FLEA BEETLES IN SUMMER OILSEED RAPE

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Introduction

Summer oilseed rape (Brassica napus) and turnip rape (B. campestris) are important crops in some parts of Sweden. In the area around Lake Mälar (including for example Stockholm, Uppsala, Västerås) these forms are much more common than winter oilseed crops. The spring sown oilseed crops germinate and the cotelydons emerge at a time when the weather is, in this part of Sweden, often warm and dry. This stage in the plant's development often coincides with the spring migration of flea beetles of the genus Phyllotreta. The beetles leave their hibernation spots and are attracted by the newly germinated oilseed. If the numbers of flea beetles are very large they may destroy many small plants. This damage is most important in oilseed rape as opposed to turnip rape as B. napus grows somewhat slower than B. campestris. The best method of protection presently available is the use of seed dressings. Treatment of B. campestris, however, does not result in yield increases as great as those for B. napus (Bengtsson, 1982).

Experimental trials in oilseed rape have shown that treatment does result in yield increases (Table 1). However, where flea beetle damage is small or non-detectable the treatment does not pay for itself in yield increase. It is common practice to sow treated seed. The alternative, which would be to monitor the crop for flea beetle occurrence and spray if flea beetle numbers are high, is not thought to be reliable. In addition to chemical treatments all measures which promote better and faster crop development are recommended.

Despite the pest status of the genus Phyllotreta little is known about the biology, species distribution, host preferences, and natural enemies in Sweden. The following is a preliminary study of some of these aspects.

Material and Methods

Untreated rape (variety Topas) and turnip rape (variety Torkel) were sown in a field in Uppsala. Five petri dishes (diameter 14 cm) were placed in each of the two plots. The dishes were filled with water and detergent. The dishes were emptied every one or two days and flea beetles were counted and identified.

In 1986 flea beetles were collected using an aspirator from trays sown with turnip rape and Sinapis alba (variety Trigo). Some were preserved

in a fixative (Weaver & Thomas 1956) while others were kept alive in petri dishes. Those preserved were later dissected to determine sex and to check for parasitization. Parasitoid larvae emerged from some of the live beetles and a few parasitoids were able to complete development to adult.

Results

The dominate species in 1985 and 1986 was Phyllotreta undulata. The second most common species (although much less abundant in oilseed crops) was P. vittula. P. nigripes, P. atra, and P. vitata were also caught in the traps but only in very small numbers. The distribution of P. undulata and P. vittula is shown in Fig. 1. The numbers are for weekly counts. The mean temperature for each week is also shown.

Results from dissections are shown in Table 2. The few adult parasitoids which emerged were identified as Townesilitus bicolor (Wesmael) (Hymeroptera: Braconidae, Eupnorinae), (Haeselbarth & Loam 1983).

Table 2. Parasitization by Hymenoptera and nematodes for Phyllotreta undulata

	males	females	total
Number dissected	174	97	271
Parasitized (Hymenoptera)	27 (16 %)	15 (15 %)	42 (15 %)
Nematode infections	20 (11 %)	16 (16 %)	36 (13 %)
Double infections	2 (1 %)	2 (2 %)	4 (1 %)

Discussion

P. undulata was the dominate species in Uppsala 1985 and 1986. The only earlier survey done in this area (Kemner 1923) also showed P. undulata to be the most common species. This may not be the case in Southern Sweden where P. atra seems to be most common (Mühlow & Sylvén 1953, Jonasson 1982). P. vittula does not have crucifers as host plants. It reproduces on grasses and cereals. It seems to be the earliest Phyllotreta species out of hibernation. P. vittula does not stay in oilseed as they are not found in the middle of the summer. They seem to stop temporarily during migration to and from overwintering sites.

Adult P. undulata which have overwintered seem to die off towards the end of June. Most of the new generation emerge at the beginning of August.

Rates of parasitism were not high. One reason might be that adult parasitoids probably emerge in the field in early July when many fields are sprayed against blossom beetles (Meligethes spp.).

Some P. undulata were found to be infected by nematodes. Nematodes are not as damaging to their host as the wasps. No ovaries or eggs were found in female P. undulata parasitized by Hymenoptera while females

P. undulata containing nematodes most often had developed ovaries or eggs.

Acknowledgement

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Literature

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TABLE 1.

Control of flea beetles in summer oil-seed rape 1985 - 1986

7(8) FÖRSÖK SEVEN TRIALS

Avräkningsmetoder : Planträkning på 4 x 50 cm/parcell. Gradering av gnagskador på hjärtbladen på 20 plantor/parcell.
Assessment methods: Plant counts on 4 x 50 cm/plot. "Gnaw" counts on cotyledon leaves on 20 plants/plot.

Försöksled (a.s., halt) Treatment (a.i.)	Dos Rate/ kg seed	Antal plantor/m Plants/m		Antal gnag /planta Gnaws/plant		Skörd Yield dt/ha 15% v.h. water cont	Relativ skörd Relative yield	Råfett Crude fat dt/ha	Klorofyll Chlorophyll ppm
		I	II	I	II				
A. Obenandlat (Untreated)		24.9	26.6	5.6	9.6	19.14	100	6.88	93.3
B. Oftanol T sacrust	25 g/kg	28.2	29.3	1.4	2.2	20.71	108	7.57	87.2
C. Marshal 40 DB (1985) sacrust	25 g/kg	28.9	29.3	1.4	2.5	20.74	108	7.40	78.2
* Marshal tekn (1986) sacrust +	12 ml/kg								
+ Rovral	10 ml/kg								
D. Rapcol 49.5 SD (1985) sacrust	40 g/kg	27.0	28.5	1.3	2.9	20.83	109	7.43	79.3
* Rapcol 43.7 SD (1986) sacrust	40 g/kg								
Antal försök Number of trial:		7	7	5	4	7		6	6
Signifikansnivå: Significance level:		0.90	0.78	0.996	0.998	0.969		0.92	0.49
Variationskoefficient (%): Coeff. of variation (%):		11.0	9.2	69.6	48.2	5.5		6.2	22.8
Signifikanta skillnader: Significant differences:				A≠övr	A≠övr				

* Mängden aktiv substans ungefär densamma trots olika formuleringar. Amount a.i about the same in spite of different formulations.

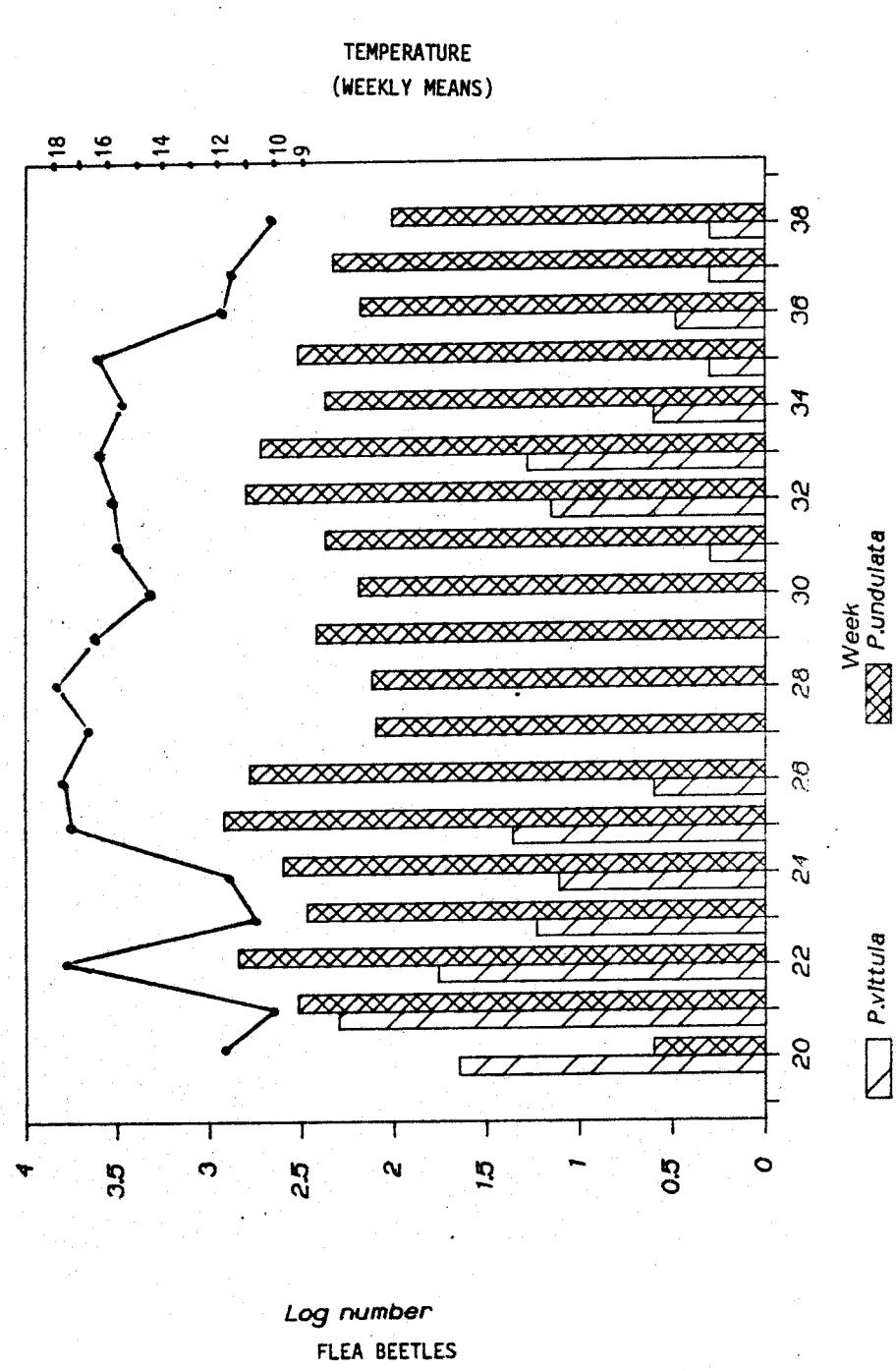

Fig. 1 Temporal distribution for flea beetles. 1985. Week 20 is 13-19 May. Week 38 is 16-22 September.