

The study of the temporal dynamics of the thrips populations (Insecta: Thysanoptera) from mountainous meadows

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Rezumat

Studiul dinamicii temporale a populațiilor de thripsi (Insecta: Thysanoptera) din pajistile montane

Dinamica temporală a populațiilor de thripsi și etologia lor au fost studiate într-o pajistă secundară, situată la 800 m altitudine, în Masivul Gârbova.

Abstract

The diurnal dynamics of thrips populations, their ethology have been studied in a secondary meadow at 800 m, in the Gârbova Massif.

Keywords: Thysanoptera, diurnal dynamics, ethology, mountain meadow

OETTINGEN (1942) is fast the only author that mentions aspects of the hour dynamics of the meadow thrips; some of his results being combatted by LEWIS (1973). LEWIS & TAYLOR (1964) studied diurnal periodicity of flight at graminicolous *Limothrips cerealium* on cereal crops in the London area.

Keywords: Thysanoptera, diurnal dynamics, ethology, mountain meadow

Material and methods

In the secondary meadows, characterized by the *Festuco rubrae* - *Agrostetum capillaris* HORV. 51 association, in the Setu site, at 800 m, in the Gârbova Massif, there has been studied the diurnal dynamics on the following plants: *Leucanthemum vulgare*, *Leontodon hispidus*, *Trifolium pratense*, *Anthyllis vulneraria*.

In this site a meteorological station was installed.

Results and discussions

The diurnal dynamics of the thrips populations has been studied in the Setu site, in summer, on the 3rd of July, between 9 - 19 h, on the following plants: *Leucanthemum vulgare*, *Leontodon hispidus*, *Trifolium pratense*, *Anthyllis vulneraria*, both from the numerical abundance point of view and from the thrips ethology's.

There could be noticed a time of maximal activity (shifting, nourishing) between 9 - 11 h, then the activity would decrease between 11 - 12 h. From 12 to 14 a time of inactivity could be noticed, generally, correlated with the maximal values of the light (45,500 luxs at 12 h and 40,000

at 13 h) (table no. 2) that disadvantages thrips motility. Although photophilous insects, at high light intensities from 1,500 m it reached even 121,000 l. that very day), they would withdraw in the interior of the flower where they stay almost still. After 14 h, a time of reduced activity can be noticed; it comes back to the maximal level between 16 - 17 h and decreases again, towards 18 - 19 h.

During the high activity hours the numerical abundance of the populations reaches a numerical maximum, that varies between 20 - 37 exemplars on *Leucanthemum vulgare*, between 51 - 67 on *Leontodon hispidus*, between 20 - 22 on *Trifolium pratense* and between 22 - 37 on *Anthyllis vulneraria* (table no. 1).

The minimum of the numerical abundance was noticed during the inactivity time, no matter the plant species: 1 exemplar (on *Trifolium pratense*), 2 exemplars (on *Anthyllis vulneraria*), 8 exemplars (on *Leucanthemum vulgare*).

Every plant is preferentially colonized by a certain Tubulifera species: thus *Haplothrips leucanthemi* populates *Leucanthemum vulgare* in 86.06%, the rest of the association being realized by *Haplothrips angusticornis* and the Terebrantia: *Thrips physapus* and *Thrips atratus*.

Table no. 1

The diurnal dynamics of the thrips populations in the Setu site (3rd of July)

Time (h)	<i>Leucanthemum</i>	<i>Leontodon</i>	<i>Trifolium</i>	<i>Anthyllis</i>
9	20 (16)	43+1L (28)	16+1L (12)	28+1L (18)
10	13 (10)	51 (47)	19+1L (16)	37 (19)
11	5+1L (4)	47 (38)	5+1L (4)	25 (14)
12	9+1L (9)	22 (17)	3 (2)	23 (10)
13	10 (9)	8 (4)	1 (1)	2 (1)
14	9 (7)	28 (21)	9+4L (4)	6 (3)
15	13+2L (12)	44 (36)	15 (13)	10+4L (5)
16	17 (14)	67 (58)	21+1L (12)	21+1L (14)
17	35+3L (34)	65 (54)	19+2L (15)	13+1L (7)
18	19 (15)	23 (17)	16+1L (10)	12+3L (5)
19	15 (12)	19 (16)	13+1L (9)	12+2L (6)

() the number of adults of:

Haplothrips leucanthemi - on *Leucanthemum vulgare*

Haplothrips alpester - on *Leontodon hispidus*

Haplothrips niger - on *Trifolium pratense* and on *Anthyllis vulneraria*

Leontodon hispidus is dominated by *Haplothrips alpester* (78.18%), *Haplothrips distinguendus* and *Thrips physapus*, *Trifolium pratense* is characterized by *Haplothrips angusticornis*, *Haplothrips leucanthemi*, *Thrips physapus* and *Odonotothrips loti* (in the site "Cabană" at 1,200m., in the same association, the proportion of *Haplothrips niger* species was higher than in the Setu site (82.5%), on *Trifolium pratense*, but it was represented by a smaller number of individuals).

On *Anthyllis vulneraria*, the thrips association is made out of *Haplothrips niger* species, 53.97%, and the rest, out of the *Haplothrips angusticornis*, *Haplothrips alpester*, *Thrips physapus* and *Aeolothrips intermedius*.

Low light intensity in the morning, before sunrise, here, in the mountains, is not enough for take-off. Most thrips species need at least 1,080 lux (LEWIS 1973). In the evening take-off usually ceases 1 - 2 h before sunset when the light fades.

Some thrips are more obviously active earlier in the day than others. Early in the morning, *Stenothrips graminum* from meadows, for example is more active than *Limothrips cerealium* (OETTINGEN, 1942).

LEWIS & TAYLOR (1964) obtained diel flight periodicity curves with a maximum at 14 h for *Limothrips cerealium* on cereals in London area.

In the Setu meadow, the diel dynamics shows small differences between species. The maximum of light intensity, about 40,000 - 45,000 lux and the one of the temperature on the soil surface (table no. 1), about 22°C, are not favourable to the thrips activity.

All *Haplothrips* species: *leucanthemi*,

alpester and *niger* presented fast the same patterns of diel dynamics, that means the true threshold temperature for take-off is fast the same.

The minimum of 1,700 lux (table no. 1) at 19 h represents and the minimum for thrips motility in the mountain conditions.

We mention that these observations concerning the diurnal dynamics in the mountainous meadow conditions are among the first ones taken down in the world (earlier OETTINGEN's studies, in 1942 concerning the values of the numerical abundance in the hour dynamics, different from ours, had been combated by LEWIS 1973).

Conclusion

The thysanoptera diurnal dynamics and their ethology is influenced by biotic factors and by the microstationary physical ones.

The thrips populations structure revealed as dominant *Haplothrips leucanthemi* species on *Leucanthemum vulgare*, *Haplothrips alpester* species on *Leontodon hispidus* and *Haplothrips niger* species on *Trifolium pratense* and on *Anthyllis vulneraria*.

The hour activity of the thrips displays 2 maximal, generally between 9 - 11 h and 16 - 17 h and a minimum, between 12 - 14 h, when the light intensity in the mountainous meadow site is at its maximum.

REFERENCES

- LEWIS T. 1973. Thrips - their biology ecology and economic importance, Acad. Press London, New York.
- LEWIS T. & TAYLOR, L. R. 1964. Diurnal perio-

- dicity of flight by insects, Trans. R. Ent Soc. Lond. 116: 393-479.
- OETTINGEN H. VON 1942. Die Thysanopteren des norddeutschen Grasslands. Ent. Beih. Berl. Dahlem, 9: 79-141.
- SCHLIEPHAKE G. 1964. Untersuchungen über die Variabilität an den Männchen de Genus Thrips L. (Thysanoptera), Dtsch. Ent. Zts. N. F., 11(3): 215-293.
- SCHLIEPHAKE G. & KLIMT K. 1979. Thysanoptera, Fransenflügler, VEB Gustav Fisch. Ver., Jena.
- SCHLIEPHAKE G. & KOCH F. 1980. Zur Thysanopterenfauna des Erzgebirges, Acta Mus. Regin., Suppl.: 105-108.

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Table no. 2.

The dynamics of the command physical mechanical factors in the Setu site (July, 3)

Time (h)	Temperature				Pshrometer		Evaporation 200 cm	Lux	Wind m/sec	Direction	Observations
	-10 cm	0 cm	20 cm	200 cm	20 cm	200 cm					
9	14.2	17.7	18.2	16.9	62	59	0.40	15,000	1.6	V-E	cloudless sky
10	14.7	19.4	18.7	18.4	60	57	0.50	26,000	2.8	V-E	cloudless sky
11	15.4	20.5	19.5	19.7	56	52	0.50	33,000	1.4	N-S	cloudless sky
12	16.4	21.8	21.2	21.0	57	50	0.60	45,500	1.8	NV-SE	cloudless sky
13	17.5	19.8	22.0	21.7	53	47	0.90	40,000	2.4	V-E	slightly changeable
14	18.4	22.0	23.4	23.2	49	41	1.10	38,000	0.8	NV-SE	slightly changeable
15	19.0	23.0	25.7	25.0	51	66	0.20	33,000	0.5	NV-SE	slightly changeable
16	19.6	20.7	23.6	23.8	54	47	0.30	25,000	2.5	NV-SE	slightly changeable
17	19.8	19.2	23.0	22.8	63	49	0.30	15,000	0.2	V-E	slightly cloudy
18	19.7	17.7	21.0	21.6	68	57	0.40	3,800	0.1	V-E	slightly cloudy
19	19.4	16.0	19.4	18.8	74	66	0.90	1,700	0.1	V-E	slightly cloudy