

ASSESSMENT OF PRODUCTION TRAITS IN THE BUCKFAST BEE

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S u m m a r y

The objective of the study, which was conducted in the northern part of the Lublin region of Poland, was to assess the production traits in Buckfast bees (Bcf) as compared with Caucasian hybrids (cau x car). The experiments were performed in two seasons each experimental group consisted of 10 colonies. The assessment of winter hardiness was carried out on the basis of the number of dead bees collected from hive bottoms, and also on the basis of the extent of colony infestation by *Nosema apis*. The criteria of the springtime colony development assessment were the measurements of the brood area and the brood increase between the measurements. The colony strength was expressed as the number of combs populated by bees. Swarming tendency was assessed on the basis of the number of colonies in which the swarming tendency occurred. Honey yield was expressed as the weight of the honey harvested. The weight of the honey that was left in the brood chamber was also assessed after the last honey harvest.

In the first season, Bcf colonies lost statistically more bees than cau x car. In the second season, however, they overwintered better than cau x car. No increased susceptibility of Bcf to *Nosema apis* infestation was found. Bcf colony development was slightly less intense than that of cau x car, and Bcf colonies had a low swarming tendency. Regarding the honey yield, Bcf bees did not differ significantly from cau x car, even though they achieved worse results under the poor nectar flow conditions. Bcf stored slightly less honey in the brood chamber than cau x car.

With regard to overwintering, springtime colony development, and swarming tendency, Bcf bees meet the expectations of beekeepers from the Lublin region. In this area satisfactory utilization of the early nectar flow is dependent on having bees with successful overwintering and intensive springtime colony development. Regarding the honey yield, Bcf are equal to cau x car hybrid colonies.

Keywords: Buckfast, assessment, production traits.

INTRODUCTION

Despite the considerable progress that has been made in bee breeding, it is still of great importance for Polish beekeepers to choose one of the several bee breeds available that would be suitable for local natural conditions. In their search for the "best bee", beekeepers are willing to utilize imported material as they believe that doing so is a method for quickly increasing their apiary yield. The breed that has been

gaining increasing popularity in our country recently is the Buckfast bee. Its popularity, especially among commercial beekeepers, in numerous countries such as Israel, France, Luxemburg, Germany, Denmark, Sweden and USA (Büchler, 1998a; Österlund, 1983) may reflect the considerable adaptability of the Buckfast bee to various natural conditions. On the other hand, it may also be that the Buckfast bee breed is easy to work with. In theory, therefore, there are no contraindications to

the introduction of that breed also in Poland.

The problems that are being discussed here, became particularly important after Poland's accession to the European Union. Opening Poland's western border facilitated the free inflow of Buckfast queens into Poland, especially from Germany. However, prior to the introduction in Germany in the late 1990's of the common breeding program for the Carniolan bee, which has been considered so far to be the best breed, and the Buckfast bee (Maul et al., 1999; Stöhr, 1999) it had not been without disputes among beekeepers and scientists (Stöhr, 1999). The decisive factor turned out to be the publishing of the results of the research that had been being carried out for many years. This research ultimately abolished the view (Maul, 1997; Pritsch, 1993) that crossing domestic queens with Buckfast drones was supposed to lead to the increased expression of defensive behavior in the domestic population of bees (Maul et al., 1999). The usefulness of Buckfast bees causes a lot of controversy also among Polish beekeepers and researchers (Żabicki and Skubida, 2004; Troszkiewicz, 1992). The author of the present study holds the view that many of the negative opinions concerning the Buckfast bee result from the fact that obtaining good quality Buckfast breeding material had been difficult until not long ago. The author also believes the negative opinions partly result from the lack of familiarity with the requirements of the Buckfast bee. To be fair there are also many positive opinions concerning the breed. Until the present, very few research studies have been conducted with the aim of checking how the Buckfast bee is performing in Poland. The primary object of the present study was to fill in that gap and to contribute to a more objective look at the above mentioned problems.

Buckfast bees, which were imported, were assessed against the Caucasian hybrid. The Caucasian hybrid has been popular and recommended for many years for the territory of eastern Poland (Bornus et al., 1974). The usefulness of Caucasian hybrids in Poland was confirmed again by recent studies (Prabucki and Chuda-Mickiewicz, 2000).

MATERIAL AND METHODS

The experiments were conducted in the northern part of the Lublin region, in a stationary apiary which consisted of long hives (frame 300 x 435 mm). A group of pure-bred Buckfast colonies was assessed for two seasons. They were assessed against colonies of hybrids. These colonies were the offspring of pure-breed Caucasian queens from the Woźnica line, instrumentally inseminated with Carniolan drones from the Nieska line (cau x car). The Caucasian queens came from a renowned Polish breeder. The pure-bred Buckfast queens were acquired from the Buckfast Breeder Association of Lower Saxony in Germany. Daughter queens obtained from one of them were reared and subsequently instrumentally inseminated with the semen of the drones being the offspring of another queen. The two queens were unrelated to each other. Each of the two groups consisted of 10 colonies.

Preparation of the colonies for each season had already commenced in the preceding season. Then, at the beginning of July, appropriate queens were added to colonies of similar strength and structure. After the exchange of bees, colonies from each group were selected for further research. The following selection criteria were assumed: good egg laying in queens and similar colony strength.

Winter hardiness was assessed on the basis of the number of dead bees that were

collected each month from hive bottoms. In order to take into account the influence of the colony strength on overwintering, the number of dead bees was calculated not only per one colony but also per one comb. The entire material taken from hive bottoms (dead bees, wax) was screened in order to separate out the *Varroa destructor* mites, which were subsequently counted. The degree of *Nosema apis* infestation in the colony was also assessed (Hartwig and Topolska, 1995). This was done in order to confirm or to exclude its potential influence on overwintering and springtime colony development as well as to check the susceptibility of the analysed groups to those parasites.

In order to assess the springtime colony development, brood area was measured three times in each colony. The first measurement was carried out on the day of the spring cleansing flight. The interval between subsequent measurements was 21 days. Brood area was used for computing the daily increase of brood cells at each measurement. Brood increase was computed from the difference of the brood cell numbers between subsequent (2nd and 1st; 3rd and 2nd) measurements. The colony strength was expressed as the number of combs fully populated by bees. That parameter was assessed at the time of brood area measurements and also at the last autumn inspection so as to take into consideration the influence of this parameter in the assessment of overwintering. Swarming was assessed on the basis of the number of colonies in which the swarming tendency occurred. Colony inspections were conducted at weekly intervals.

The assessment of honey yield was performed on the basis of the weight of the extracted honey. This was computed by weighing the combs for each colony separately, before and after extracting the honey. Three honey harvests were carried

out in each season, one in May, June and July. The first two of them were the harvests from the spring nectar flow and the obtained honey was referred to as the spring honey. At the third harvest, in July, honey was obtained from the summer nectar flow. Since honey was extracted only from the combs in the honey chamber, after the last harvest, the quantity of honey [kg] left in the brood chamber was measured.

The results were analysed statistically using a packet SAS (2000). Statistical analyses of the effects of the group and the season as well as of the interactions between them (group x season) were performed using two-factorial ANOVA analysis.

RESULTS AND DISCUSSION

Nectar flow conditions, climatic conditions and the work methods used

In the area where the experiments were conducted, the nectar flow is typical of the major part of Poland's territory, with the highest nectar flow in the first half of the season. Under favourable conditions, it is possible to obtain honey from the fruit trees, *Taraxacum officinale* and *Brassica napus*. The last nectar flow is provided by *Tilia cordata*, which, however, is often unreliable because of drought.

The winter of the first season was mild and short. The weather in spring, however, did not favour making use of the nectar flow from *Salix* sp., yet they were favourable during the blooming of *Acer platanoides*, as well as fruit trees and *Centaurea cyanus*. Drought and hot weather did not favour the nectar secretion in *Tilia cordata*. The winter of the second season was frigid and the spring chilly with light killing frosts in April. The colonies, however, efficiently used the nectar flow provided by *Salix* sp. and *Acer platanoides*. Nectar secretion of *Centaurea cyanus* and

Table 1

Mean number of dead bees during overwintering

Number of dead bees			Group		Overall seasons	Interaction group x season
			Bcf	cau x car		
Per one comb	Season 1	LSM SE	229 a 16.11	176 b 16.99	202 11.71	F = 2.79 p = 0.104
	Season 2	LSM SE	226 16.11	229 16.99	227 11.71	
	Overall groups	LSM SE	227 11.39	202 12.01	214 8.73	
Per one colony	Season 1	LSM SE	1479 a 98.81	1182 b 104.16	1330 71.79	F = 4.37 p = 0.044
	Season 2	LSM SE	1443 98.81	1571 104.16	1507 71.79	
	Overall groups	LSM SE	1461 69.87	1376 73.65	1418 53.81	

Bcf – Buckfast; cau x car – Caucasian x Carniolan; LSM - least square means; SE - standard error; a, b – difference significant in rows at $P \leq 0.05$.

Tilia cordata was also fairly good.

The activities performed in autumn were related to directing the colony development. The aim of the autumn activities was to facilitate overwintering of strong colonies for rapid development in spring. This would then guarantee satisfactory honey production from the early nectar flow. The analysis of the weather/natural conditions of the northern Lublin region shows that those regions are the hardest for beekeepers (Maksymiuk, 1987). This definitely made the criterion of the Buckfast bees assessment even stricter.

Winter hardiness

Overwintering colonies in both groups populated a similar number of combs – from 6 to 7. The mean value in the Bcf group in the first season was 6.5 and in the second season 6.40 combs. In the cau x car group the respective mean values were 6.78 and 6.88. In the first season, Bcf colonies lost statistically more bees than cau x car, yet they lost fewer in the second season (Tab. 1). The group x season interaction

was significant for the number of dead bees calculated per one colony. The winter hardiness of the Bcf colonies was, consequently, similar to that of the cau x car hybrids, which are recommended for the territory of eastern Poland (Prabucki and Chuda-Mickiewicz, 2000; Bornus et al., 1974). This conclusion is consistent with author's earlier observations made during the comparison of F₁ Bcf hybrids with F₁ Caucasian hybrids (Olszewski et al., 2002). Likewise, no significant influence of breed on winter hardiness was observed by Hońko and Jasiński (2002). They compared Bcf bees in Finland with Italian, Carniolan and Middle European bees. On the other hand, in the experiments of Gerula and Jagiełło (1998), conducted in south-eastern Poland, colonies of Bcf hybrids overwintered better than Caucasian and Carniolan hybrids. That, however, might have resulted from the fact that Bcf bees in their experiments came from a Norwegian population. Contrary to

beekeepers' opinions (Jungels, 1998), the author did not observe the tendency in Buckfast bees to finish the brood rearing later in autumn. This trait according to Jungels (1998) is the result of crossing with the Anatolian bee, *Apis mellifera anatolica*.

The level of infestation by *Varroa destructor* was similar in both groups. Only individual mites were found, which allows for the exclusion of their influence on the course of overwintering. In the first season mites were found in four Bcf colonies. Their number ranged from 1 to 2 per one colony. In the second season, mites were found in all colonies and this time their numbers ranged from 3 to 9 per one colony. The presence of mites from 1 to 3 per one colony was also found in five cau x car colonies in the first season. In the second season, mites were found in all cau x car colonies as well and their numbers ranged from 2 to 7 per one colony. Büchler (1998b) found a higher level of brood infestation by *Varroa destructor* in Bcf than in Carniolan bee colonies, and the lowest level of brood infestation in Middle European colonies. In fact, the author of the present study did not examine the level of brood infestation but monitored solely the number of mites that died in the course of overwintering. This may be a partial measure of the effectiveness of the medication that was applied. Nevertheless, in Bcf colonies, as compared with the other groups, no increase in the number of *Varroa destructor* was found, which in theory Bcf colonies might be favored by earlier commencement of brood rearing, inclination to robbing (Büchler, 1998b) and, as some beekeepers claim, late finishing of brood rearing in autumn.

No increased susceptibility to *Nosema* was found in Bcf colonies, either. Cases of mild or trace infestation with *Nosema apis* were found only in bee samples coming from individual colonies. In the first

season, no *Nosema apis* spores were found in any of the Bcf colonies. Individual spores were found only in one of the cau x car colonies. In the second season, mild infestation was found in three cau x car colonies whereas in the Bcf group, individual *Nosema apis* spores were found in one colony. That result is consistent with the observations of Bruder Adam (Bruder Adam, 1983). In the studies conducted in Finland by Hońko and Jasiński (2002), the lowest level of infestation by *Nosema apis* was recorded in Middle European bees, slightly higher in Bcf and the highest in Italian and Carniolan bees.

To sum up it should be stressed, that regarding winter hardiness, Bcf bees were not much worse than Caucasian bee hybrids that are highly valued in the Lublin region. In the light of these observations, Bcf bees, which are originally bred in the sea climate of northern Germany (much different from the climate of eastern Poland), may be considered to be capable of good overwintering in the Lublin region.

Springtime colony development, colony strength and swarming

Larger brood area which involves a larger daily increase of brood cells, was found in cau x car. However, significant differences were noted only at the third brood measurement in the first season (Tab. 2 part 1.). The Bcf colonies were slightly weaker at the beginning of overwintering, and they remained slightly weaker also after the spring colony compression. However, it is interesting with regard to colony strength (number of populated combs), that at subsequent measurements, even though they had less brood, Bcf bees started to catch up with cau x car (Tab. 2 part 2.). That trend may have resulted from the better longevity of Bcf, which seems to be confirmed by the results of longevity assessment performed under laboratory conditions (Olszewski

unpublished data). The group factor had a significant effect on the following parameters: brood area at the third measurement, brood increase between 3rd and 2nd measurement, colony strength at the last autumn inspection and colony

strength at the first brood measurement. The season factor had a significant effect on: brood area at the third measurement, brood increase between 3rd and 2nd measurement and colony strength at the first, second and third brood measurement.

Table 2 part 1
Springtime colony development

Examined traits			Group		Overall seasons	Interaction group x season
			Bcf	cau x car		
Brood area at the first measurement [dm ²]	Season 1	LSM SE	11.01 1.37	12.38 1.44	11.70 0.99	F = 0.13 p = 0.723
	Season 2	LSM SE	11.44 1.37	13.81 1.44	12.63 0.99	
	Overall groups	LSM SE	11.23 0.97	13.10 1.02	12.11 0.69	
Brood area at the second measurement [dm ²]	Season 1	LSM SE	36.14 2.08	38.27 2.20	37.20 1.51	F = 0.53 p = 0.471
	Season 2	LSM SE	33.81 2.08	36.51 2.20	35.16 1.51	
	Overall groups	LSM SE	34.98 1.47	37.39 1.55	36.18 1.08	
Brood area at the third measurement [dm ²]	Season 1	LSM SE	51.78 A 3.15	69.93 B 3.32	60.85 ** 2.28	F = 2.13 p = 0.153
	Season 2	LSM SE	74.55 3.15	83.26 3.32	78.91 ** 2.28	
	Overall groups	LSM SE	63.16 ** 2.22	76.60 ** 2.35	69.53 2.45	
Brood increase (number of cells between 2 nd and 1 st measurement)	Season 1	LSM SE	479 43.20	493 45.53	486 31.38	F = 0.79 p = 0.381
	Season 2	LSM SE	426 43.20	432 45.53	429 31.38	
	Overall groups	LSM SE	452 30.54	462 32.19	457 22.81	
Brood increase (number of cells between 3 rd and 2 nd measurement)	Season 1	LSM SE	298 A 74.53	603 B 78.56	450 ** 54.14	F = 0.62 p = 0.437
	Season 2	LSM SE	776 74.53	890 78.56	833 ** 54.14	
	Overall groups	LSM SE	537 ** 52.70	746 ** 55.55	641 54.51	

Bcf – Buckfast; **cau x car** – Caucasian x Carniolan; **LSM** - least square means; **SE** – the standard error; **a, b** – difference significant in rows at $P \leq 0.05$; **A, B** – difference significant in rows at $P \leq 0.01$; * - the effect of group factor (in rows) and the effect of season factor (in columns) significant at $P \leq 0.05$; ** - the effect of group factor (in rows) and the effect of season factor (in columns) significant at $P \leq 0.01$

Table 2 part 2

Springtime colony development

Examined traits			Group		Overall seasons	Interaction group x season
			Bcf	cau x car		
Colony strength at the last autumn inspection (number of combs)	Season 1	LSM SE	6.50 0.14	6.78 0.15	6.64 0.10	F = 0.49 p = 0.489
	Season 2	LSM SE	6.40 a 0.14	6.88 b 0.15	6.64 0.10	
	Overall groups	LSM SE	6.45 * 0.10	6.83 * 0.10	6.63 0.07	
Colony strength at the first brood measurement (number of combs)	Season 1	LSM SE	4.80 0.15	5.11 0.16	4.95 ** 0.10	F = 0.33 p = 0.571
	Season 2	LSM SE	5.40 a 0.15	5.88 b 0.16	5.64 ** 0.10	
	Overall groups	LSM SE	5.10 * 0.10	5.50 *0.11	5.29 0.09	
Colony strength at the second brood measurement (number of combs)	Season 1	LSM SE	6.00 0.24	6.22 0.25	6.11 * 0.17	F = 0.54 p = 0.456
	Season 2	LSM SE	6.70 0.24	6.55 0.25	6.62 * 0.17	
	Overall groups	LSM SE	6.35 0.17	6.39 0.18	6.37 0.12	
Colony strength at the third brood measurement (number of combs)	Season 1	LSM SE	14.80 0.25	14.89 0.27	14.84 ** 0.18	F = 0.19 p = 0.663
	Season 2	LSM SE	15.70 0.25	15.55 0.27	15.63 ** 0.18	
	Overall groups	LSM SE	15.25 0.18	15.22 0.19	15.24 0.14	

Bcf – Buckfast; **cau x car** – Caucasian x Carniolan; **LSM** - least square means; **SE** – the standard error; **a, b** – difference significant in rows at $P \leq 0.05$; **A, B** – difference significant in rows at $P \leq 0.01$; * - the effect of group factor (in rows) and the effect of season factor (in columns) significant at $P \leq 0.05$; ** - the effect of group factor (in rows) and the effect of season factor (in columns) significant at $P \leq 0.01$

The group x season interaction was not found to be significant for any of the traits studied.

Researchers agree that the rate of the springtime colony development of Bcf bees is similar to that of Caucasian hybrids, Carniolan and Italian bees. It is much faster than that of Middle European bees (Hońko and Jasiński, 2002; Olszewski et al., 2002; Büchler, 2000; Liebig, 1982). Moreover, it is Bcf bees that are strong when entering the

overwintering period, and consequently, they are characterized by intensive springtime colony development (Büchler, 1998a; Pritsch, 1993). The results obtained in the present study show that in the Lublin region cau x car did slightly better than Bcf. Their advantage may have been the result of the presence of Carniolan bee genes in their genotype. This observation may support the opinion of Troszkiewicz (1993), who claims that as a result of the breeding work conducted in

Poland, breeding lines of the Caucasian bee have been obtained which are characterized by early springtime colony development. The crossing of queens coming from such a line with Carniolan drones may result in further intensification of their springtime colony development due to the heterosis effect. In conclusion it may be stated that Bcf bees meet the expectations of beekeepers from the Lublin region. These expectations depend on satisfactory utilisation of the early nectar flow which is dependent on having bees characterized by successful overwintering and intensive springtime colony development.

Not a single colony of the Bcf group showed a swarm tendency. In the cau x car group swarm tendency was noted in only one colony. Many authors claim that because the Bcf bee achieves better than average colony strength with very limited swarming it has won the approval of commercial beekeepers (Golz, 2000; Maul et al., 1999; Büchler, 1998b; Pritsch, 1993; Bruder Adam, 1983; Maul, 1977). They are right to a great extent, since a high swarming tendency not only prevents productivity but also leads to increased costs (Woyke, 1998; Bruder Adam, 1983). The author's studies confirmed the opinion of Golz (2000) and Pritsch (1993) of the exceptionally low swarming tendency in Bcf. That is why Bcf bees may be suitable for those beekeepers who have limited time for managing their apiaries. Perhaps in the future the low swarming tendency may become the decisive factor for preferring Bcf in Poland, especially by commercial beekeepers, as it is now in other countries such as Israel, France, Luxembourg, Germany, Denmark, Sweden and USA (Büchler 1998a; Österlund, 1983).

Honey yield

In the first season, after the poor nectar flow provided by *Tilia cordata*, which was caused by drought and hot weather, the

honey yield of cau x car was significantly higher than that of Bcf (Tab. 3). In the second season honey yield, both from the spring and the summer nectar flow, was similar in both groups. In both seasons cau x car showed a greater tendency than Bcf to store honey in the brood chamber. The group factor had a significant effect on the following parameters: honey extracted in summer, honey left in the brood chamber and overall yield. The season factor had a significant effect on: honey extracted in summer, total extracted honey and overall yield. The group x season interaction was significant for honey extracted in summer and honey left in the brood chamber. Regarding the honey yield, Bcf bees did not differ significantly from cau x car, even though they performed worse under the poor nectar flow conditions. Experiments performed by German authors, however, point to a similar productivity level of Bcf and the Carniolan bee (Büchler, 2000; Liebig, 1982; Maul, 1977). Finally, in Finland (Hońko and Jasiński, 2002) Carniolan bees proved to be the most productive, Bcf and Italian bees showed similar and slightly worse productivity, and the productivity of the Middle European bees was the lowest. There are not enough Polish comparative studies to provide unquestionable results. In south-eastern Poland, Caucasian hybrids were the most productive, and Bcf hybrids as well as the Carniolan ones, showed worse productivity but were similar to each other (Gerula and Jagiełło, 1998). The author's previous studies (Olszewski et al., 2002) conducted in the Lublin region, did not show any differences regarding the honey yield between F₁ Bcf hybrids and F₁ Caucasian hybrids. The divergence in the assessment results of the Bcf bees in Poland may result from the variety of nectar flow conditions, and from the fact that the material under assessment came

from various sources. The Bcf bees used in the studies which were conducted in Germany, and those used in the previous and present studies of the author, came from the North German population. Gerula and Jagiełło (1998) on the other hand used bees of Norwegian origin.

Hońko and Jasiński (2002) in Finland, assessed material used by Finnish beekeepers and also the material imported from Canada.

It is worth noticing, however, that both in the author's studies and in all the cited works, the results achieved by the Bcf were

Table 3

Honey yield

Honey yield			Group		Overall seasons	Interaction group x season
			Bcf	cau x car		
Honey extracted in spring	Season 1	LSM SE	15.49 0.88	16.06 0.92	15.77 0.64	F = 0.04 p = 0.852
	Season 2	LSM SE	15.55 0.88	16.46 0.92	16.00 0.64	
	Overall groups	LSM SE	15.52 0.62	16.26 0.65	15.89 0.43	
Honey extracted in summer	Season 1	LSM SE	8.35 A 0.46	10.87 B 0.49	9.61 ** 0.34	F = 7.18 p = 0.011
	Season 2	LSM SE	12.39 0.46	12.33 0.49	12.36 ** 0.34	
	Overall groups	LSM SE	10.37 * 0.33	11.60 * 0.34	10.98 0.35	
Total extracted honey	Season 1	LSM SE	23.84 a 1.17	26.27 b 1.24	25.05 ** 0.85	F = 0.43 p = 0.518
	Season 2	LSM SE	27.94 1.17	28.80 1.24	28.37 ** 0.85	
	Overall groups	Lsm SE	25.89 0.83	27.53 0.87	26.71 0.65	
Honey left in the brood chamber	Season 1	LSM SE	2.25 A 0.53	6.27 B 0.56	4.26 0.39	F = 4.76 p = 0.036
	Season 2	LSM SE	4.44 a 0.53	6.16 b 0.56	5.35 0.39	
	Overall groups	LSM SE	3.40 ** 0.38	6.22 ** 0.40	4.78 0.37	
Overall yield	Season 1	LSM SE	25.54 A 1.24	32.49 B 1.31	29.04 ** 0.90	F = 3.13 p = 0.085
	Season 2	LSM SE	32.55 1.24	34.96 1.31	33.72 ** 0.90	
	Overall groups	LSM SE	29.01 ** 0.88	33.76 ** 0.93	31.38 0.84	

Bcf – Buckfast; **cau x car** – Caucasian x Carniolan; **LSM** - least square means; **SE** – the standard error; **a, b** – difference significant in rows at $P \leq 0.05$; **A, B** – difference significant in rows at $P \leq 0.01$; * - the effect of group factor (in rows) and the effect of season factor (in columns) significant at $P \leq 0.05$; ** - the effect of group factor (in rows) and the effect of season factor (in columns) significant at $P \leq 0.01$

good and never belonged to the worst group. This is despite the fact that the examined Bcf bees originated from various apiaries, countries or continents, even when the specific experiments were separated by many years (Büchler, 2000; Liebig, 1982; Maul, 1977). This may prove that Brother Adam was successful in achieving the aim of his life, which was to create an artificial, generally useful breed of the honeybee by combining valuable traits of various breeds. That fact would also explain the popularity of Bcf bees in many countries that have considerably different climates and nectar flow (Büchler, 1998a; Österlund, 1983).

In the context of the results obtained, Bcf bees may be considered to use abundant nectar flow well. They use both the early nectar flow, owing to their intensive springtime colony development, and the later flows, which is the result of sustaining the strength of the colonies throughout the season. German researchers and beekeepers arrived at similar conclusions (Golz, 2000; Maul et al., 1999; Büchler, 1998a; Pritsch, 1993). They also claim that Bcf bees show the best performance in migratory beekeeping operations, which provide the continuity of the nectar flow. The author, on the other hand, conducted his analyses of that bee in a stationary apiary, in the area where the main nectar flow occurred in the first half of the season, i.e. under the natural conditions of an average Polish apiary. It was under those conditions, which are considered unfavourable by German researchers (Golz, 2000; Büchler, 1998a; Pritsch, 1993), that the Bcf bee showed a similar honey yield to that of Caucasian hybrids which are so highly valued in the Lublin region. Therefore, a conclusion may be made, that the specificity of the nectar flow in the Lublin region does not pose an obstacle to the utilization of the Bcf bee. The information

that the Bcf bees stored little honey in their brood chamber, which did not limit the egg laying capability, may be useful for beekeepers. That fact should also be taken into consideration during longer breaks in nectar flow and after the last honey harvest. In such situations feeding the colonies is usually necessary in order to support brood rearing.

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REFERENCES

- Bornus L., Bobrzecki J., Bojarczuk Cz., Gromisz M., Kalinowski J., Król A., Nowakowski J., Ostrowska W., Woźnica J., Zaręba J. (1974) - Przydatność użytkowa mieszańców międzyrasowych pszczoły miodnej w warunkach przyrodniczych Polski. *Pszczel. Zesz. nauk.*, 17: 1-49.
- Bruder Adam (1983) - Meine Betriebsweise. Ehrenwirth Verlag, München.
- Büchler R. (1998a) - Erfahrungen mit der Buckfastbiene I. *Deut. Bienen J.*, 6(4): 4-7.
- Büchler R. (1998b) - Erfahrungen mit der Buckfastbiene II. *Deut. Bienen J.*, 6(5): 19-22.
- Büchler R. (2000) - Buckfast und Carnica im Vergleich. *Deut. Bienen J.*, 8(3): 10-13.
- Gerula D., Jagiełło R. (1998) - Wstępna ocena przydatności użytkowej pszczół Buckfast oraz mieszańców kaukaskich i kraińskich na terenie Pogórza Przemyskiego. *XXXV Naukowa Konferencja Pszczelarska - Puławy*, 16-18.
- Golz W. (2000) - Von Dzierzon bis Bruder Adam. 150 Jahre deutsche Züchtung der Honigbiene. Selbstverlag, Hornacker 15, 27729 Hambergen.
- Hartwig A., Topolska G. (1995) - Przydatność rutynowych badań pszczół z osypu zimowego. *Pszczel. Zesz. nauk.*, 39(1): 71-77.

- Hońko S., Jasiński Z. (2002) - Comparison of different honeybee races under the conditions of south-western Finland. *J. apic. Sci.*, 46(2):97-106.
- Jungels P. (1998) - Betriebsweise und Zuchtauslese in einer Berufsimkerei Teil 4. Über Leistungskomponenten und Varroaresistenz. *Deut. Bienen J.*, 6(6): 23-24.
- Liebig G. (1982) - Buckfast oder Carnica? Vergleich von Volkentwicklung und Honigleistung. *Deut. Bienen J.*, 9: 338-339.
- Maksymiuk W. (1987) - Przyrodnicze podstawy produkcji pasiecznej Polski środkowo-wschodniej. LZGraf, Biała Podlaska.
- Maul V. (1977) - Vergleichende Prüfung von Buckfast- und Carnica-Volkern unter verschiedener Betriebsweise im Jahr 1976. *Die Biene*, 1: 5-12.
- Maul V. (1997) - Haben wir keine guten Bienen in Deutschland? I. *Deut. Bienen J.*, 5(4): 4-5.
- Maul V., Petersen N. (1978) - Vergleichende Prüfung von Buckfast- und Carnica-Volkern unter verschiedener Betriebsweise im Jahr 1977. *Die Biene*, 2: 44-52.
- Maul V., Bienefeld K., Van Praagh J., Dustmann J., Staemmler G., Mautz D. (1999) - Einfluss von Buckfast und Carnica auf Verhaltenseigenschaften der Landbiene. *Imker Freund*, 3: 12-15.
- Olszewski K., Jagiełło R., Paleolog J. (2002) - Porównanie mieszańców F₁ pszczół kaukaskich z mieszańcami F₁ pszczół Buckfast w warunkach pożytkowych północnej Lubelszczyzny. *Annales UMCS Sectio EE*, 28: 199-206.
- Österlund E. (1983) - rother Adam and His Buckfast Bee. *Am. Bee J.*, 123(2): 85-88.
- Prabucki J., Chuda-Mickiewicz B. (2000) - Podnoszenie wydajności miodowej użytkowanych w Polsce pszczół. *Pszczelarstwo*, 11: 5-7.
- Pritsch G. (1993) - Die Carnica- und die Buckfastbiene in Deutschland. *Deut. Bienen J.*, 1(1): 10-13.
- SAS Institute (2000) - SAS User's Guide. SAS Institute Inc., Cary.
- Stöhr A. (1999) - Abschlußarbeit, Referent für Öffentlichkeitsarbeit IV. Ein mittelfristiges PR-Konzept für das Projekt Deutscher Berufs- und Erwerbssimkerbund e. V.
- Troszkiewicz J. (1993) - Materiał hodowlany w pasiekach uznanych za zarodowe. *Pszczelarstwo*, 3: 15-16.
- Woyke J. (1998) - Zasady pracy hodowlanej. In: *Pszczelnictwo* pod red. J. Prabuckiego. Wydawnictwo „Albatros”, Szczecin.
- Żabicki S., Skubida P. (2004) - Czy warto hodować pszczoły włoskie i Buckfast? *Pszczelarstwo*, 6: 18-19.

OCENA CECH UŻYTKOWYCH PSZCZÓŁ BUCKFAST

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

Celem badań była ocena cech użytkowych pszczół Buckfast (Bcf) na tle mieszańców pszczół kaukaskich (cau x car) w warunkach północnej Lubelszczyzny. Badania prowadzono przez dwa sezony, a grupy liczyły po 10 rodzin. Zimotrwałość oceniano na podstawie liczby martwych pszczół wybieranych z dna uli, oraz stopnia porażenia rodzin przez *Nosema apis*. Rozwój wiosenny oceniano na podstawie pomiarów powierzchni czerwiu oraz dynamiki przyrostu czerwiu między pomiarami. Miara siły rodzin była liczba plastrów obsiadanych przez pszczoły. Rojliwość oceniano na podstawie liczby rodzin, w których stwierdzono nastrój rojowy. Miara wydajności miodowej była masa pozyskanego miodu. Po ostatnim miodobraniu szacowania masę miodu pozostawionego w gniazdach rodzin.

W pierwszym sezonie rodziny Bcf straciły więcej pszczół niż cau x car, w drugim zimowały nieznacznie lepiej do cau x car. Nie stwierdzono także zwiększonej podatności Bcf na *Nosema apis*. Bcf rozwijały się nieco słabiej od cau x car. Cechowała je mała skłonność do rójki. Pod względem wydajności miodowej Bcf nie odbiegały znacznie od cau x car, chociaż były gorsze w warunkach słabego pożytku. Bcf składały mniej miodu w gnieździe niż cau x car.

Pod względem zimowli, rozwoju wiosennego i skłonności do rójki Bcf spełniają oczekiwania pszczelarzy z Lubelszczyzny, gdzie zadowalające wykorzystanie wczesnych pożytków zależy od dobrej zimowli i intensywnego rozwoju wiosennego. Pod względem wydajności miodowej dorównują one rodzinom mieszańców cau x car.

Słowa kluczowe: Buckfast, ocena, cechy użytkowe.