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Affinities between Dibra Honeybee Populations and *Apis Mellifera Carnica*

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Abstract

In Dibra district, 27 morphological traits were measured on 180 worker bee. Measurements were made in samples collected from three different locations: Sohodoll, Maqellar and Melan. The aim of this study was the quantitative evaluation of morphological traits for bees in in Dibra district and by using this evaluation we studied the affinities that exist for these morphological traits between Dibra population and subspecies of *Apis mellifera carnica*. The measurement of morphological traits was done using a contemporary method (Scan Photo technique). The average values of the measured parameters were: Cubital index (CI) (2.73mm), Angle A_4 (29.18), Angle B_4 (112.38), Angle D_7 (97.83), Angle E_9 (23.46), Angle G_{18} (90.01), Angle K_{19} (76.76), Angle J_{10} (54.12), Angle J_{16} (91.08), Angle N_{23} (96.05), Angle L_{13} (10.46), Angle O_{26} (36.5), Proboscis length (PL) (6.398mm), Forewing length **(**FWL) (9.406mm), Forewing width (FWW) (3.167mm), Femur length (FL) (2.434mm), Tibia length **(**TL) (3.217mm), Basitarsus length (BL) (2.073mm), Basitarsus width **(**BW) (1.231mm), Number of hooks (HA) (20.394), Sternite 3 longitudinal (LS_3) (2.8mm), Wax mirror of sternite 3 longitudinal (WL) (1.386mm), Wax mirror of sternite 3 transversal (WT) (2.396mm), Distance between wax mirrors of sternite 3(WD) (0.288mm), Tomentum (TOM A) (0.753mm), Length of hairs on tergite 5 (HLT_5) (0.2740mm), Longitudinal diameter of tergitite 4 (T_4) (2.14mm). The obtained data for 17 parameters have similar values with the same traits of *A.m.carnica*. We conclude that classification of Dibra population into the group of *Apis mellifera carnica*, could be a significant hypothesis.

Keywords: honeybee, morphometric traits, Scan Photo technique (SPT), *A.m.carnica*

1. Introduction

In this study morphometric measurements are performed on worker bee samples collected from different areas in Dibra district. Due to the introduction of queens of several breeds in Albania which may have led to the emergence of different hybrids and the fact that the district of Dibra is on the border with Macedonia from which there are many exchanges we thought to conduct this study to judge on the racial affiliation of the bee population in Dibra district. The aim of this investigation was the quantitative evaluation of morphological characters, for bees in Dibra district. By using this evaluation we studied the affinities that exist for these morphological traits between the Dibra population and subspecies of *Apis mellifera carnica.*

Materials and Methods

Three honeybee colonies were sampled from 3 different locations in Dibra district (Sohodoll, Maqellar and Melan). We randomly selected three stable colonies, with satisfactory health status, and in each colony we have taken three samples of 100 bees each. The sampling was done on the combs using the open mouth jar containing the cotton soaked in ether. The

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honeybees chosen for analysis were from inside of the hives. 20 worker bees from each sample (n=9) have been dissected and measured. 27 characteristics were measured in each worker bee and recorded in separate tables for each sample. The body parts of the bees were mounted on slides, scanned in the resolution of 4800 dpi and measured using the computer program Photoshop (H. Abo-Shara et al., 2012). Morphometric analyses were performed on the forewings, hind wings, on the hind legs, tergite 4, tergite 5, sternite 3 and proboscis of worker bees and all parts which are symmetrical are measured on the right organ. Preparations of dissected parts are registered in separate images as shown in Figure 1.

Figure 1: Hind legs image

Measurements were done by standard method (Ruttner et al., 1978). STATISTICS 7 and EXCEL program were used to make statistical analysis of data. Table 1, shows the external characteristics used in this study.

Results and Disscusion

In tables 1, 2 and 3 are given averages (x), minimum value (X_{min}), maximum value (X_{max}), variance (S^2), standard deviation (S) and variation coefficient (CV), which were measured for 27 analyzed traits and for the 9 bee samples.

Table 1: Statistical parameters of the head, wing and leg traits

Traits	**St.prm**	**Samples**									**Dibra**
		S_1	**S_2**	**S_3**	**S_4**	**S_5**	**S_6**	**S_7**	**S_8**	**S_9**	
(PL) Length of proboscis	X	6.195	6.31	6.39	6.71	6.69	6.675	6.285	6.105	6.225	6.398
	X_{min}	5.4	6	5.9	6	6.2	6.3	6.1	5.9	6	
	X_{max}	7	6.9	7	7	7.1	6.9	6.7	6.7	6.9	
	S^2	0.134	0.082	0.0977	0.0998	0.064	0.0398	0.0234	0.0615	0.1219	
	S	0.366	0.286	0.3127	0.3159	0.252	0.199	0.1529	0.2479	0.3491	
	CV	5.9	4.5	4.89	4.7	3.766	2.98	2.43	4.06	5.6	
FWL Forewing Length	X	9.39	9.505	9.38	9.445	9.475	9.375	9.28	9.43	9.38	9.406
	X_{min}	8.7	9.2	9	9.2	9.2	9	8.9	9.1	9.1	
	X_{max}	9.8	9.9	9.8	9.8	9.9	9.8	9.5	9.9	9.7	
	S^2	0.062	0.054	0.042	0.034	0.031	0.0588	0.0227	0.0495	0.03	
	S	0.249	0.2324	0.2049	0.184	0.177	0.2424	0.1506	0.222	0.173	
	CV	2.65	2.445	2.184	1.948	1.868	2.265	1.623	2.354	1.844	
FWW Forewing Width	X	3.155	3.2	3.13	3.175	3.18	3.19	3.11	3.165	3.205	3.167
	X_{min}	3	3	2.9	3.1	3.1	3	3	3	3.1	
	X_{max}	3.3	3.3	3.2	3.3	3.3	3.3	3.3	3.3	3.3	
	S^2	0.006	0.0073	0.0064	0.0051	0.006	0.0052	0.0073	0.0087	0.0037	
	S	0.077	0.085	0.08	0.0714	0.077	0.072	0.085	0.0933	0.061	
	CV	2.345	2.66	2.555	2.248	2.345	2.257	2.66	2.947	1.9	
FL Femur Length	X	2.415	2.32	2.425	2.385	2.395	2.405	2.395	2.565	2.605	2.434
	X_{min}	2.2	2.2	2.1	2.2	2.3	2.2	2.2	2.5	2.5	
	X_{max}	2.6	2.4	2.6	2.5	2.5	2.5	2.5	2.7	2.8	
	S^2	0.008	0.008	0.0114	0.0066	0.0026	0.0068	0.0057	0.0045	0.0047	
	S	0.089	0.089	0.107	0.0812	0.051	0.082	0.075	0.067	0.068	

	CV	3.685	3.685	4.612	3.4	2.13	3.41	3.13	2.612	2.61	
TL Tibia Length	X	3.255	3.21	3.235	3.175	3.2	3.245	3.225	3.19	3.217	3.217
	X_{min}	3.1	3.1	3.1	3	3	3.1	3.1	3.1	3	
	X_{max}	3.4	3.4	3.4	3.4	3.3	3.4	3.4	3.4	3.4	
	S^2	0.0068	0.0052	0.0087	0.0083	0.0074	0.0058	0.0062	0.0073	0.0066	
	S	0.082	0.072	0.093	0.0911	0.086	0.076	0.079	0.085	0.081	
	CV	3.41	2.24	2.87	2.87	2.69	2.34	2.45	2.66	2.517	
BL Basitarsus Length	X	2.055	2.07	2.02	2.05	2.065	2.045	2.04	2.17	2.14	2.073
	X_{min}	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2	
	X_{max}	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
	S^2	0.0079	0.0043	0.009	0.0058	0.0077	0.0099	0.0057	0.0022	0.0057	
	S	0.089	0.0655	0.095	0.076	0.088	0.099	0.075	0.047	0.075	
	CV	4.33	3.16	4.7	3.7	4.26	4.84	3.68	2.17	3.5	
BW Basitarsus Width	X	1.265	1.23	1.255	1.21	1.25	1.235	1.23	1.2	1.205	1.231
	X_{min}	1.2	1.2	1.2	1.1	1.2	1.2	1.1	1.1	1.1	
	X_{max}	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	
	S^2	0.0024	0.0022	0.0026	0.0031	0.0026	0.0024	0.0043	0.0021	0.0016	
	S	0.049	0.047	0.051	0.056	0.051	0.049	0.066	0.046	0.04	
	CV	3.87	2.17	4.06	4.63	4.06	3.97	5.37	3.83	3.32	
HA Number of hooks	X	21.1	19.4	20.25	20.8	19.75	19.35	20.85	21.3	20.75	20.394
	X_{min}	18	15	18	19	15	16	17	18	18	
	X_{max}	23	22	24	23	25	22	23	24	23	
	S^2	2.094	3.095	3.145	1.853	5.88	1.923	2.45	3.589	2.934	
	S	1.447	1.76	1.773	1.167	2.43	1.386	1.565	1.89	1.71	
	CV	6.86	9.1	8.75	5.61	12.3	7.16	7.5	8.87	8.24	

Table 2: Statistical parameters of the sternite 3, tergite 4 and tergite 5 traits

LS_3 Sternite 3, Longitudinal	X	2.81	2.785	2.78	2.785	2.795	2.775	2.8	2.85	2.82	2.8
	X_{min}	2.7	2.6	2.7	2.7	2.7	2.6	2.7	2.7	2.7	
	X_{max}	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3	2.9	
	S^2	0.0062	0.0077	0.0059	0.0034	0.0058	0.0051	0.0032	0.011	0.0048	
	S	0.079	0.088	0.077	0.058	0.076	0.071	0.056	0.1	0.069	
	CV	2.8	3.16	2.77	2.08	2.72	2.56	2	3.51	2.45	
WL Wax mirror of sternite 3 longitudinal	X	1.38	1.359	1.375	1.375	1.375	1.405	1.415	1.4	1.39	1.386
	X_{min}	1.3	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	
	X_{max}	1.4	1.5	1.4	1.4	1.5	1.5	1.5	1.6	1.5	
	S^2	0.0017	0.0047	0.0019	0.0019	0.003	0.0037	0.0024	0.0074	0.0041	
	S	0.041	0.069	0.044	0.044	0.054	0.06	0.05	0.086	0.064	
	CV	2.97	5.08	3.2	3.2	3.93	4.27	3.53	6.14	4.6	
WT Wax mirror of sternite 3 transversal	X	2.37	2.345	2.365	2.38	2.382	2.375	2.41	2.475	2.46	2.396
	X_{min}	2.3	2.2	2.2	2.3	2.24	2.3	2.3	2.3	2.4	
	X_{max}	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	
	S^2	0.0043	0.0058	0.0056	0.0039	0.0042	0.0051	0.0083	0.0062	0.0046	
	S	0.066	0.076	0.075	0.062	0.065	0.07	0.091	0.079	0.068	
	CV	2.78	3.24	3.17	2.61	2.73	2.95	3.78	3.19	2.76	
WD Distance	X	0.325	0.3	0.315	0.315	0.295	0.3	0.255	0.235	0.255	0.288
	X_{min}	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	
	X_{max}	0.5	0.4	0.3	0.4	0.4	0.4	0.4	0.3	0.3	
	S^2	0.003	0.0084	0.0013	0.0013	0.0037	0.0032	0.0058	0.0024	0.0026	

between wax mirrors St. 3	S	0.055	0.092	0.036	0.036	0.06	0.057	0.076	0.049	0.051	
	CV	16.9	30.6	11.43	11.43	20.34	19	29.8	20.85	20	
TOMA Width of Tomentum , tergite 4	X	0.735	0.765	0.775	0.795	0.75	0.63	0.735	0.74	0.855	0.753
	X_{min}	0.6	0.6	0.7	0.7	0.7	0.5	0.6	0.6	0.7	
	X_{max}	0.9	0.9	0.9	0.9	0.9	0.8	0.9	1	1	
	S^2	0.0056	0.0066	0.0041	0.0058	0.0037	0.0064	0.0066	0.0099	0.0068	
	S	0.0751	0.081	0.064	0.076	0.061	0.08	0.081	0.099	0.08	
	CV	10.2	10.59	8.26	9.56	8.13	12.7	11	13.4	9.36	
HLT_5 Length of hairs on tergite 5	X	0.245	0.26	0.26	0.255	0.275	0.26	0.265	0.32	0.325	0.274
	X_{min}	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	
	X_{max}	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	
	S^2	0.0026	0.0025	0.0025	0.0026	0.0019	0.0025	0.0024	0.0017	0.003	
	S	0.05	0.05	0.05	0.05	0.043	0.05	0.049	0.04	0.055	
	CV	20.4	19.23	19.23	19.6	15.64	19.23	18.49	12.5	16.92	
T_4 Longitudinal diameter of tergitite 4	X	2.115	2.145	2.125	2.14	2.125	2.11	2.17	2.215	2.115	2.14
	X_{min}	2	2	2	2	2	2	2.1	2	2	
	X_{max}	2.2	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.2	
	S^2	0.0045	0.0068	0.0051	0.0046	0.0041	0.002	0.0054	0.0077	0.0035	
	S	0.067	0.082	0.07	0.067	0.064	0.045	0.073	0.087	0.059	
	CV	3.17	3.82	3.29	3.13	3	2.13	3.36	3.93	2.79	

Table 3: Statistical parameters of the cubital index and 11 forewing angles

CI Cubital index	X	2.566	2.825	2.825	2.825	2.566	2.608	2.683	2.808	2.875	2.73
	X_{min}	1.66	2.5	2.5	2.5	1.66	1.66	1.66	1.66	2.5	
	X_{max}	3	3	3.5	3	3	3	3	3.5	3.5	
	S^2	0.228	0.059	0.086	0.059	0.228	0.1	0.147	0.227	0.076	
	S	0.477	0.243	0.293	0.243	0.477	0.32	0.383	0.48	0.28	
	CV	18.6	8.6	10.37	8.6	18.6	12.27	14.27	17.1	9.74	
Angle **A_4**	X	29.37	29.66	29.115	28.69	27.915	28.49	29.985	29.7	29.71	29.18
	X_{min}	25.4	25.4	25.3	25.1	22.6	25.5	26.4	25.9	27.3	
	X_{max}	33.4	33.9	32	33.4	30.7	31.2	33.1	33.7	33.4	
	S^2	4.67	5.62	3.05	4.99	3.58	2.113	3.317	4.92	2.65	
	S	2.16	2.37	1.75	2.23	1.89	1.45	1.82	2.22	1.63	
	CV	7.35	7.99	6	7.77	6.77	5.1	6.1	7.47	5.49	
Angle **B_4**	X	111.96	110.8	110.78	114.61	115.47	114.77	108.88	112.37	111.83	112.38
	X_{min}	104.2	101.7	105.7	107	109.3	110.1	100.5	101.7	101.7	
	X_{max}	121.6	120.6	122	122.3	126	119.5	117.2	125.9	117.5	
	S^2	21.52	28.77	16.34	23.68	20.74	6.3	24.78	37.37	13.6	
	S	4.64	5.36	4.04	4.87	4.55	2.51	4.98	6.1	3.69	
	CV	4.14	4.84	3.65	4.25	3.94	2.2	4.57	5.43	3.3	
Angle **D_7**	X	97.725	96.525	95.54	99.7	99.465	99.71	97.315	97.29	97.19	97.83
	X_{min}	89.2	90.7	90.1	92.8	89.8	93.6	91	91.1	87.5	
	X_{max}	103.51	102.2	102.5	107.6	107.3	106	103.2	101.9	104.4	
	S^2	14.55	11.65	12.86	10.32	22.06	11.29	12.79	9.11	15.96	
	S	3.8	3.4	3.57	3.2	4.69	3.36	3.58	3	3.99	
	CV	3.9	3.52	3.74	3.21	4.72	3.37	3.68	3.08	4.1	

Angle **E_9**	X	22.545	23.265	22.845	24.475	24.645	24.22	22.62	23.155	23.365	23.46
	X_{min}	20.5	20.1	19.9	21.1	21.7	22.5	19.6	19.5	20.7	
	X_{max}	25.4	27.8	25.4	26.6	28.3	27.3	27.1	28.1	27.2	
	S^2	1.93	3.13	1.95	1.88	3.58	1.28	4.596	2.99	2.59	
	S	1.39	1.77	1.39	1.37	1.89	1.13	2.14	1.73	1.61	
	CV	6.17	7.6	6.08	5.59	7.67	4.67	9.46	7.47	6.89	
Angle **G_{18}**	X	90.15	89.75	89.715	91.11	90.373	90.315	89.085	90.04	89.59	90.01
	X_{min}	86.1	85.3	83.8	84	86	86.2	82.8	83.9	84.9	
	X_{max}	94	94.6	95.7	95	93.9	94.8	94.7	94.4	92.8	
	S^2	5.76	6.3	9.55	5.7	6.24	5.87	9.14	11.34	2.98	
	S	2.4	2.5	3.09	2.39	2.49	2.42	3.02	3.37	1.73	
	CV	2.66	2.78	3.44	2.62	2.75	2.68	3.39	3.74	1.93	
Angle **K_{19}**	X	78.06	76.28	76.15	77.49	76.975	76.37	76.175	77.395	75.985	76.76
	X_{min}	74.4	71.1	71.8	73.4	72.2	71.3	69.3	73.3	70.5	
	X_{max}	81.7	86.1	81	84.2	81.7	81	81.4	83.4	79.4	
	S^2	5.41	10.42	5.65	6.78	6.28	7.74	9.21	8.01	6.49	
	S	2.33	3.23	2.38	2.6	2.5	2.78	3.03	2.83	2.55	
	CV	2.96	4.23	3.13	3.35	3.24	3.64	3.98	3.66	3.36	
Angle **J_{10}**	X	52.71	53.25	52.56	54.93	55.15	55.82	54.985	55.095	52.59	54.12
	X_{min}	47.7	48.3	45.2	50.7	49.4	48.6	48.6	51.2	46.7	
	X_{max}	57.9	60	57.5	60.2	62.1	62	60.1	60.4	60.1	
	S^2	11.82	7.38	9.34	8.26	12.78	12.44	13.25	7.14	16	
	S	3.44	2.72	3.1	2.87	3.57	3.53	3.64	2.67	4	
	CV	6.53	5.11	5.93	5.22	6.47	6.32	6.62	4.85	7.6	
Angle **J_{16}**	X	89.62	91.615	90.415	92.31	90.475	90.49	92.8	91.79	90.245	91.08
	X_{min}	82.3	85.9	83.5	84.2	82.1	85.7	88.1	85.3	80.1	
	X_{max}	98.4	98	99	99.9	99.2	95	102.6	100.3	98.3	
	S^2	15.96	8.84	14.28	13.7	15.09	5.96	11.04	17.02	25.86	
	S	3.99	2.97	3.78	3.7	3.88	2.44	3.3	4.13	5.08	
	CV	4.45	3.24	4.18	4	4.29	2.69	3.56	4.49	5.6	
Angle **N_{23}**	X	97.015	96.875	95.625	97.075	96.5	96.29	95.755	95.36	93.95	96.05
	X_{min}	87	91.4	91.6	91.8	87.1	92.8	88.9	90.1	81.4	
	X_{max}	101.7	103.1	99.8	101.9	102.9	101.6	100.2	100	102.5	
	S^2	10.9	8.77	7.16	8.53	14.69	6.94	15.31	8.94	21	
	S	3.3	2.96	2.68	2.92	3.83	2.63	3.91	2.99	4.58	
	CV	3.4	3.1	2.8	3	3.97	2.73	4.1	3.14	4.87	
Angle **L_{13}**	X	10.285	10.58	10.35	9.87	10.765	10.73	10.04	10.385	11.13	10.46
	X_{min}	9.2	8.4	8.6	8.2	9.3	9.6	9.2	9.2	9.3	
	X_{max}	12.9	13.1	12.7	11.7	12.8	12.9	12.7	11.4	12.2	
	S^2	1.05	1.37	1.16	1.1	0.79	1.28	1.71	0.51	0.53	
	S	1.02	1.17	1.1	1.05	0.88	1.13	1.31	0.71	0.73	
	CV	9.92	11.1	10.6	10.6	8.2	10.53	13	6.8	6.46	
Angle **O_{26}**	X	35.29	35.215	39.265	37.105	35.44	35.37	35.45	38.15	37.215	36.5
	X_{min}	30.8	31.2	32.3	32.5	31.3	29.6	28.4	30.2	31.9	
	X_{max}	41.3	44.5	46	41.1	40.7	42.8	42.6	40.6	40.8	
	S^2	11.39	11.72	12.11	5.39	6.87	12.34	13.59	20.4	6.18	
	S	3.37	3.42	3.48	2.32	2.6	3.5	3.69	4.52	2.48	
	CV	9.55	9.7	8.86	6.25	7.34	9.89	10.4	11.8	2.66	

Variation intervals of the cubital index in the observed samples ranged from 2.566 to 2.825mm, with an average value of 2.73mm. The obtained value is within the values presented by other authors for the carnica

race. In the studies of Ruttner (1973), the value of the cubital index ranges from 2.4 to 3mm. D Kauhausen-Keller & R Keller (1994) stated that the value of the cubital index is 2.7mm. Variation intervals of the angle A_4 in the observed samples ranged from 27.915 to 29.985, with an average value of 29.18. The obtained value is within the values presented by other authors for the *Apis mellifera carnica*. In the studies of V Maul & A Hähnle (1994), the value of angle A_4 is 29. DAWINO protocol stated that the value of angle A_4 is 30.1. While the carnica race from ex-Yugoslavia had a value of 29.04 (morphometric bee data bank of the "Institut fur Bienenkunde"), and carnica from Austria had a value of 29.196 (morphometric bee data bank of the "Institut fur Bienenkunde").

Angle B_4 in the observed samples ranged from 108.88 to 115.47, with an average value of 112.38. The obtained values for this trait are within the range of values for the carniolan race. According to V Maul & A Hähnle (1994), angle B_4 in the carniolan race is 112.7, according to Mirella Leporati., Marina Valli., Sandro Cavicci (1984) angle B_4 is 112.6. While *A.m.carnica* from Austria had a value of 112.62 (Institut fur Bienenkunde). Angle D_7 ranges from 95.64 to 99.71, with an average value of 97.83. The results are consistent with the values of carnica the race from ex-Yugoslavia (98,075) (Institut fur Bienenkunde).

The variation interval for angle E_9 ranges from 22.545 to 24.645, with an average value of 23.46.V Maul & A Hähnle (1994) obtained a value of 23.3 for this angle. According to the DAWINO Protocol value of this angle for *A.m.carnica* is (23.4). As we see the results for this trait are consistent with the values of *A.m.carnica*. The average value of angle G_{18} in the observed sample was 90.01, while the variation interval ranges from 89.085 to 91.11. A similar average value for carnica race (89.8) was determined by DAWINO protocol and by morphometric bee data bank of the "Institut fur Bienenkunde" for carnica from ex-Yugoslavia (90.78). The average value of angle J_{10} in the observed sample was 54.12 and the variation interval ranges from 52.56 to 55.82. The obtained data for this trait are similar to data provided by DAWINO Protocol (54.6) for *Apis mellifera carnica.*

In the studied colonies proboscis length ranged from 6.105 to 6.71 mm with an average value of 6.398 mm. The data obtained for proboscis length have similar values that Ruttner (1973) states for the carniolan honey bee (6.4-6.8mm), and similar values with carnica from Austria (6,396mm) (Institut fur Bienenkunde). The variation interval for forewing length ranges from 9.28 to 9.505mm, with an average value of 9.406mm. These results are similar to that of Krivcov (1992) for the carnica race (9.00-9.40mm). A similar average value (9.403mm) was determined for *Apis mellifera carnica* from Austria (Institut fur Bienenkunde). Forewing width ranges from 3.11 to 3.205mm, with an average value of 3.167mm. The results are consistent with the values of carnica race from ex-Yugoslavia (3.182mm) (Institut fur Bienenkunde).

In the observed samples tibia length ranged from 3.175 to 3.255 mm, with an average value of 3.217 mm. The resulting average value coincides with the average value of carnica race from ex-Yugoslavia (3.221mm) (Institut fur Bienenkunde). Basitarsus length ranged from 2.02 to 2.17 mm, with an average value of 2.073 mm. Average value for this trait coincides with the average value of carnica race from ex-Yugoslavia (2.091mm) (Institut fur Bienenkunde). While the sternite 3 longitudinal ranged from 0.70 to 0.87 mm in the nine samples from Dibra district, with an average value of 2.8 mm. The obtained data are similar to carnica from Austria (2.808mm) (Institut fur Bienenkunde).

Wax mirror of sternite 3 longitudinal, with an average value of 1.386 mm, ranged from 1.359 to 1.415 mm. The obtained data are similar to carnica from Austria (1.363mm) (Institut fur Bienenkunde). Distance between wax mirrors of Sternite 3 with an average value of 0.288 mm, ranges from 0.235 to 0.325mm and obtained data are similar to carnica from ex-Yugoslavia (0.27mm) (Institut fur Bienenkunde). The average length of hairs on tergite 5 was 0.274mm, while the variation interval ranges from 0.245 to 0.325mm. The resulting average value coincides with the average value of *A.m.carnica* (0.28mm) presented by J.-M. Cornuet., J. Fresnaye., L. Tassencourt (1975). And the average value of longitudinal diameter of tergitite 4 (2.14mm) coincides with the average value of *A.m.carnica* from ex-Yugoslavia (2.199mm) (Institut fur Bienenkunde).

As it seems the obtained values of the observed parameters were consistent with the values that are characteristic to the carnica race. This may have occurred because of the limited movement of bees in these areas, they do not apply often migratory beekeeping between different areas. This may have happened also due to oriented exchange of genetic material. Few cases of importation of foreign queens were observed in this district. In most of those cases

that were observed, has occurred import of carnica race from eastern Balkan countries. We suggest extending the study to other areas of this district to have a wider coverage of the study area. We also suggest beekeepers to continue only with the introduction of the carnica breed in our country and not other breeds in order to preserve the race of our country (Kulici, M., Bajrami, Z., Kume K (2014) thus avoiding the emergence of non resistant hybrids to our geographical and pasture conditions.

Conclusion

We determined the ranges of variation for 27 morphological traits. This study demonstrated that 17 indices of the Dibra bee population had significantly similar values with those of *Apis mellifera carnica*. For this reason classification of the Dibra population into the group of *Apis mellifera carnica*, despite interventions and exchanges with neighboring countries could be a significant hypothesis.

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