

**BEEKEEPING VALUE
OF SEED PRODUCTION PLANTINGS OF PERKO
(*BRASSICA RAPA* VAR. *OLEIFERA* X *BRASSICA CHINENSIS*)**

Zbigniew Koltowski

Research Institute of Pomology and Floriculture, Apiculture Division,
Kazimierska 2 Str., 24-100 Puławy, Poland, e-mail: zbigniew.koltowski@man.pulawy.pl

S u m m a r y

Perko (a cross between rape and Chinese cabbage) is a new fodder plant, more and more cultivated as a green forage and a silage for domestic animals. Seed production fields of this plant supply certain quantities of nectar and pollen to insects. The aim of the investigations carried out in the years 1999-2000 was to define how large and how attractive those quantities are as bee forage. The abundance of nectar secretion was investigated by pipette method, the abundance of pollen production with ether method, and the density of bees per area unit was counted during top-hours of foraging.

It was found that perko blooms on average about 1 week earlier than winter-rape, and blooms as long as rape, on average about 4 weeks. Considering the abundance of blooming, nectar secretion and pollen production perko can be (in dependence on the weather conditions) a little poorer than rape, and sometimes can equal or even surpass it. The density of bees on perko field was clearly lower than on winter-rape. However, the weaker state of the bee colonies at early time of perko blooming could decide about it.

Generally, with respect to beekeeping values we can recognize perko as a plant a little bit less valuable than winter-rape.

Keywords: perko, winter rape, beekeeping value, nectar secretion, pollen productivity.

INTRODUCTION

„Perko“ belongs to the *Cruciferae* family and nowadays it is cultivated in Poland more and more often. This interspecific hybrid was created by crossing turnip like rape (*Brassica rapa* var. *oleifera*) with Chinese cabbage (*Brassica chinensis*). It is cultivated as a fodder-plant, used for green forage and silage for domestic animals. To assure sufficient quantity of seeds we need some plantings of this plant for seed production. Such seed production plantings deliver certain quantities of nectar and pollen for bees. The aim of the study was to qualify which quantities they reach. The relevant experiments were executed in the years 1999-2000, and the obtained results are presented in the following report.

MATERIAL AND METHODS

The perko field was situated on muddy soil in Puławy in the first year, and on average podsolic soil 7-km apart from Puławy in the second one. The abundance of nectar secretion was investigated according to the pipette method (J a b ł o ń s k i and S z k l a n o w s k a 1979). The abundance of pollen production was estimated by ether method (W a r a k o m s k a 1972, S z k l a n o w s k a and P l u t a 1984). When the plants were matured some analyses of selected biometric features of plants were executed, too. The results collected for „perko“ are presented in comparison with similar data obtained at the same time in Puławy for winter oilseed rape.

RESULTS AND DISCUSSION

It was stated that perko starts its blooming about 1 week earlier than winter rape and its blooming is the same length as rape, that means on average about 4 weeks, but sometimes during warm sunny weather less than 3 weeks (Table 1). Plants of perko reached an average of about 150 cm in height, while plants of winter rape over 170 cm. The plants of these two species were similar branched, what means they had over 6 and over 7 branches for perko and rape respectively. Only in 1999 did perko have few branches, but the density of plants on the perko field in 1999 was extremely high - almost 90 plants per 1 square meter. Usually the number of plants per that unit was lower than 50. However, it had not any influence on number of flowers per 1 ha. It was almost the same for perko and rape in 1999 - about 12 thousand, and also in 2000 - about 10 thousand flowers per 1 hectare.

With respect to abundance of nectar secretion „perko“ exceeded winter rape in 1999, but it was caused by the earlier blooming time and more favorable weather conditions at that time. In the second year of investigation (2000) when the nectar was collected at the same time for perko and for winter rape, the „perko“ flowers contained only 40% of the quantity of sugars present in rape flowers. Such different nectar secretion of perko flowers was reflected by the intensity of bee foraging on its flowers. However, during good weather conditions the highest density of honeybees per one square meter of perko was not so high - 3.5 and 1.5 in 1999 and 2000 respectively, while on rape we could meet an average of 6.5 honeybees year by year. It is possible that numerous larvae of *Meligetes aeneus* decreased quantity of nectar inside the „perko“ flowers.

With respect to abundance of pollen production „perko“ exceeded winter rape, too. The „perko“ flowers produced about 16 and 14 mg of pollen per 10 flowers in 1999 and 2000 respectively. The rape flowers produced only about 13 mg per 10 flowers each year.

Table 1

Some results of abundance of blooming, nectar secretion and pollen production of „perko“ and winter rape in Puławy in 1999-2000

Niektóre wyniki badań obfitości kwitnienia, nektarowania i pylenia perko oraz rzepaku ozimego w Puławach w latach 1999-2000

Investigated feature Badana cecha	Year 1999 - Rok 1999		Year 2000 - Rok 2000		Average - Średnio	
	Perko Perko	Winter rape Rzepak	Perko Perko	Winter rape Rzepak	Perko Perko	Winter rape Rzepak
Start of blooming Początek kwitnienia	26.04	4.05	22.04	27.04	24.04	1.05
End of blooming Koniec kwitnienia	22.05	27.05	11.05	14.05	17.05	21.05
Height of plants in cm Wysokość roślin w cm	144	184	154	161	149	173
Number of branches per plant Liczba rozgałęzień na roślinie	5.0	8.4	7.1	6.7	6.1	7.6
Number of plants per 1m ² Liczba roślin na 1m ²	87	35	49	46	68	41
Number of flowers per 1m ² in 10 ³ Liczba kwiatów na 1m ² w tys.	11.2	12.5	10.0	9.3	10.6	10.9
Mass of sugars per 10 flowers in mg Masa cukrów z 10 kwiatów w mg	9.14	7.85	4.37	11.75	6.76	9.80
Mass of pollen per 10 flowers in mg Masa pyłku z 10 kwiatów w mg	16.10	12.66	13.85	13.22	14.98	12.94
Sugars efficiency in kg/ha Wydajność cukrów w kg/ha	102	98	44	109	73	104
Pollen efficiency in kg/ha Wydajność pyłku w kg/ha	180	158	138	123	159	141
Number of honeybees per 1 m ² * Liczba pszczoł miodnych na 1 m ² *	3-4	6-7	1-2	6-7	2-3	6-7

* - Average density of honeybees observed during top hours of flowers foraging in full blooming season

* - Średnie zagęszczenie pszczoł, obserwowane w szczytowych godzinach oblotu podczas okresu pełni kwitnienia roślin.

The yield of sugars and pollen of „perko“ was a little bit higher than that of winter rape in 1999, but this regularity was confirmed in 2000 for pollen yield only. Much lower nectar secretion of „perko“ flowers in 2000 found the result in much lower sugars yield - about 44 kg per 1 ha. Both of these two species produced more pollen than sugars per area unit.

The reported results for nectar secretion and pollen production of „perko“ can be compared to similar results for winter rape obtained by other authors. Generally we can say, that weight of sugars from 10 flowers is in accordance with data obtained by others (Kubišova et al. 1980, Kamler 1980 and Williams 1985) but slightly lower values were obtained by Demianowicz (1968) and Jabłoński et al. (1985). Moreover, our results are in the range of nectar secretion values calculated for 71 rape genotypes by Pierre et al. (1999). Results concerning the pollen production and intensity of bee foraging on flowers are in full accordance only with those reported by Jabłoński et al. (1985).

CONCLUSIONS

„Perko“ is quite a good source of nectar and pollen flow in the springtime. In comparison with winter rape „perko“ delivers little lower quantities of nectar and similar quantities of pollen. From larger seed production plantings of this species beekeepers can harvest honey.

The lesser number of bees foraging on „perko“ fields compared to winter rape fields stems not only from weaker nectar secretion of flowers but also from the earlier blooming time of this plant.

REFERENCES

- Demianowicz Z. (1968)- Biologia kwitnienia i nektarowanie pięciu odmian rzepaku ozimego. *Ann. UMCS Lublin - Polonia, Sectio E*, 23(19):241-263.
- Jabłoński B., Skowronek J., Szklanowska K. (1985)- Wartość pszczelarska, zapylanie i plonowanie niskoerukowych odmian rzepaku ozimego. *Pszczeln. Zesz. Nauk.*, 29:339-358.
- Jabłoński B., Szklanowska K. (1979)- Propozycje zmiany metody badań nektarowania roślin. *Pszczeln. Zesz. Nauk.*, 23:105-114.
- Kamler F. (1980)- Nektarnost otród řepky ozime (*Brassica napus* var. *arvensis*). *Rostlinna vyroba*, 26(53):181-189.
- Kubišova S., Nedbalova V., Plesnik R. (1980)- Cinnost vcely medonosne (*Apis mellifera* L.) na repce. *Polnohospodarstvo*, 26(8):744-754.
- Pierre J., Mesquida J., Marilleau R., Pham-Delegue M.H., Renard M. (1999)- Nectar secretion in winter oilseed rape, *Brassica napus* - quantitative and qualitative variability among 71 genotypes. *Plant Breeding*, 118:471-476.
- Szklanowska K., Pluta S. (1984)- Wydajność pyłkowa sadu wiśniowego odmian Kerezer, Nefris, Łutówka. *Pszczeln. Zesz. Nauk.*, 29:231-251.
- Warakomska Z. (1972)- Badania nad wydajnością pyłkową roślin. *Pszczeln. Zesz. Nauk.*, 16:63-96.
- Williams I.H. (1985)- The pollination of Swede rape (*Brassica napus* L.). *Bee World*, 66(1):16-22.

WARTOŚĆ PSZCZELARSKA UPRAW NASIENNYCH PERKO (*BRASSICA RAPA* VAR. *OLEIFERA* X *BRASSICA CHINENSIS*)

Kołtowski Z.

S t r e s z c z e n i e

Perko (mieszaniec rzepiku z kapustą chińską) jest nową rośliną pastewną, coraz szerszej uprawianą na zielonki i kiszonki dla zwierząt domowych. Plantacje nasienne tej rośliny dostarczają owadom pewnych ilości nektaru i pyłku. Badania wykonane w latach 1999-2000 miały na celu określenie jak duże są to ilości i jak bardzo atrakcyjne jako pożytek pszczeli. Obfitość nektarowania badano metodą pipetową, obfitość pylenia metodą eterową, a zagęszczenie pszczół na poletkach ustalano w szczytowych godzinach oblotu.

Stwierdzono, że perko, w porównaniu z rzepakiem ozimym, zakwita średnio około 1 tygodnia wcześniej, a kwitnie tak samo długo jak rzepak, tzn. średnio około 4 tygodnie. Pod względem obfitości kwitnienia oraz nektarowania i pylenia może ono (w zależności od warunków pogody) być niewiele słabsze od rzepaku, a niekiedy może mu dorównywać lub nawet go przewyższać. Zagęszczenie pszczół na plantacji perko okazało się wyraźnie mniejsze niż na rzepaku ozimym. O tym jednak mógł decydować słabszy stan pasiek w terenie, co przy wcześniejszej porze kwitnienia perko jest zrozumiałe.

Ogólnie biorąc, perko pod względem wartości pszczelarskiej można uznać za roślinę niewiele ustępującą rzepakowi ozimemu.

Słowa kluczowe: perko, rzepak ozimy, wartość pszczelarska, nektarowanie, pylenie.