PROBLEMS WITH ATHALIA ROSAE L. (HYM.: TENTHREDINIDAE) IN HUNGARY

Gy. Sáringer

Winter rape (Brassica napus L. f. biennis Thell.) is grown at present in Hungary on 50.000 ha and is still increasing. Spring rape (B. napus L. f. annua Thell.) is not grown in Hungary. The average yield of winter rape varied between 10 and 16,5 dz/ha. Among the factor influencing the yield, Athalia rosae plays a dominant role. This fact is reflected also in earlier Hungarian literature (HORVATH, 1884; JABLONOWSKI, 1893) where A. rosae was mentioned as the most important rape pest in Hungary.

Studying the literature of the last 70 years, reports on severe damages caused by this pest showed a certain periodicy of 5 - 8 years. In my regular observations carried out for 20 years, however, I could not detect any regularity in the mass swarming of the insects. It is my opinion that the degree of infestation on rape depends on swarming phenology and plant phenology, e.g. the presence of susceptible plant stages. That means, if the swarming of the second summer generation coincides with plant stages optimal for egg laying (plants with 4 - 5 leaves), a heavy infestation may be expected. If the rape plants are more advanced at that stage the damage will be only moderate.

Athalia rosae swarms three times a year in Hungary. Hibernation occurs in the eonymphal stage in the soil inside the cocoon. Swarming of the hibernated generation begins in the first days of May and lasts about 35 days until 10th of June. The peak of swarming occurs between 20th and 30th of May. This generation lays its eggs on the cultivated mustard (Sinapis alba L.) or on S. arvensis L. - The first summer generation swarms between the end of June up to the end of July. The females of this generation lay their eggs mainly into volunteer plants grown from seeds which have dropped at harvest. The second summer generation begins swarming at the end of August. That swarming lasts till the begin of October (SARINGER, 1957 a, b, 1961). From an economical point of view the progenies of this generation are most dangerous, because this generation has the highest population (Fig. 1).

The number of generations per year of Athalia rosae is regulated by the combined effect of photoperiod and temperature. In Fig. 2 the results of larval rearing experiments are shown, carried out at three constant temperatures and different photoperiods. According to these results the diapause occurring in the eonymphal stage at 18 and 22° C is induced mainly by the photoperiod. At 28° C and at even higher temperature the effect of photoperiod is substantially modified by the temperature. The photophase, critical for diapause at 18 and 22° C comes up to 14 and 15 hours (SARINGER, 1964). The mature larva are the sensitive ones for the photoperiod. This sensitive stage was found to be at the termination of the feeding and

Figure 1: Swarming of different generations of Athalia roasae in Keszthely (Southwest Hungary)

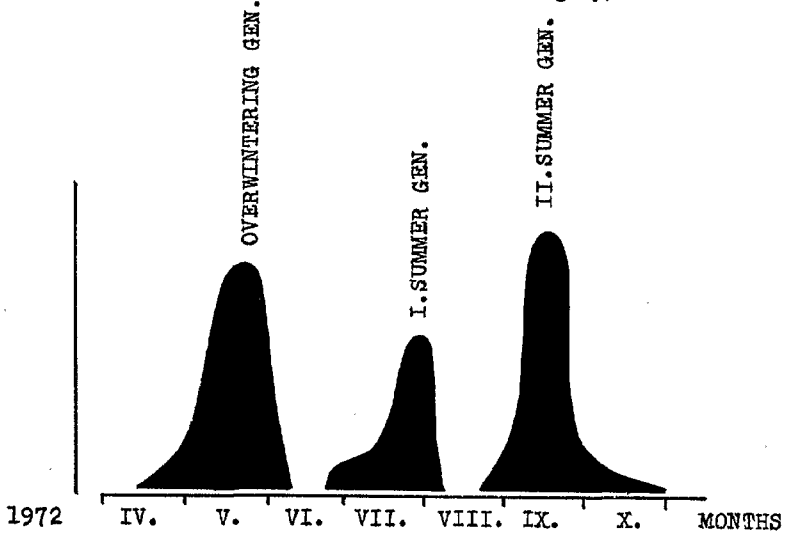
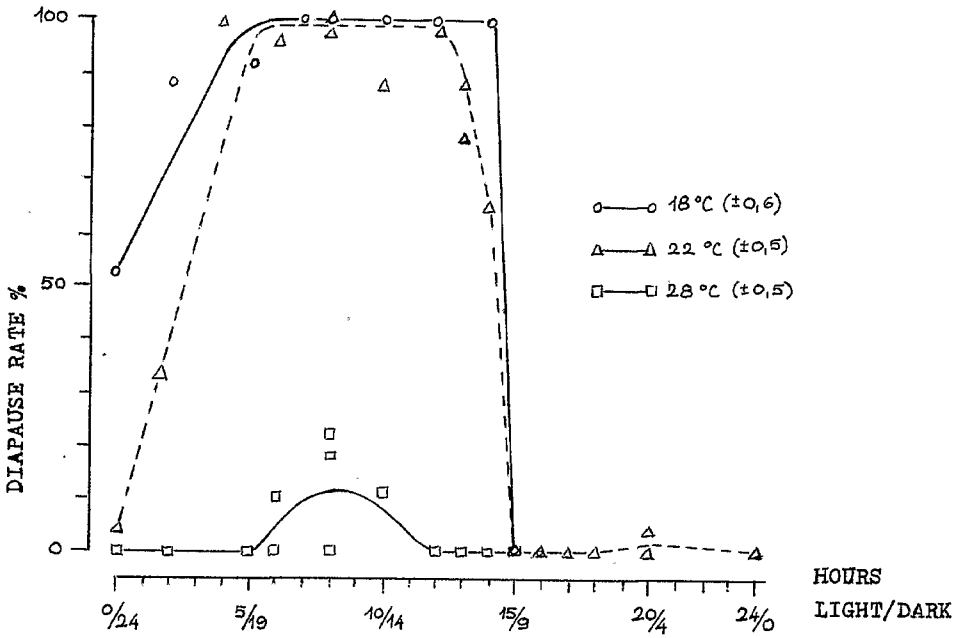


Figure 2: Diapause curves of Athalia rosae at different temperatures and photoperiods (after SARINGER, 1964)



the moving into the soil for pupation. That period lasts about 3 - 4 days (SARINGER, 1967). In experiments carried out at 22° C and 17/7 photoperiod for 11 consecutive generations I did not find any relationship between any of the generations and the percentage of insects in diapause. The diapausing larvae can be reactivated in 2 - 3 weeks at high temperatures of 28-32° C. Because of the climatic conditions temperature and photoperiod in Hungary there is the possibility of three generations a year. It was thus established that Athalia rosae is a long-day insect with a facultative diapause.

In the last two stages of development larvae consume on rape 86,5 and on mustard 88,9 % of their total larval food (SARINGER, 1957 a). This fact shows the importance of controlling the insects at the beginning of the larval development.

Of the natural enemies Tachina nigricans Egger and Perilampus aeneus Rossi were reared. The rate of parasitism remained, however, always below 10 %.

The control of A. rosae is carried out on farms according to two methods developped by the author:

1. Agrotechnical method. When the L_2-L_4 larvae of the second summer generation develop on volunteer rape, these fields are to be ploughed at the end of July. On one of our large farms no other method was used for 11 years. The chemical treatment usually necessary in September could be omitted. The volunteer rape acted as green manure and increased yield of wheat grown afterwards to about 80 to 120 kg/ha. This method needs consideration also from the point of view of environmental protection.

2. Chemical treatment. In September/October spraying with Wofatox Spritzpulver 30 or Methylparathion WP can be recommended with 0,4 - 0,5 % solutions, or Wofatox dust can be used at quantities of 17,5 - 20 kg/ha at any time of the young larval stage.

Furthermore, a new ecological control method is developped. The method is still in the experimental stage and is based on the susceptibility of larvae against the photoperiod. Larvae reared at a daylength in correspondence with that in September, which has a photoperiod shorter than the critical daylength, show in the scotophase two light sensitive periods. If in these periods the larvae are exposed to light for about 30 minutes, they develop without diapause. - A control method would consist of a "photoflash" treatment. During the nights of September or October the larvae should be illuminated from 11,30 to 12 p.m. and from 3 to 3,30 a.m. by using reflectors of a car or tractor. These short light impulses would prevent the larval diapause and stimulate the development of the imagines in the autumn. The oviposition on this generation would, however, be unsuccessful on the senescent rape leaves and lead to substantial decrease in population density.

Literature

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