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ECOTYPES DIFFERENTIATION WITHIN HONEYBEE (*APIS MELLIFERA CARPATICA*) FROM TRANSYLVANIA

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Abstract. The honeybee ecotypes differentiation from Transylvania are the results of organism`s adaptation at different environmental conditions. Behindhand characteristic morphometric measurements it can be differentiated some ecotypes of *Apis mellifera carpatica*. In this way, were measured the honeybees from 4 Transylvanian region: Silvasu de Campie (plain), Sagu (plain), Beclean (mountain) and Sibiu (mountain). The results confirm a mixture between the ecotypes from the Transylvanian regions, and the same characteristics showed last years are not any more presented. This things are the results of transhumance apiculture.

INTRODUCTION

The honeybee races are the results of natural selection and the environmental conditions (climate, floral resources). The adaptation to the different climate conditions lead to honeybee races spreading around the world. Traditional apiculture managed the crossing within these races from some European regions, due to the fact that these species were half-tamed, breaded and grown from prehistoric periods. First subspecies classification based on morphometric measurements regarding size and colors. The bases of morphometry were established by G. A. Cojevnicov in 1898s, who realized the first measurements to the Caucasian honeybee tongue and he proposed the measurement the chitin parts.

Apiculture in Romania: Within the irano-mediteranian group's the one which lives in carpato-danubian region, Romanian zone, it is the *Apis mellifera carpatica* (Foti, 1962) ecotype. The Mediterranean climate interferences from occident, warm and humid with the continental climate from East, drying and great temperature differences, which can be find on varied relief, from the plain to the mountain, made a plurality of ecology factors that contributed at the development of some ecotype within the race. Within this population can be differentiating 5 ecotypes: from Vest Plain, from Transylvania, from the mountain, from Moldova and from the steppe. These ecotypes are differentiated about some morphologic characters: length of proboscis, length of body, length of metatarsus and tibia, length of the fist wing, cubital index.

Morphometrical studies which are on the base of our study were described by Ruttner in 1988. He examined and classified the honeybees from all around the world: he described 39 morphometric characters. In the book „Biogeography and Taxonomy of Honeybees" it is not exactly define the position of honeybee's races, because were harvested a small number of samples from every region. Morphometrical studies were realized all around the world: Philippine (Aurora C. Tilde, 2002), Thailand (Chaiyawong Thadsanee, 2004), Turkey, Greece, China (Tan Ken, 2003), Slovenia, Kenya, Uruguay, Serbia etc.

In the variability analyses at all *Apis mellifera* species become obviously that different parts of body has different function. In this way, the legs and the proboscis are abundant irrigate with hemolymphe and in this way produced a cool effect (Allen's rule). Like this, the legs and the proboscis has small dimensions in could areas. Appendices with temperature protective function (like the covering hair) follow Bergmann's rule (Marina D. Meixner, 2007).

The ecotype and races differentiation in Transylvanian region it is very important to conserve these adapted populations. Do to the transhumance beekeeping, the genes are crossed, and it will not be possible anymore to distinguish exactly the ecotype which is characteristic for a region.

As a consequence of Romania adhesion to the European Union, the possibility that foreign beekeeper which grow other bee's race, like Buckfast, to come in our regions with bees for making transhumance apiculture, exists. In this way they decay the biodiversity ecotype of the Romanian honeybee.

MATERIAL AND METHODS

Honeybee samples was colected from 4 Transylvanian areas: 2 from plain region (Sagu-AR and Silvasu de Campie-BN) and 2 from mountain (Beclean-BV and Sibiu-SB). The honeybee samples procceded from traditional apiaries and it will avoided to get samples from the places where the transhumance are practiced. This is an important factor because in this way we can avoid to cross the genes within different population from Romania. The morphometric analyses were realised with Olympus Microscope, using the Quick Photo Micro 2,2 pc programme.

RESULTS AND DISCUSSIONS

The obtained results regarding lenght of proboscis, lenght of metatarsus, Cubital index and lenght of tibia are presented in Fig. 1, Fig. 2, Fig. 3 and Fig. 4.

After measurement development, some differences between mountain sample and plain samples can be notice.

Important differences can be notice at proboscis length (*Fig 2*). This is about 6 mm in mountain areas, 5.6 mm in plain at Sagu and 4.55 mm at Silvaşu de Câmpie.

These data are not in concordance with those obtained by Ruttner, so, in mountain area can be observed a growth of proboscis length.

Mărghitaş (2006) sustain that in Transylvanian area the proboscis length is about 6,44 mm, and this result is different from the other studies, because the average of proboscis length in Transylvania area is about 5,54 mm.

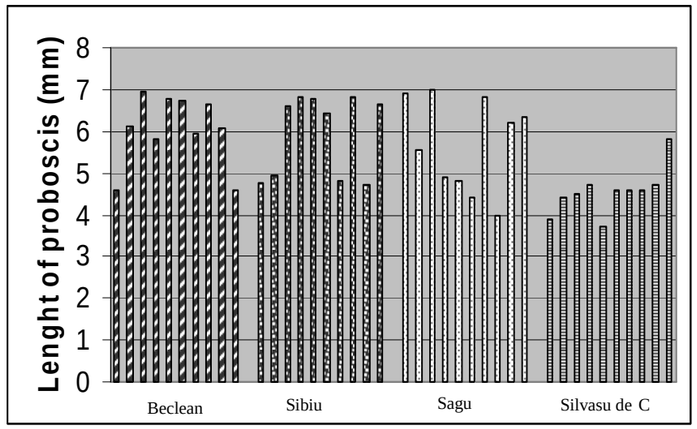
It was observed that in many apiaries which practiced transhumance exists the hybrid Buckfast of *Apis mellifera*. This thing goes to biodiversity degradation of ecotype.

More informations and correctly data will be obtained after enlarging the morphometric measurements.

Table 1 - Morphometrical measurements obtained at *Apis mellifera carpatica*

		oscis ght	Forewing lenght	Forewing width	Cubital index	Radial cells lenght	Angles									Hamuli no	Femurs lenght	Tibias lenght	M ta le
							A 4	B 4	D 7	E 9	G 18	K 19	L 13	N 23	O 26				
		,58	6,67	2,19	2,1	3,1	0,19	112,10	88,60	21,80	92,20	76,60	15,20	94,90	42,50	21	2,31	3,01	2
		,12	9,42	3,25	2,81	3,46	28,30	108,80	81,40	20,40	90,70	77,90	11,30	98,80	35,10	24	2,45	3,96	2
		,93	6,96	2,3	3,26	2,56	32,60	97,80	85,90	20,20	101,80	84,40	11,60	101,00	39,60	23	2,74	3,4	2
		,83	9,34	3,13	2,21	3,41	28,50	105,10	85,70	18,10	93,90	76,40	12,20	100,90	40,90	20	3,19	3,88	2
		,78	6,82	2,46	2,5	2,49	59,20	116,40	84,80	20,50	95,30	78,70	29,80	98,70	41,60	21	2,56	3,46	2
		,74	7,12	2,49	2,52	2,59	30,50	100,50	84,80	19,90	96,10	81,20	10,60	91,60	36,70	25	2,71	3,39	2
		,94	8,95	3,09	3,26	3,24	32,50	105,00	87,30	19,30	95,20	83,60	12,60	96,10	35,40	21	2,68	3,51	2
		,63	7,07	2,38	2,86	2,5	32,60	105,50	89,10	22,30	99,20	73,50	11,60	97,90	39,70	17	2,70	3,49	2
		,09	8,94	2,77	1,92	3,20	37,20	94,30	97,00	20,40	106,50	71,90	12,60	94,30	38,50	21	3,10	3,90	2
		,57	9,49	2,98	2,07	3,36	36,90	95,30	95,60	20,30	107,80	78,70	15,90	92,30	36,50	21	3,11	4,11	2
		,77	7,07	2,13	2,66	2,57	30,20	103,80	97,80	20,30	105,60	77,30	15,40	91,30	43,00	23	3,34	3,87	2
		,93	7,27	1,98	1,65	2,64	24,00	112,10	81,90	13,70	95,00	86,30	9,50	124,40	54,20	24	1,90	2,54	1
		,6	6,73	2,31	2	2,42	32,60	106,30	89,70	20,40	95,80	80,00	13,90	99,20	44,80	22	1,96	2,28	1
		,84	9,23	3,27	2,11	3,34	27,50	115,70	94,60	21,60	93,50	79,40	14,50	94,10	37,20	22	3,39	4,12	2
		,76	9,03	2,98	2,28	3,39	31,80	98,20	88,00	20,4	96,60	82,60	12,50	101,20	38,30		1,95	2,39	1
		,41	9,78	3,41	2,17	3,62	33,20	98,60	93,50	20,80	107,50	75,90	14,30	89,90	40,00	22	3,16	4,18	2
		,81	7,33	2,52	2,45	2,72	31,80	93,70	91,90	9,50	109,30	73,80	13,50	89,50	42,70	22	3,28	4,32	2
		,81	6,97	2,4	2,55	2,49	30,70	104,80	86,90	34,70	13,30	96,40	13,5	99,45	38,30	22	3,04	4,12	2
		,7	6,73	2,34	2,15	2,42	32,00	105,30	90,90	23,00	99,70	73,10	13,70	93,90		21	3,87	4,98	3
		,63	7,27	2,29	2,26	2,63	33,20	102,30	92,30	21,60	93,80	76,00	12,20	91,10	36,00	24	1,91	2,40	1
		,92	6,79	2,36	2,7	2,51	27,60	110,70	87,40	21,30	90,90	76,30	13,20	98,90	31,30	24	1,57	2,48	1
		,55	7,16	2,34	2,33	2,47	27,3	112,87	88,7	23,2	93	77,3	12,7	99,5	33,4	22	2,15	2,86	1
		,99	7,32	2,45	2,47	2,43	28,20	112,50	83,50	21,60	92,40	70,30	12,70	99,60	34,30	23	1,96	2,60	1
		,88	6,9	2,32	2,38	2,47	28,30	107,60	86,00	19,10	92,00	77,80	12,90	102,80	34,00	22	1,93	2,56	1
		,8	6,63	2,23	2,52	2,41	25,20	119,10	84,40	25,10	86,60	81,50	13,50	100,20	43,00	22	2,65	3,47	2
		,42	7,24	2,28	2,25	2,67	27,80	110,00	90,40	20,70	95,60	70,60	11,30	103,40	33,40	21	2,02	2,62	1
		,8	7,18	2,42	2,21	2,61	27,40	119,50	90,20	26,90	95,20	78,30	13,70	96,30	35,90	22	3,17	4,08	2
		4	6,77	2,36	2,26	2,47	27,30	114,80	88,70	24,30	91,60	76,10	12,10	97,00	36,30	22	2,50	3,21	2
		,2	6,71	2,45	2,1	2,43	28,20	110,00	85,70	23,40	85,70	80,20	13,60	91,30	27,90	23	1,74	2,40	1
		,33	6,57	2,21	2,1	2,38	29,70	112,10	91,10	24,70	97,20	77,40	11,50	89,30	36,40	20	1,84	2,35	1
		,9	10,1	3,3	3	3,3	29,20	107,10	97,70	19,30	100,40	70,00	19,50	104,60	36,10	22	2,5	3,3	2
		,4	6,5	2,1	3	2,4	30,30	110,70	99,60	21,00	85,20	71,70	18,80	92,90	43,00	24	1,9	2,1	2
		,5	9	3	2,5	3,3	30,50	106,40	98,50	21,80	95,50	80,2	16,30	92,10	33,70	23	2	2,2	2
		,7	9	2,6	1,66	3,4	30,80	111,20	106,20	23,60	99,40	83,80	15,50	90,20	39,60	21	2,5	3	2
		,7	8,3	2,9	3	3,1	31,40	102,90	120,10	22,30	90,80	80,40	14,20	95,00	33,60	22	2,8	3,6	2
		,6	8,8	2,8	3	3,3	26,50	116,20	86,10	19,80	89,80	80,30	14,00	98,70	44,50	24	2,4	3,1	2
		,6	6,4	1,9	2	2,4	26,40	116,80	92,30	18,20	86,10	80,20	13,00	88,60	34,50	22	2,4	3,1	2
		,6	6,8	2,6	2	2,5	26,20	114,50	92,30	22,10	89,70	77,00	14,40	93,30	28,10	22	2,7	3,3	2
		,7	8,5	2,6	1,66	3,2	31,20	106,00	98,80	20,00	97,60	83,20	14,60	102,20	32,60	24	3,4	4,2	2

		,8	7,3	2,3	1,86	2,6	27,10	119,20	92,90	21,60	93,90	82,40	12,20	91,10	49,20	21	2,5	3,2	



Beclean Sibiu Sagu

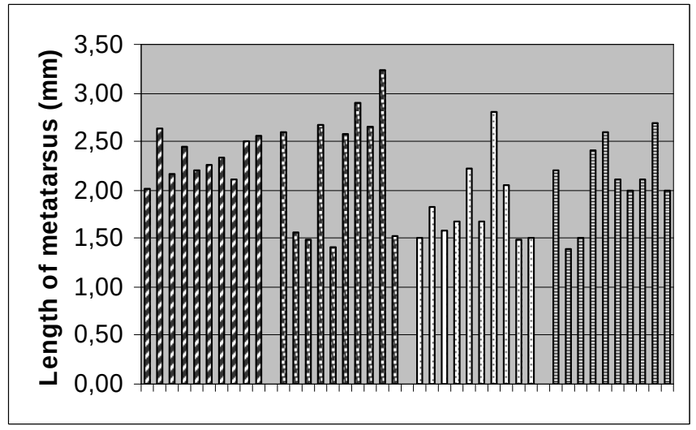


Fig. 1: *Lenght of proboscis*

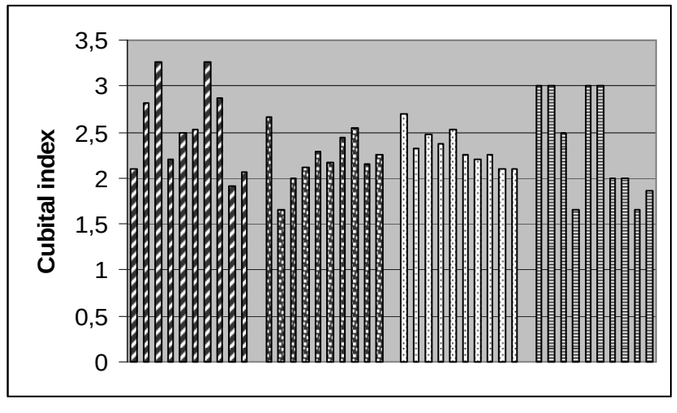


Fig. 2: *Lenght of metatarsus*

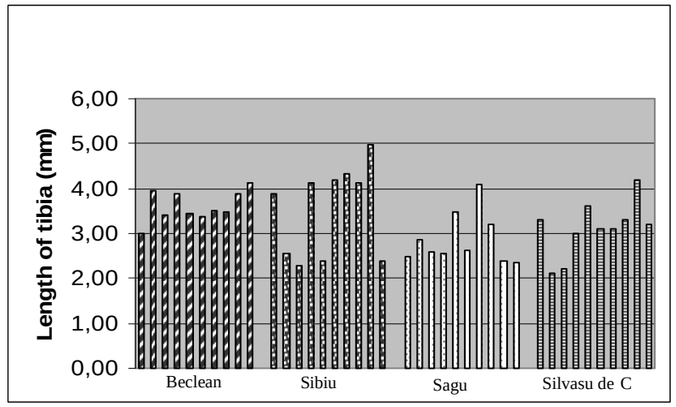


Fig.3:*Cubital index*

Fig. 4*: Tibia lenght*

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CONCLUSIONS

1. Few years ago similar studies were made by different authors, but the results obtained by those were very similar for *Apis mellifera carpatica*, in our region. This thing shows that the ecotypes were exactly separated.
2. In this period of time this thing is not happen any more due to the fact that the ecotypes are crossed. This is demonstrated by our study, and a motivation is give by transhumance beekeeping.

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