

THE OCCURRENCE OF THRIPS (*THRIPDAE*, *THYSANOPTERA*) ON DIFFERENT CULTIVARS OF PEA (*PISUM SATIVUM* L.)

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Abstracted: April 28, 2003

Abstract: In 1999–2001 the occurrence of thrips was analysed on seven cultivars of pea. The samples of leaves, then leaves and flower buds and the flowers were collected from plots. The analyses were initiated when the earliest cultivar (*Sześciogodniowy*) began flowering and were repeated every 4–7 days, until the end of flowering. The following species of thrips were found: *Frankliniella intonsa* Trybom, *Thrips major* Uzel, *Thrips fuscipennis* Hal., *Thrips tabaci* Lind. and *Kakothrips robustus* Uzel. The clear differences between the number of thrips on the particular cultivars of pea were noticed. The most attractive were late cultivars Nike and Telefon as well as middle late Delisa II. It seems that the most important factor effecting on the number of thrips on particular cultivars was rather the start and the end of flowering than the length of the flowering period. The greatest number of thrips was noticed on flowers, from 50% to 77%. The thrips initially were found on leaves and then, as the pea was growing, on the flower buds and flowers. After the emergence of thrips, the analyses should be first initiated on leaves.

Key words: *Pisum sativum* L., pea, cultivars, thrips

INTRODUCTION

During the research on the pests of pea carried out by one of the co-authors, the thrips were very often found (Wnuk 1988; Wnuk and Wiech 1996). There are several species of thrips occurring on pea and Zawirska (1969), Žilcova and Derbeneva (1972) recorded 10 of them. *Kakothrips robustus* Uzel is considered as the one of the most important pest of pea, although according to Zawirska (1969) it is not very numerous on this plant in comparison with the number of polyphagous species: *Frankliniella intonsa* Trybom, *Thrips angusticeps* Uzel and *T. tabaci* Lind.

In the northwest part of the France, *T. angusticeps* Uzel (Taupin et al. 1991) is regarded locally as the most important pest on pea. The information about the occurrence of thrips on the various cultivars of pea is relatively poor. Žilcova and

Derbenieva (1972) and Kagan (1985) noticed that *K. robustus* Uzel is more numerous on the late cultivars of pea.

The aim of the analyses was to evaluate the occurrence of different species of thrips on the various cultivars of pea (*P. sativum* L.).

MATERIALS AND METHODS

The analyses of the occurrence of the thrips were carried out in the Experimental Station in Mydlniki near Cracow during 1999–2001. The method of randomized blocks with four replications was used. Each plot had an area of 20 m² (4 × 5 m). Seven cultivars with different period and length of flowering as well as maturing of seeds were used in the experiments (Tab. 1). No chemical treatments against the pests were applied on plots, only herbicide Afalon 50 WP (linuron) 2 kg/ha was used. Each year all pea cultivars were sown at the same time (every year at the beginning of April). The occurrence of thrips was analyzed on leaves, flower buds and flowers. First only leaves were analysed, next leaves and flower buds and then flower buds and flowers. During each observation 25 leaves, flower buds and flowers were collected from each plot from five randomly selected plants located on the diagonal of the plot. The collected parts of plants were stored in plastic bags and transported to the laboratory. Then the thrips were preserved in 25% solution of alcohol and after four days in 75% solution of alcohol. As the thrips were relocating from leaves to flower buds and flowers, only the generative parts of plants were analysed. In the last phase of flowering, the thrips were gathered only from flowers. The first analyses were carried out in the second or third decade of May i.e. few days before the expected flowering of the earliest cultivar Sześciotygodniowy. They were repeated every 4–7 days depending on the weather and the development of plants. To determine the attractiveness of the particular cultivars of pea to thrips, the number of thrips per one leaf, flower bud and flower was calculated, because the number of analysed samples of particular parts of plants was different. As the start of the flowering, the day when 10% of plants had developed the petals of the crown of the first pair of flowers was selected.

The Dunncan's multiple test was used for statistical analysis of results.

Table 1. Length of flowering of pea and the number of thrips collected from leaves, flower buds and flowers (Mydlniki, 1999–2001)

Cultivar	Type	1999			2000			2001		
		Length of flowering	Number of thrips		Length of flowering	Number of thrips		Length of flowering	Number of thrips	
			Total	Per sample		Total	Per sample		Total	Per samples
Sześciotygodniowy	Very early	22	776	19.4	17	423	15.1	26	497	11.3
Cud Kelwedonu	Early	15	349	10.8	17	509	18.2	25	444	10.1
Ilówiecki Cukrowy	Middle early	32	1290	21.5	26	1148	28.7	25	404	9.2
Delisa II	Middle early	28	1603	30.8	25	1368	34.2	30	682	14.2
Konserwowy	Middle late	27	1410	27.1	24	1024	21.3	21	534	9.5
Telefon	Late	22	1920	40.0	27	1783	27.8	30	1157	20.7
Nike	Late	19	1343	33.6	34	1438	21.1	21	677	14.1

RESULTS

The following species were found among the collected thrips (among 20 000): *F. intonsa* Trybom, *T. major* Uzel, *T. fuscipennis* Hal., *T. tabaci* Lind. and *K. robustus* Uzel considered as the one of the main pest of pea. The detailed data on the species composition of the thrips on the parts of the pea will be presented in the separate paper.

The greatest number of thrips per one sample was found on the late cultivars Telefon and Nike and on the middle early Delisa II (Tab. 1). There was no influence of the flowering period on the number of thrips. Probably it was caused by the fact, that these cultivars were flowering later than others thus allowing the infestation of the newly developed flowers by thrips flying from already flowering cultivars. The data on the number of thrips per leaf, flower bud and flower confirm the previous results that the greatest number of thrips can be observed on the late cultivars (Tab. 2). In the subsequent years, a relatively large number of thrips on some cultivars was recorded (Delisa II and Konserwowy).

The different periods of infestation of the parts of the plant of particular cultivars were noticed (Figs. 1–3). On the very-early cultivar (Sześciotygodniowy), thrips infested the leaves, flower buds and flowers nearly at the same time. Later, they were found only on the flower buds and flowers. On late cultivars (Telefon and Nike), the thrips were noticed on leaves for a very long time, which was especially evident in 2000. The thrips were found on flower buds and flowers later, because they were flying from other cultivars, which finished the flowering. The numbers of thrips at particular dates of analysis in the subsequent years were different. In 1999 the greatest number of thrips was noticed in the first and second decade of June, in 2000 at the end of May and at the beginning of June, while the greatest number of thrips in 2001 was recorded in the second half of June. The number of thrips was mainly influenced by the growth phase of the development of pea i.e. the occurrence of flower buds and flowers in the particular cultivars.

Table 2. Average number of thrips per one leaf, flower bud and flower during the whole vegetation period (Mydlniki, 1999–2001)

Cultivar	1999			2000			2001			1999–2001		
	Leaf	Flower bud	Flower	Leaf	Flower bud	Flower	Leaf	Flower bud	Flower	Leaf	Flower bud	Flower
Sześciotygodniowy	0.16ab	0.23a	1.33b	0.08a	0.5a	0.87a	0.16ab	0.4ab	0.6b	0.13a	0.37ab	0.93b
Cud	0.18ab	0.18a	0.68a	0.36e	0.55ab	1.02ab	0.24c	0.28a	0.63a	0.26bc	0.33a	0.77a
Kelwedonu												
Hówiecki	0.14a	0.62bc	1.2b	0.26c	0.68ab	1.74bc	0.24c	0.28a	0.53a	0.21b	0.52bc	1.15b
Cukrowy												
Delisa II	0.25ab	0.75c	1.87c	0.26c	0.65ab	2.63d	0.38d	0.32ab	0.88bc	0.29cd	0.57c	1.79de
Konserwowy	0.29ab	0.56b	1.73c	0.24b	0.77b	1.51ab	0.09a	0.36bc	0.97c	0.2b	0.56c	1.4c
Telefon	0.64c	1.17d	2.3d	0.27d	1.01c	1.93cd	0.23bc	0.79c	1.33d	0.38e	0.99e	1.85e
Nike	0.4bc	1.02d	1.98c	0.46f	0.52ab	1.47ab	0.17ab	0.56bc	0.95c	0.34de	0.7d	1.46cd

Means followed by the same letter do not differ at 5% level of significance (Duncan's multiple test)

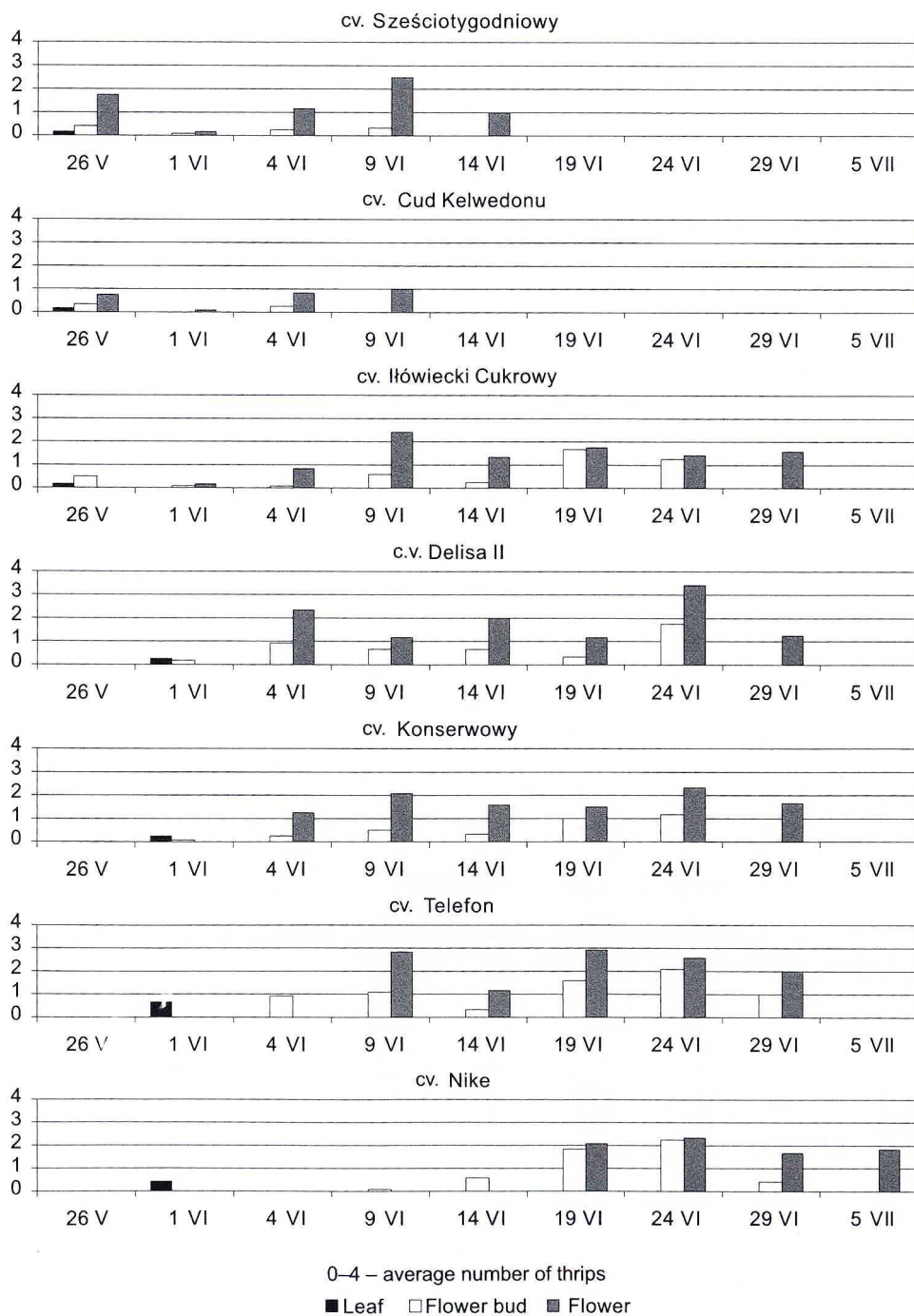


Fig. 1. The average number of thrips per one leaf, flower bud and flower of pea (Mydlniki, 1999)

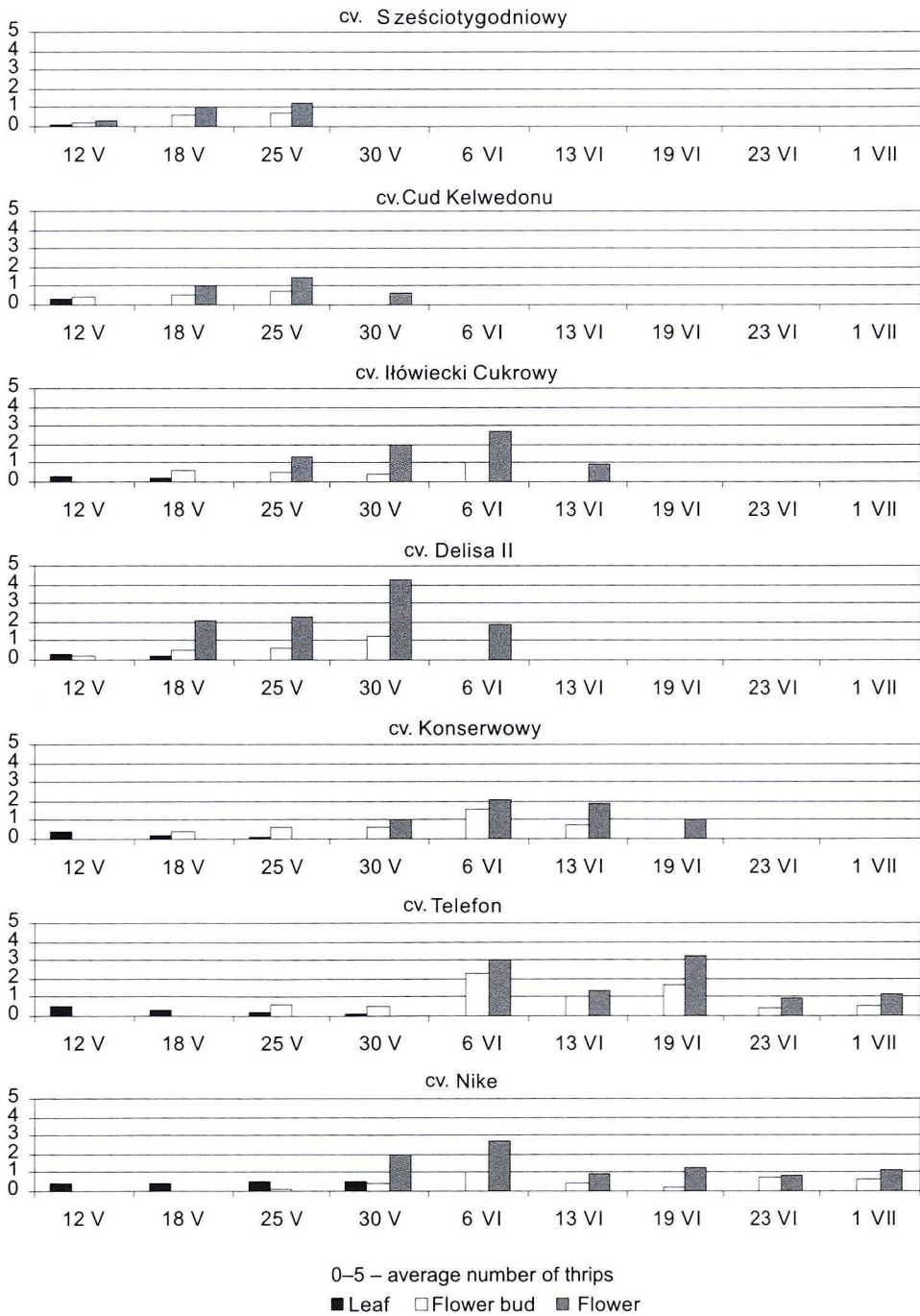


Fig. 2. The average number of thrips per one leaf, flower bud and flower of pea (Mydlniki, 2000)

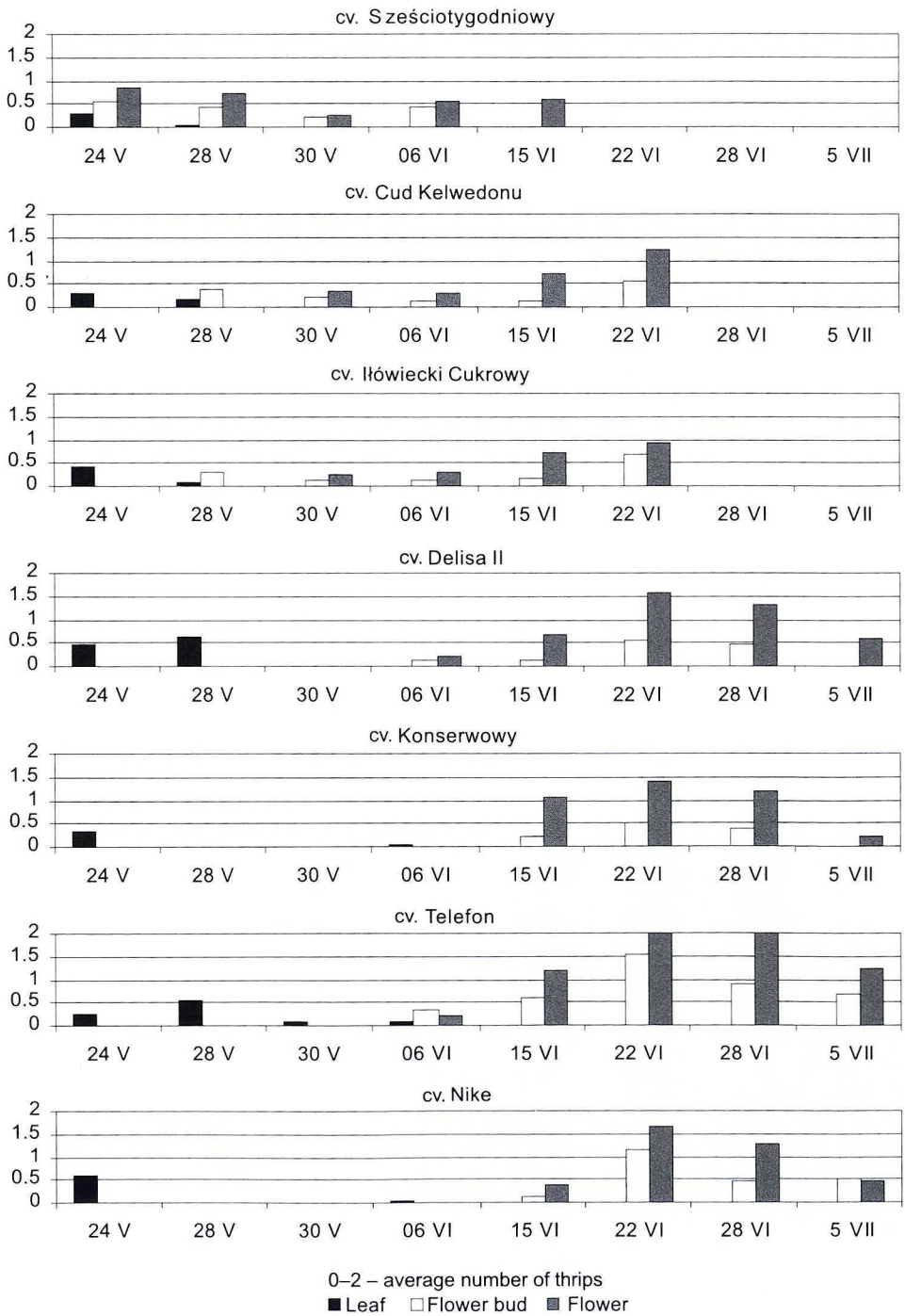


Fig. 3. The average number of thrips per one leaf, flower bud and flower of pea (Mydlniki, 2001)

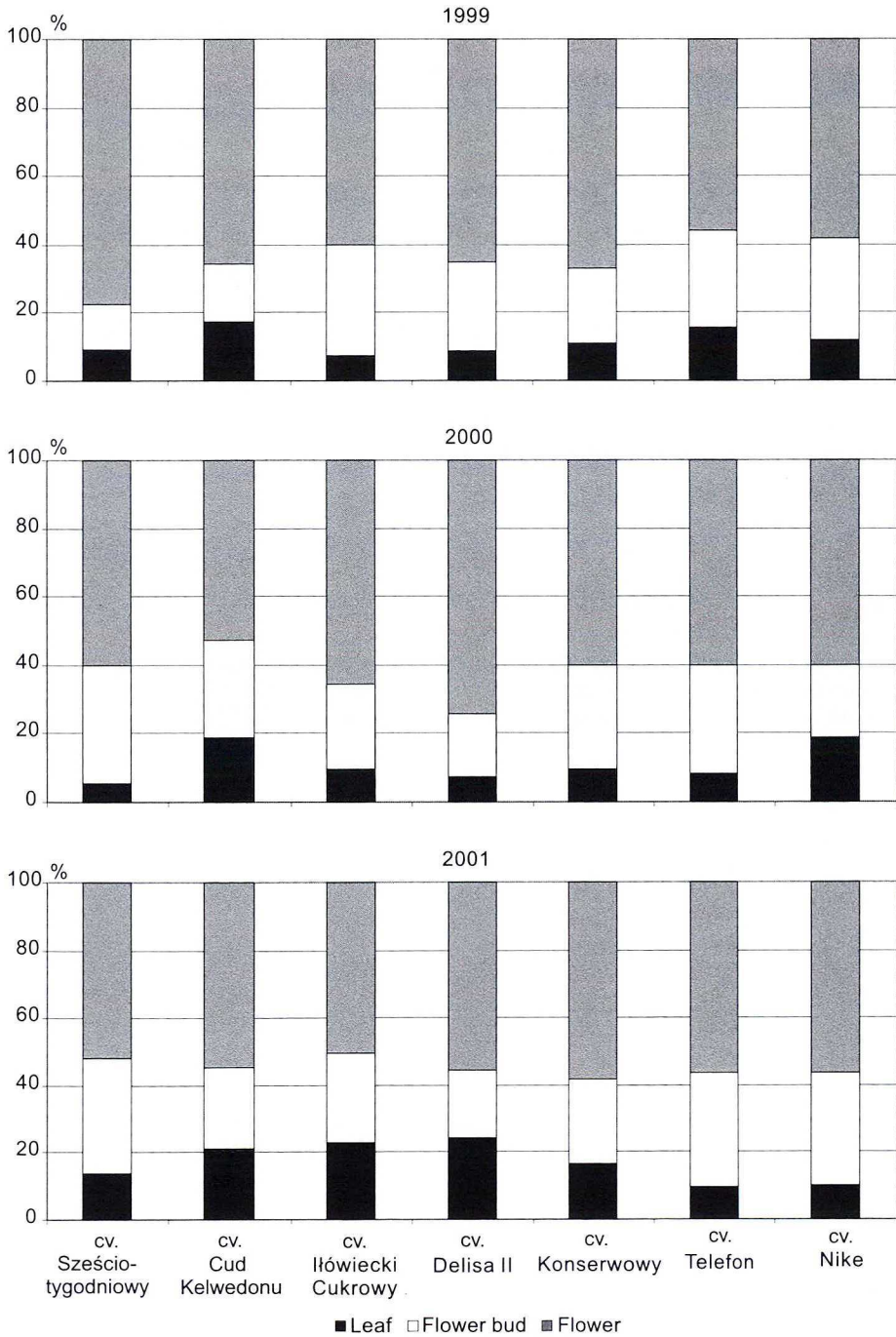


Fig. 4. Percentage share in infestation of leaves, flower buds and flowers on different cultivars of pea by thrips (Mydlniki, 1999–2001)

Comparison of the infestation of the parts of the pea by thrips shows that the flowers were the heaviest infested (Fig. 4). 5.5%–24% of the recorded thrips were found on the leaves, depending on the cultivar. On the flower buds there were from 13% to 34% thrips and on the flower from 50% to 77%. In the subsequent years, the percent infestations of the parts of the pea in the same cultivars were similar (Fig. 4).

CONCLUSIONS

1. The greatest number of thrips was found on late cultivars. The following species of thrips were found: *F. intonsa* Trybom, *T. major* Uzel, *T. fuscipennis* Hal., *T. tabaci* Lind. and *K. robustus* Uzel.
2. On the particular parts of the pea, the greatest number of thrips (61.5%) was found on the flowers, then on the flower buds (26.6%) and on the leaves (11.9%).
3. The estimation of the degree of infestation by thrips should start from the analysis of leaves as the pests occur on them.

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POLISH SUMMARY

WYSTĘPOWANIE WCIORNASTKÓW (*THRIPIDAE*, *THYSANOPTERA*) NA RÓŻNYCH ODMIANACH GROCHU (*PISUM SATIVUM* L.)

W latach 1999–2001 na siedmiu odmianach grochu warzywnego określono występowanie wciornastków. W tym celu z poletek odmianowych grochu pobierano próby najpierw liści, potem liści i pąków kwiatowych, a na końcu samych kwiatów z których wybierano wszystkie znajdujące się wciornastki. Pobieranie prób rozpoczęto wtedy, kiedy najwcześniejsza odmiana (Sześciotygodniowy) rozpoczynała kwitnienie i prowadzono je co 4–7 dni, aż do zakończenia kwitnienia.

Stwierdzone zostały następujące gatunki przylżeńców: *Frankliniella intonsa* Trybom, *Thrips major* Uzel, *Thrips fuscipennis* Hal., *Thrips tabaci* Lind. oraz *Kakothrips robustus* Uzel. Na poszczególnych odmianach grochu widoczne były wyraźne różnice w liczbie stwierdzonych wciornastków. Najbardziej atrakcyjnymi w tym względzie były odmiany późne Nike i Telefon oraz odmiana średnio późna Delisa II. Wydaje się, że nie długość okresu kwitnienia wpływała na większą liczebność wciornastków na poszczególnych odmianach, ale okres rozpoczęcia i za-

kończenia kwitnienia. Najwięcej wciornastków stwierdzono na kwiatach, od 50% do 77% wszystkich zebranych. Wciornastki początkowo spotykane były na liściach i w miarę rozwoju grochu przemieszczały się na pąki kwiatowe a później na kwiaty. Przy określaniu pojawiania się wciornastków kontrolę ich liczebności powinno rozpocząć się od przeglądania liści.