Development of Leucoma salicis (L.) (Lepidoptera: Lymantriidae) on Populus alba (L.) and Poplar Clone “I-214”

Avtzis N.D. Department of Forestry, TEI of Drama, GR-661 00 Drama, Greece

https://doi.org/10.12681/eh.13977

To cite this article:

Avtzis, N. (1990). Development of Leucoma salicis (L.) (Lepidoptera: Lymantriidae) on Populus alba (L.) and Poplar Clone “I-214”. ENTOMOLOGIA HELLENICA, 8, 25-27. doi:https://doi.org/10.12681/eh.13977
Development of *Leucoma salicis* (L.) (Lepidoptera: Lymantriidae) on *Populus alba* (L.) and Poplar Clone “I-214”

N. D. AVTZIS

Department of Forestry, TEI of Drama, GR-661 00 Drama, Greece

ABSTRACT

Tests were made to determine if the phytophagous insect *Leucoma salicis* (L.) (Lepidoptera: Lymantriidae), preferred *Populus alba* (L.) or Poplar Clone “I-214” as its host. These tests were based on field observations in experimental plots at the nursery of the Forest Research Institute in Thessaloniki, N. Greece. The observations which continued for a two-year period (1984, 1985) corroborated the high resistance of *P. alba* to *L. salicis*. Rearing on this host-plant caused retarded growth, produced lower number of eggs, caused higher larval mortality and generally showed reduced development always, in comparison with the rearing of this insect on leaves of Clone “I-214”.

Introduction

*Leucoma* (= *Stilpnotia*) *salicis* (L.) is one of the most harmful leaf-eating insects in Europe extending from the Scandinavian countries to the Mediterranean region (Schwenke 1978). It can also be found in North Africa and in Asia Minor. In China it is also considered a serious pest that attacks poplar plantations (Wei 1988). In Greece this insect has two generations per year, and damages mainly poplars and infrequently willows (Kailidis 1986). In this research, food demands of *L. salicis* were examined in order to ascertain if the severity of infestation could be reduced by the application of appropriate silvicultural measure, for example selection of the right poplar host plant for planting at a particular site.

Materials and Methods

The experiments lasted for two years (1984, 1985), and two and three-year old poplar trees of the Euramerican Clone “I-214” and also *P. alba* were used. The experimental plots were located in a nursery which belongs to the Forest Research Institute of Thessaloniki (N. Greece).

On the trees which were selected for the necessities of the experiments, young larvae of *L. salicis*, 24 hours old, were placed. Annually, 12 groups which contained 50 larvae each were enclosed in cloth bags on 6 trees of “I-214” and on 6 trees of *P. alba*, with enough food for their development. In this way the action of natural enemies was excluded.

The first placement occurred on July 4, 1984 and the same process was repeated in 1985 (July 20). By daily observation the start of pupation was assessed. Every day the pupae which were formed were removed from the cloth bags and were stored in glass tubes at room temperature. The development of *L. salicis* in relation to food consumption was estimated by the following biological measures: larval weight 20 and 30 days after the beginning of the experiment, larval mortality, duration of the larval stage, weight of the pupae, fecundity (number of eggs per female). Means were compared at the 0.05 level using the t-test (Steel and Torrie 1980). Further details are given in the results section.

1 Received for publication May 7, 1990.
TABLE 1. Influence of host plant on the development and fecundity of L. salicis during 1984 and 1985 (Mean ± SD).

|                  | 1984          | 1985          |
|------------------|---------------|---------------|
|                  | 1-214         | P. alba       |
| Larval weight 20 days after the beginning of the experiment (gr) | 0.06 ± 0.02 a | 0.006 ± 0.008 b |
| Larval weight 30 days after the beginning of the experiment (gr) | 0.42 ± 0.15 a | 0.02 ± 0.03 b |
| Larval mortality (%) | 30.0          | 57.6 ± 8.9 b  |
| Duration of the larval stage in days | 33.9 ± 1.9 a | 60.3 ± 6.1 b |
| Duration of the larval plus pupal stages in days | 40.7 ± 1.6 a | 65.1 ± 6.0 b |
| Weight of pupae (gr) | 0.49 ± 0.14 a | 0.19 ± 0.07 b |
| Fecundity-number of eggs per female (n) | 354.0 ± 70.9 a | 92.0 ± 37.5 b |

* In each year, means followed by different letters in the row are significantly different at 0.05 level.

Results

For two consecutive years L. salicis showed significantly better development on Clone "1-214" than on P. alba. The leaves of P. alba seem to be an unsuitable diet for L. salicis (Table 1). The weight of larvae which fed on P. alba was lower than the weight of those fed on Clone "1-214". This influence was evident on the weight 20 and 30 days after the beginning of the experiment in both years 1984 and 1985. A similar influence was also seen in the case of larval mortality. Larvae reared on P. alba suffered higher rates of mortality than those fed on Clone "1-214". Their rate of development was also affected by the kind of food. A shorter duration of the larval stage was recorded on Clone "1-214" than on P. alba.

Larval diet also affected the length of the larval plus pupal stages. In the repeats of 1984 and 1985 it was found that the larval and pupal stages were faster on Clone "1-214" than on P. alba. The weight of the pupae also seemed affected by the host plant. Larvae reared on P. alba leaves gave pupae with the lowest weight. The type of host plant influenced insect fecundity also. Females fed as larvae on Clone "1-214" produced the highest number of eggs, while those moths fed in the larval stage on P. alba were found to produce the lowest number of eggs.

Discussion

P. alba is a less suitable host than Poplar Clone "1-214" for L. salicis. It is not clear whether this is a non-acceptance or an antibiosis type of resistance. The effect of chemism (Avtzis 1978, Bombosch 1972, Lunderstädt et al. 1975, Nef 1982, 1985, Schopf et al. 1982, Schopf 1983, Schopf and Avtzis 1987) as well as of the structure of food taken by the herbivorous insects (Führer 1967, Huang 1975, Huang and Führer 1979) influences their development. This field of observation corroborated the high resistance of P. alba in comparison to Clone "1-214" to L. salicis. Nef (unpublished work) found that feeding on P. alba resulted in increased larval mortality and inferior pupal weight.

Although heavy defoliation from L. salicis was shown to cause growth reduction in poplar plantations, it is not profitable from an economic standpoint to use P. alba for establishing poplar plantations, which in Greece consist of 70% of Clone "1-214". Planting of P. alba in parks and roadsides might reduce the problem of damage by L. salicis in some areas.

Acknowledgment

I would like to thank Mr. D. Dagaris of the Forest Research Institute of Thessaloniki for his assistance.

References

Avtzis, N. D. 1978. Einfluss verschiedener Massnahmen auf die Eignung von Fichtennadeln als Nahrung für Gilpina hereyniae Htg. (Hym., Diprionidae). Diss. Göttingen.
KEY WORDS: Leucoma (= Stilpnotia) salicis, Populus alba, Poplar Clone "1-214"

AVTZIS: LEUCOMA SALICIS ON POPULUS ALBA AND POPLAR CLONE “1-214”

Se piemattikis epihaneis tis Idromatos Dusikion Ereunon tis Thessalonikis pragmatopoi-htikan to 1984 kai 1985 peirarmai upostirh a me skopta ti dieireinise tis epideiasi stis leu-kis Populus alba (L.) kai ton klwvou “1-214”, sas uliko ektrofh, pano sthn exelezi sthn lep-tostiperi Leucoma salicis (L.). H epideiasi tis filos-xepisth pano sti syniekrimeno etnio pistrupolhtika me ti botheia ton parakato biologikov paramevtrwn: bauro pronymh 20 kai 30 hmeres meta tina anarxh tis peiramaton, thnismotita pronymh, diadikaia pronymikov stadiou, sunolikh diadikaia pronymikov kai nymnikov stadiou, bauro tis nymh, arthmou aiv-gon ana theliko. Ta diakriaies duo chrwn peiramata ediasan mia synhli anvehikotita tis daf-sonikov eidoos P. alba upewnati sti filos-xeph Leucoma salicis. Se kath peripitpse, ti ektrofh ton eintomou pano sto P. alba eixe sw anapteleusma ti cheirterei anaptuxh ton se skhsh pantote pro tis ektrofh ton eintomou pano se “1-214.”