

The biological cycle of *Thrips physapus* LINNAEUS, 1761 (Thysanoptera: Thripidae)

Liliana VASILIU-OROMULU

Rezumat

Ciclul biologic al speciei *Thrips physapus* LINNAEUS, 1761 (Thysanoptera: Thripidae)

Thrips physapus este o specie dominantă în cadrul asociației de tisanoptere din siturile de pajiște secundară, din Masivul Gârbova. S-a urmărit ciclul ei biologic în funcție de factorii abiotici timp de doi ani consecutivi, în natură, ceea ce reprezintă o prioritate pe plan mondial.

Abstract

Thrips physapus is as a dominant species in the thrips association from the secondary meadows from the Gârbova Massive.

The work presents their biological cycle in function of the abiotic factors during two years, in the nature, that representing a world priority.

Keywords: Thysanoptera, *Thrips physapus*, biological cycle

The duration of biological cycle and in consequence of each class of age, varies among the same species from a population to another and of same population, during time, depending on the values of certain environmental factors, such as temperature and humidity (BOTNARIUC & VĂDINEANU 1982).

The biological cycle of some thysanoptera species was studied both in experimental conditions and in

nature. Sharga, in England (after LEWIS, 1973) has restrained the duration of stage for *Limothrips cerealium* HALIDAY, 1936 as following: for eggs, 10-13 days; Larva I, 5-7 days; larva II, 8-10 days; pronympha, 2-3 days; nymph, 6-7 days. For *Thrips simplex* (MORISON 1930), at 15°C (LEWIS 1973) the egg stage lasted 12.8 days; larva II larva and 18.6 days; I pronympha and nymph, 11.7 days. For *Thrips linarius* UZEL, 1895, FRANSSSEN & MANTEL (1961) pointed out that in the Nederland, the egg incubation lasts 7-9 days, larva I, 3-4 days; larva II, 12 days; pronympha, 1-2 days; nymph, 4-5 days.

Material and Method

The thrips species was studied in the Gârbova Massive in a secondary meadow, in the Șețu site: 800 m altitude, S-W exhibition, brown eubasic meadow soil, characterized by the association *Festuco rubrae-Agrostetum capillaris* HORV. 1951, in fir-beech zone.

The plant species studied for the biological cycle of the thrips was *Leontodon hispidus*, the flowers were covered with silk sack.

Results and Discussions

Thrips physapus is a mezophylous, polyphagous species with sexual reproduction, whose biological cycle's duration, in nature, hasn't been studied. Since *Thrips physapus* is characterized as a domi-

nant species in the thrips association from the investigated sites, in the Gârbova Massive (by shake method), we have studied their biological cycle, two years in a row, in the Șețu site at 800 m altitude, with the vegetal association *Festuco rubrae-Agrostetum capillaris*. In this site we have obtained the values of certain microphysical factors, registered at our own meteorological station, fact that enabled us to establish the duration of different biological stages of the thrips, depending on the temperature and the air relative humidity.

Generally, the biological cycle is 25-33 days long when the food is sufficient (on the *Leontodon hispidus*), at 14,3°C temperature and 70,9% humidity and 28-38 days for the same food condition, almost the same relative humidity (70,0%), but at 12,7°C (table 1, fig. 1).

So, the decrease of the temperature values with 1,6°C and especially the humidity, with 0,9% has changed the average duration of the biological cycle, extending it with 3-5 days.

In the Șețu site, the offspring adults come out when soil temperature at 10 cm depth, reaches 9-10°C, and the air temperature 12-14°C.

His process takes place during 2-3 weeks, spaced out depending on the temperature and the relative humidity of the air, the first year of study, in May, and the second in June, in this case, because of the extended winter and the late vegetal (springing) development.

The duration of the biological cycle of the species *Thrips physapus* L.

Stage	I year			II year		
	Duration (in days)	T °C	RH %	Duration (in days)	T °C	RH %
egg	5 - 9	12,0-14,0	65-75	6 - 11	9,0-14,5	67-77
larva I	10 - 11	13,0-15,5	65-75	12 - 13	9,0-14,0	62-77
larva II	5 - 6	14,5-17,0	70-75	6 - 7	11,0-12,5	62-70
pronympha	2 - 3	13,5-14,2	68-73	2 - 3	12,0-14,5	69-71
nympha	3 - 4	13,5-16,2	69-74	2 - 4	14,8-15,2	71-74
Total	25 - 33	14,3	70,9	28 - 38	12,7	70,0

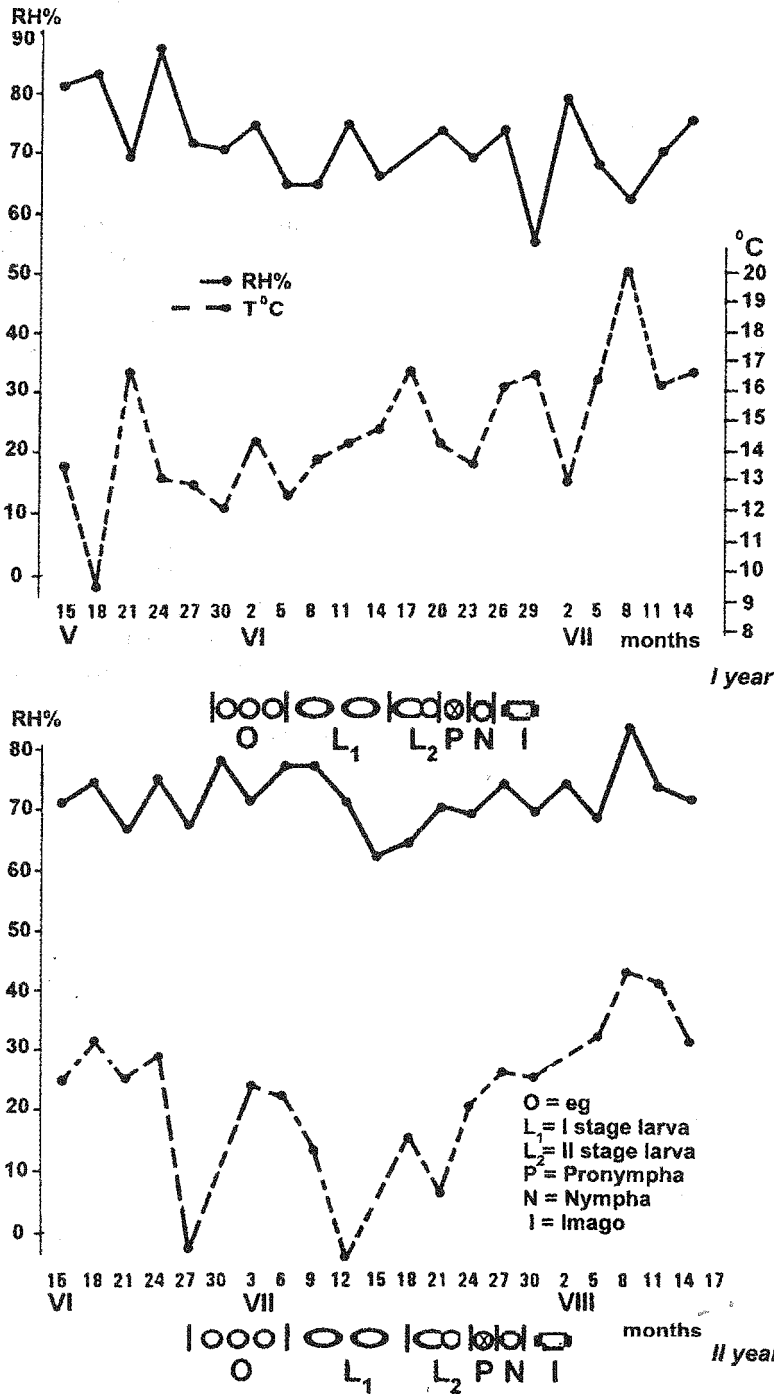


Fig. 1 The biological cycle of *Thrips physapus* L. species (during two years)

9-10 days later, the females can lay about 90-120 eggs during 2-3 weeks.

In June, the first year, and in July, the second year, in the ligulates flowers of *Leontodon*, experimentally covered with silk sack, there were found at the same time, eggs, larvae and adults.

The plants situated in the middle of the site, in sunnier places than the extremes, bordered by planted spruce, are mostly used for laying eggs.

The first oviposition were observed at about 11.30^h, when the air temperature reached 14°C. The females, by permanent moving of the antenna investigate the future place of oviposition. The eggs are introduced one by one, rarely two or three at the same place, on the flower tissues, where they are protected against the light (are safe from the light). The average number of eggs per covered inflorescence was of 50 in the first year and of 102 eggs in the second, but there are also *Leontodon*'s inflorescences without eggs, in this case, the larvae of others insect orders being found.

Eggs generally develop in 7-8 days. An extension of this period is due to the fact that the average temperature was lower in the second year comparing to the first, which means that the approximate 3°C difference lead to the extension of the egg incubation with 1-2 days (fig. 1).

The I and II larva are both greatly influence by the air humidity and by the succulence of the vegetal cells which they feed with; they are more active when the body hygrosopicity is optimal.

In the second year, due to the lower humidity (55%) and temperature (9°C) we could observe the increase of thrips mortality in the I larva.

The extension of the development of the larva II in the second year, with 1-2 days, and the increased thrips mortality in this stage can be explained by the decrease of the temperature with 2°C and of the humidity with 3.5%.

The stage of pronympha (prepupa) had the same of 2-3 days duration, years, average temperature and relative humidity being almost unchanged (13.85°C, 70% respectively 13.25°C, 70%).

The stage of nymph (pupa) had a 3-4 days

duration at the average temperature of 14.85°C and at 71.5% relative humidity; and 2-4 days at the temperature of 15°C respectively 72.5%.

In both stage of pronympha and nymph, the thrips do not breed and are considered as inactive; but when disturbed, they achieve slight movements.

The study has emphasized the general decreasing tendency of the period of the biological cycle at higher average temperature, at the same values of the relative humidity, in both years of researches.

Thrips physapus develop and feed on various plants belonging to characteristic association of the mountainous meadows.

It is here the temperature, which determines the duration of the biological cycle of the thysanoptera.

Conclusions

The biological cycle of *Thrips physapus* species, studied in nature of the first time in the world, lasts an average of 25-33 days, in sufficient food conditions, at 14.3°C average temperature and at 70.9% average relative humidity and it lasts 28-38 days in the same food, 70% relative humidity conditions, when the temperature is bellow 12.7°C.

REFERENCES

- BOTNARIUC N. & VĂDINEANU A. 1982. *Ecologie*, Ed. did. și pedag. București.
- FRANSEN C. J. H. & MANTEL W. P. 1961. De Door Tripse Veroorzaakte Beschadigingen in Het Vlasgewas en Het Voorkomen Daarvan, *Tijdschr. Plzickt*, 67: 39-51.
- LEWIS T. 1973. *Thrips - their biology ecology and economic importance*, Acad. Press London, New York.
- VASILIU-OROMULU L. 1995. Population Diversity of Thysanoptera in Romanian Meadows, in "Thrips Biology and Management" Ed. Parker B.L. et al. Plenum Press New York NATO ASI s. A: Life Sc. 276: 469-477.
- VASILIU-OROMULU L. Ecological indices of thrips populations from the Gârbova Massive (Insecta: Thysanoptera), *Entomologica Romanica* (in press).

Liliana VASILIU - OROMULU
Institute of Biology,
RO-79651, Bucharest-6,
Spl. Independentei 296, Po Box 56-53,
Romania

Received: 10.02.2001

Accepted: 21.02.2001

Printed: 6.12.2001