but to a lesser degree, by the second generation which remained until hibernation. It is probable that these hibernating larvae would again attack *Orobanche* the following spring if its germination occurred before pupation of the larvae.

It should be mentioned that in Yugoslavia some 10 to 15 years ago, particularly between 1950 and 1956, *Orobanche* presented a much greater problem. Today, however, outbreaks are sporadic and populations less dense. It is thought that this is mainly due to control by insects. The relationship between *S. segetum* and the host-plant *O. cumana* will be thoroughly investigated in the near future.

Other Diptera as well as some Aphididae and Elateridae species observed on *Orobanche* are being identified and studied to determine their dependence on *Orobanche* as host-plant.

Several species of phytophagous insects have been observed on *Cuscuta* spp. So far, *Smicronyx jungermanniae* Reich. (Col., Curculionidae) has been found to be the most dominant species. In Yugoslavia this species was observed on *Cuscuta pentagona* Eng. for the first time in 1952 (Stojanovic, 1961). It develops very high populations in abandoned habitats where *Cuscuta* grows more or less spontaneously, particularly on weeds, along road-sides, river banks, irrigation ditches and other places where the soil

is not tilled and weeds are not destroyed. On regularly cultivated areas, where such crops as alfalfa, red clover, carrots, potatoes, etc. are grown, populations remain very small because their normal development cycle is continually disturbed by the destruction of the host plants and by other agro-technical measures.

*S. jungermanniae*, having 2 to 3 generations per year, belongs to the group of polyvoltine insects which are dependent on normal feeding conditions, i.e. on the quantity and quality of the host plant. In 1968 this insect was observed on *C. pentagona*, *C. europaea* L. and *C. trifolii* Choisy.

So far observations have shown that individuals of the population developing on *C. trifolii* (in bloom) are considerably smaller than those developing on the other hosts. *S. jungermanniae* lays its eggs in the unopened flowers and the larvae feed on the inner contents of the flower. Taking into consideration the space and amount of food available for development, it is understandable why these individuals are so small. With further research it is hoped to demonstrate that there is a special form of *S. jungermanniae* which develops in the flowers of *C. trifolii*.

*S. jungermanniae* hibernates as an adult in the immediate vicinity of the host plant. Several specimens of *Smicronyx seriepilosus* Tourn. were reared from *Cuscuta campestris* Yuncker in only one locality. With further investigations it is hoped to show the degree of dependence of this species on *Cuscuta* as a host-plant.

Other phytophagous insect species observed on *Cuscuta* are being identified and studied as to their dependence on *Cuscuta* as host-plant.

### Conclusions

*P. orobanchia*, as known to date, is the most specific phytophagous species for controlling *Orobanche* spp. It has a high rate of multiplication and the larvae feed on the seeds, destroying a high percentage of them. Its artificial multiplication and spread are possible.

*S. segetum* is the most powerful control agent against *O. cumana*, but its multiplication and spread cannot be considered because of the polyphagous nature of the larvae.

*S. jungermanniae* is a good control agent against *Cuscuta* only in uncultivated areas. In cultivated areas

its development is disturbed and its populations reduced.

#### References

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