

Online Material

Appendix I. Classification functions for discrimination of three honeybee subspecies using mean of 10 forewings from one **colony**. The forewings were described by **distances and angles** between vein junctions.

subspecies	a	b	d	A4	B4	D7	E9	G18	J10	K19
<i>A. m. carnica</i>	18899.1	15223.9	-536.1	331.9	119.8	94.7	43.2	22.9	-26.9	28.3
<i>A. m. caucasica</i>	18803.1	15291.1	-581.7	330.4	118.8	96.0	43.1	21.9	-25.9	27.4
<i>A. m. mellifera</i>	18921.3	15640.5	-597.3	332.5	120.6	95.2	38.0	22.0	-27.2	28.4

Appendix I (continued)

subspecies	L13	N23	O26	constant
<i>A. m. carnica</i>	72.3	82.7	29.3	-29600.4
<i>A. m. caucasica</i>	72.5	83.1	28.8	-29342.6
<i>A. m. mellifera</i>	75.3	84.5	29.6	-29751.2

Appendix II. Classification functions for discrimination of three honeybee subspecies using mean of 10 forewings from one **colony**. The forewings were described by the **coordinates** of vein junctions and centroid size (cs).

subspecies	1x	2x	3y	5x	6x	6y	7x	7y	10x	10y
<i>A. m. carnica</i>	-253978	-115566	-195657	-92220	-178295	324140	77289	294311	61072	-94837
<i>A. m. caucasica</i>	-254228	-113132	-194594	-91725	-178602	324907	78967	296801	62966	-95229
<i>A. m. mellifera</i>	-255299	-112018	-193365	-91045	-177039	320561	77541	297520	62173	-93404

Appendix II (continued)

subspecies	11x	11y	12x	12y	13x	14y	15y	16x	17y	18x
<i>A. m. carnica</i>	30505	88138	12618	-256408	190543	-30448	55858	262271	-58345	368756
<i>A. m. caucasica</i>	28393	91636	16447	-257139	189415	-31670	56254	263410	-55909	370060
<i>A. m. mellifera</i>	30969	90009	13660	-254730	190712	-32329	57650	263774	-56837	368259

Appendix II (continued)

subspecies	18y	cs	constant
<i>A. m. carnica</i>	143225	1781	-245328
<i>A. m. caucasica</i>	142248	1710	-245289
<i>A. m. mellifera</i>	145459	1762	-244317

Appendix III. Classification functions for discrimination of three honeybee subspecies using **single** forewing. The forewings were described by **distances and angles** between vein junctions.

subspecies	a	b	c	d	A4	B4	D7	E9	G18	J10
<i>A. m. carnica</i>	4075.34	3155.16	615.00	155.25	83.30	28.69	17.15	6.32	9.81	4.06
<i>A. m. caucasica</i>	4041.61	3152.67	613.02	140.25	82.94	28.40	17.55	6.27	9.66	4.18
<i>A. m. mellifera</i>	4061.79	3217.39	631.31	135.87	83.07	28.66	17.45	5.23	9.76	3.92

Appendix III (continued)

subspecies	J16	K19	L13	N23	O26	constant
<i>A. m. carnica</i>	14.61	11.67	6.30	8.94	5.63	-7994.24
<i>A. m. caucasica</i>	14.57	11.42	6.50	8.92	5.61	-7904.97
<i>A. m. mellifera</i>	14.65	11.67	6.73	9.11	5.70	-7992.28

Appendix IV. Classification functions for discrimination of three honeybee subspecies using **single** forewing. The forewings were described by the **coordinates** of vein junctions and centroid size (cs).

subspecies	1x	2x	2y	3y	4x	4y	5x	5y	6x	6y
<i>A. m. carnica</i>	-88396.2	-65395.6	73668.5	-15901.9	-56302.1	47707.5	-72589.8	30881.6	-42510.6	125098.9
<i>A. m. caucasica</i>	-88308.6	-65059.1	73699.8	-16024.0	-56333.7	47585.7	-72311.2	31055.8	-42520.1	125280.9
<i>A. m. mellifera</i>	-88639.9	-64886.0	73918.4	-15368.5	-56452.3	48004.1	-72417.3	30989.6	-42325.0	124364.6

Appendix IV (continued)

subspecies	7x	7y	8y	9x	10x	10y	11x	11y	12x	12y
<i>A. m. carnica</i>	6972.5	30361.6	36842.6	15680.3	-3412.0	9523.9	-4109.3	18248.3	-5526.0	-32558.7
<i>A. m. caucasica</i>	6890.7	30536.5	36691.1	15691.6	-3334.8	9724.0	-4279.7	18527.9	-5063.9	-32625.1
<i>A. m. mellifera</i>	6955.8	30331.7	36934.4	15735.7	-3343.4	9724.1	-4028.5	18385.1	-5567.3	-32461.8

Appendix IV (continued)

subspecies	13x	13y	14x	14y	16y	17x	17y	18x	cs	constant
<i>A. m. carnica</i>	6861.9	-33318.8	43010.6	60227.6	-49361.7	91985.6	-42640.4	42975.2	1230.8	-87421.8
<i>A. m. caucasica</i>	6769.1	-33260.3	42814.2	60145.3	-49173.1	91785.3	-42139.8	42901.6	1219.2	-87010.2
<i>A. m. mellifera</i>	6781.1	-33360.4	42988.6	59905.9	-49487.7	91822.5	-42874.5	42687.1	1226.9	-87019.5

Appendix V. Mean values of **distances and angles** describing forewing.

subspecies	a	b	c	d	A4	B4	D7	E9	G18	J10
<i>A. m. carnica</i>	0.626176	0.202318	0.883217	2.010233	28.09853	108.5262	93.9761	22.52686	98.93501	49.45519
<i>A. m. caucasica</i>	0.525944	0.231025	0.851363	1.956611	32.03879	103.5628	101.3087	20.90850	98.67491	51.30637
<i>A. m. mellifera</i>	0.533505	0.269788	0.865971	1.973236	29.87412	104.2515	100.8813	18.64765	99.93541	48.31194
all	0.561875	0.234377	0.866851	1.980027	30.00381	105.4468	98.7220	20.69434	99.18178	49.69117

Appendix V (continued)

subspecies	J16	K19	L13	N23	O26
<i>A. m. carnica</i>	101.1183	80.90713	13.92240	95.33635	35.40521
<i>A. m. caucasica</i>	99.4224	79.20062	14.55574	93.85485	35.42705
<i>A. m. mellifera</i>	101.7870	82.38411	14.94815	95.80810	37.32251
all	100.7759	80.83062	14.47543	94.99977	36.05159

Appendix VI. Mean values of aligned **coordinates** and centroid size (cs) describing forewing.

subspecies	1x	1y	2x	2y	3x	3y	4x	4y	5x	5y
<i>A. m. carnica</i>	-0.355517	-0.060097	-0.322758	-0.064247	-0.237353	0.077279	-0.232895	-0.012259	-0.228089	-0.157861
<i>A. m. caucasica</i>	-0.352307	-0.056946	-0.313726	-0.059965	-0.249671	0.077325	-0.238204	-0.013620	-0.217884	-0.154844
<i>A. m. mellifera</i>	-0.359813	-0.057543	-0.315363	-0.058972	-0.250742	0.076119	-0.240673	-0.011782	-0.219051	-0.153627
all (reference)	-0.355879	-0.058195	-0.317282	-0.061061	-0.245922	0.076907	-0.237257	-0.012554	-0.221675	-0.155444

Appendix VI (continued)

subspecies	6x	6y	7x	7y	8x	8y	9x	9y	10x	10y
<i>A. m. carnica</i>	-0.108757	0.088653	-0.022297	0.137749	-0.042552	0.109308	0.030825	0.051612	-0.027858	0.011561
<i>A. m. caucasica</i>	-0.113698	0.089778	-0.026700	0.140994	-0.048968	0.109797	0.028678	0.050614	-0.022371	0.014001
<i>A. m. mellifera</i>	-0.114157	0.084405	-0.024146	0.135741	-0.044180	0.106542	0.030564	0.048958	-0.020365	0.014147
all (reference)	-0.112204	0.087612	-0.024381	0.138161	-0.045233	0.108549	0.030022	0.050395	-0.023532	0.013236

Appendix VI (continued)

subspecies	11x	11y	12x	12y	13x	13y	14x	14y	15x	15y
<i>A. m. carnica</i>	0.045069	-0.044934	0.054779	-0.115304	0.085023	-0.168346	0.119209	0.124176	0.168832	0.074706
<i>A. m. caucasica</i>	0.048791	-0.045497	0.059946	-0.117527	0.089810	-0.170703	0.112704	0.126120	0.168115	0.072901
<i>A. m. mellifera</i>	0.049433	-0.042430	0.057038	-0.113441	0.087805	-0.165912	0.119559	0.120789	0.168869	0.071540
all (reference)	0.047764	-0.044287	0.057254	-0.115424	0.087546	-0.168321	0.117157	0.123695	0.168605	0.073049

Appendix VI (continued)

subspecies	16x	16y	17x	17y	18x	18y	cs
<i>A. m. carnica</i>	0.308844	0.003809	0.373590	-0.004098	0.391902	-0.051708	5.832256
<i>A. m. caucasica</i>	0.308785	0.001396	0.374397	-0.006705	0.392301	-0.057115	5.731783
<i>A. m. mellifera</i>	0.310304	0.001976	0.374660	-0.005538	0.390259	-0.050970	5.793806
all (reference)	0.309311	0.002394	0.374216	-0.005447	0.391487	-0.053265	5.785948