SUPPLEMENTARY FILE

Table S1. Detailed information regarding sample codes, botanical origins, harvesting times and sampling locations

Sample ID	Scientific name of the honey source plant	Common name	Harvesting time	Conformation of floral origin	Geographical location of the apiary in Iran
A	Ziziphus jujuba	Jujube	May 2022	Declared by beekeeper questionnaire	Khosf, South Khorasan Province
B	Alhagi maurorum	Camelthorn	June 2022	Declared by beekeeper questionnaire	Khaf, Razavi Khorasan Province
C	Alhagi maurorum	Camelthorn	June 2022	Declared by beekeeper questionnaire	Qaen, South Khorasan Province
D	Berberis vulgaris	Barberry	May 2022	Declared by beekeeper questionnaire	Qaen, South Khorasan Province
E	Ziziphus jujuba	Jujube	June 2022	Declared by beekeeper questionnaire	Zirkuh, South Khorasan Province
F	Citrus aurantium	Bitter Orange	May 2022	Declared by beekeeper questionnaire	Makran, Miandorud, Mazandaran Province
G	Robinia pseudoacacia	Acacia	May 2022	Declared by beekeeper questionnaire	Mashhad, Razavi Khorasan Province
H	Coriandrum sativum	Coriander	May 2022	Declared by beekeeper questionnaire	Navar, Razan, Hamadan Province
I	Forest honey	Forest	June 2022	Declared by beekeeper questionnaire	Mianroodbar, Nur, Mazandaran Province
J	Mountain honey	Mountain	July 2022	Declared by beekeeper questionnaire	Baladeh, Mazandaran Province
K	Citrus aurantium	Bitter Orange	May 2022	Declared by beekeeper questionnaire	Royan, Mazandaran Province
L	Ziziphus spina-christi	Persian Sidr	November 2021	Declared by beekeeper questionnaire	Lar, Larestan, Fars Province
M	Ziziphus spina-christi	Persian Sidr	November 2021	Declared by beekeeper questionnaire	Riz, Jam, Bushehr Province
N	Tilia begoniifolia	Linden	August 2022	Declared by beekeeper questionnaire	Siah Rudbar, Aliabad-e katul, Golestan Province
O	Eucalyptus camaldulensis	Eucalyptus	May 2022	Declared by beekeeper questionnaire	Bushehr, Bushehr Province
P	Mountain honey	Mountain	May 2022	Declared by beekeeper questionnaire	Tallhe, Dashtestan, Bushehr Province
Q	Coriandrum sativum	Coriander	December 2021	Declared by beekeeper questionnaire	Hamedan, Hamadan Province
R	Brassica napus	Rapseed	July 2022	Declared by beekeeper questionnaire	Bojnord, North Khorasan Province
S	Ziziphus spina-christi	Persian Sidr	December 2021	Declared by beekeeper questionnaire	Konarak, Sistan & Baluchestan Province
T	Astragalus spp.	Astragalus	July 2022	Declared by beekeeper questionnaire	Mount Shahjahan, Shirvan, North Khorasan Province
U	Eucalyptus globulus	Eucalyptus	July 2022	Declared by beekeeper questionnaire	Neka, Mazandaran Province
V	Tilia begoniifolia	Linden	August 2022	Declared by beekeeper questionnaire	Ramiyan, Golestan Province
W	Astragalus spp.	Astragalus	August 2022	Declared by beekeeper questionnaire	Qhahvaj, Avaj, Qhazvin Province
X	Thymus daenesis	Persian Thyme	December 2021	Declared by beekeeper questionnaire	Bandar Abbas, Hormozgan Province
Y	Oliveria decumbens	Oliveria	March 2022	Declared by beekeeper questionnaire	Tazian, Bandar Abbas, Hormozgan Province
Z	Robinia pseudoacacia	Acacia	July 2022	Declared by beekeeper questionnaire	Mashhad, Razavi Khorasan Province
AA	Berberis vulgaris	Barberry	June 2022	Declared by beekeeper questionnaire	Mud, Sarbisheh, South Khorasan Province
BB	Foeniculum vulgare	Fennel	August 2022	Declared by beekeeper questionnaire	Soltanabad, Sardrud, Razan, Hamadan Province

Table S2. Descriptive sensory characteristics of honey samples from different botanical origins

Sample	botanical origin	clarity	color	viscosity	duration of the aroma sensation after swallowing
A	Jujube	clear	dark	viscous	medium
B	Camelthorn	clear	light	normal viscosity	short (less than 30 s)
C	Camelthorn	clear	light	normal viscosity	medium
D	Barberry	clear	very dark	viscous	medium
E	Jujube	clear	dark	normal viscosity	medium
F	Bitter Orange	clear	light	very fluid	medium
G	Acacia	impurities	light	fluid	medium
H	Coriander	clear	medium	fluid	medium
I	Forest	air bubbles or foam	medium	normal viscosity	medium
J	Mountain	clear	medium	normal viscosity	medium
K	Bitter Orange	clear	light	fluid	medium
L	Persian Sidr	impurities	dark	viscous	medium
M	Persian Sidr	impurities	dark	viscous	long (longer than 5 min)
N	Linden	impurities	dark	fluid	long (longer than 5 min)
O	Eucalyptus	impurities	light	normal viscosity	short (less than 30 s)
P	Mountain	impurities	medium	normal viscosity	medium
Q	Coriander	clear	light	viscous	medium
R	Rapseed	impurities	very light	normal viscosity	medium
S	Persian Sidr	clear	dark	normal viscosity	medium
T	Astragalus	air bubbles or foam	very light	fluid	short (less than 30 s)
U	Eucalyptus	clear	medium	very fluid	medium
V	Linden	clear	dark	fluid	medium
W	Astragalus	clear	light	normal viscosity	medium
X	Persian Thyme	impurities	dark	viscous	medium
Y	Oliveria	impurities	very dark	normal viscosity	medium
Z	Acacia	clear	very light	viscous	medium
AA	Barberry	clear	very dark	viscous	long (longer than 5 min)
BB	Fennel	clear	dark	viscous	medium

Table S3. The complete sensory intensity scores for all 28 honey samples are presented in Table 1, while summary statistics and significant differences among botanical groups are discussed in the following sections.

S.	botanical origin	Olfactory intensity	Floral	Fruity	Warm	Aromatic	Chemical	Vegetal	Animal	Sweetness	Sourness	Bitterness	Saltiness
A	Jujube	5.56	3.8	1.28	0.53	0.72	0.16	2.3	0.56	6.6	2.8	1.2	0.2
B	Camelthorn	3.3	2.5	0.96	0.39	0.17	0.32	1.9	0.18	7.2	0.2	0	0
C	Camelthorn	3.83	2.75	1.76	0.75	0.24	0.48	1.6	0.87	6.4	1	0.4	0
D	Barberry	3	2.8	1.92	1.2	1.14	0	1.2	0	7.6	1	1	0.2
E	Jujube	6.9	4.3	1.68	0.95	0.72	0.56	2.7	0.95	6.2	3	1.2	0.4
F	Bitter Orange	8.6	3.5	1.52	0.25	2	0.48	0.87	0	7.2	1.2	0.8	0
G	Acacia	3.5	0.2	1.4	0.33	0.27	0.56	0.86	0	5.2	2.4	0.4	0
H	Coriander	7.3	4.5	1.84	1.6	0.84	0.32	3.7	0.06	4.4	0.6	1	1
I	Forest	3.7	3	2.08	2.17	1.26	0.56	3.23	0.6	3.8	2.2	4.4	1.2
J	Mountain	5.9	2.8	1.84	0.33	1.11	0.16	0.66	0.37	5.4	0.8	0.4	0.6
K	Bitter Orange	8	3.5	1.76	0.28	1.4	0.32	0.67	0.56	5.6	1.8	0	0
L	Persian Sidr	3.25	2.5	1.44	0.7	0.5	0.08	1.1	0.37	7.4	2	0.8	0.6
M	Persian Sidr	2.4	2.75	1.28	0.92	1.1	0	1.6	0.19	7.2	0.4	0.8	0.2
N	Linden	3.88	3.2	0.96	1.5	0.78	0	1.66	1.7	2.4	0.6	2.6	0.66
O	Eucalyptus	3.75	0.18	0.96	0.7	0.58	0.2	1.33	0.13	6.8	0.4	0.2	0.4
P	Mountain	4.25	2	1.44	0.37	0.32	0	0.22	0	7.8	1.4	0	0
Q	Coriander	7.2	4	0.64	0.17	0.24	0	0.23	0	5.8	0.6	0.4	1
R	Rapseed	2.8	0.3	1.2	0.2	0.23	0	0.86	0.25	7.4	0	0	0
S	Persian Sidr	4.83	2.2	0.48	0.7	0.78	0.64	0.43	0	7.8	0	1	0
T	Astragalus	4.17	0.5	0	0.42	0	0	0.46	0	5.8	0	0	0
U	Eucalyptus	4.16	0.45	0.8	0.45	0.78	0	0.43	0	6.6	2.2	1.4	0
V	Linden	3.88	3.5	0.96	1.08	0.75	0	2.23	1.7	3.6	1.4	1.4	0
W	Astragalus	3.9	2	1.36	0.64	0.86	0.4	0.9	0.13	5	2.6	0.4	0
X	Persian Thyme	2.3	2.75	0.96	0.28	0.87	0	0.43	0	6.2	0.4	0	0
Y	Oliveria	2.2	2	0.72	0.24	0.28	0.08	0.17	0	6.4	0.2	0.6	0.2
Z	Acacia	1.4	1.5	1.2	0.14	0.58	0	0.43	0	8.4	0	0	0
AA	Barberry	3.25	2.8	1.44	0.57	0.78	0.16	0.66	0	7.4	0.6	0.8	0
BB	Fennel	2.4	3	0.8	0.33	0.58	0	0.66	0.2	6.8	0	0.4	0.2

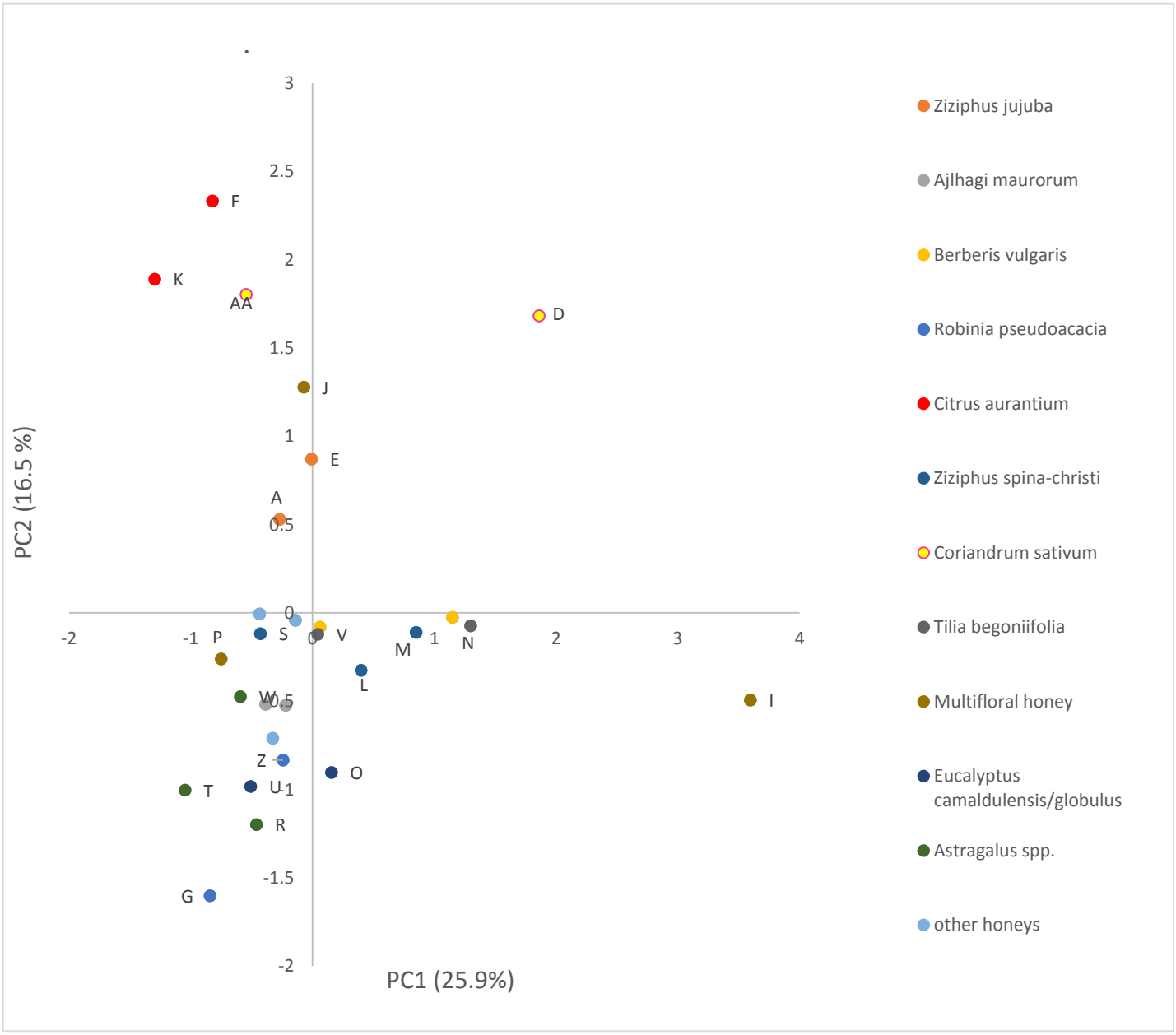


Figure S1. Score plot of PCA based on sensory attributes of honey samples. Samples are color-coded by botanical origin. Ellipses represent 95% confidence intervals for each group.

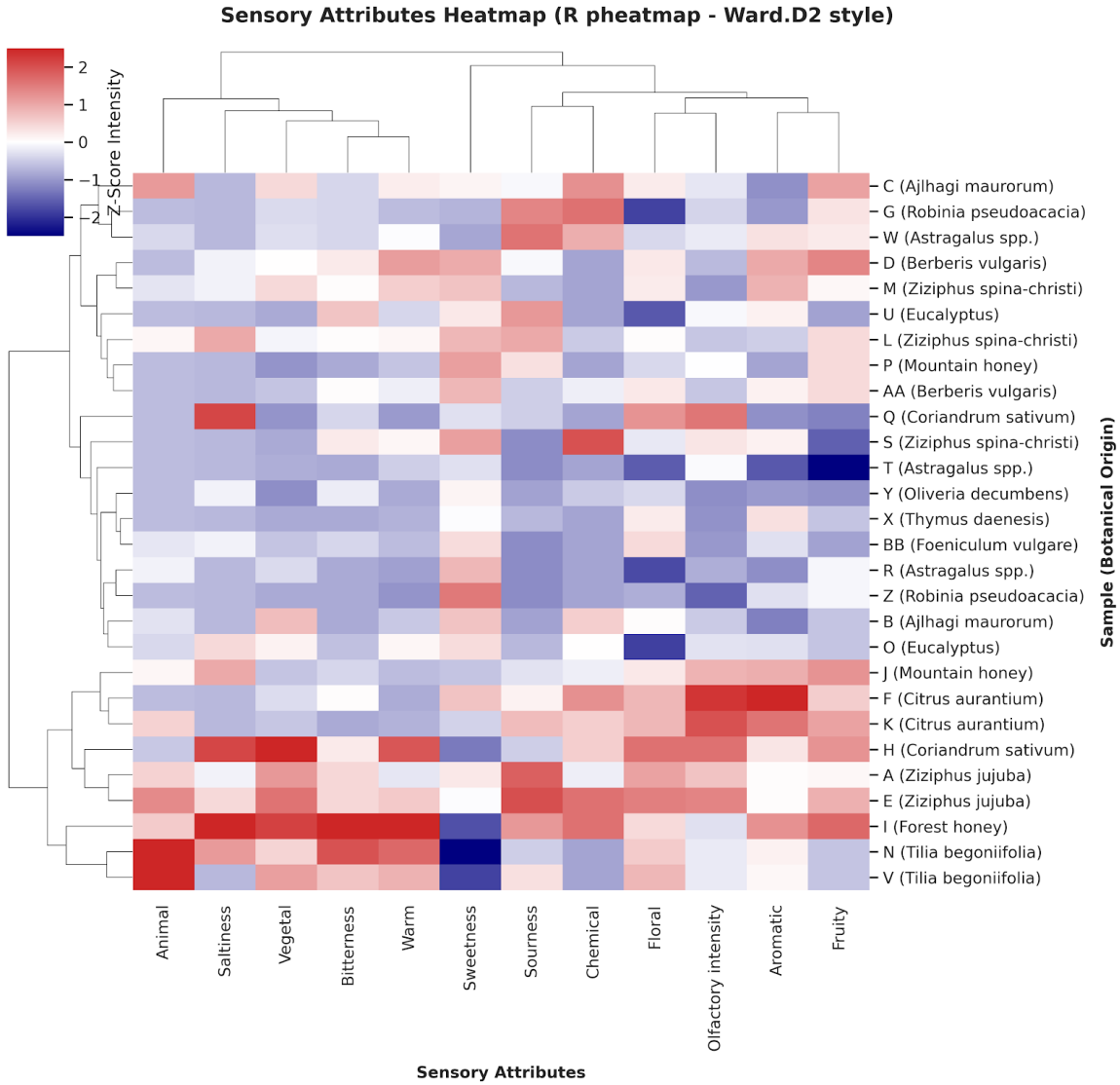


Figure S2. Heat map and hierarchical clustering of honey samples (n = 28) based on 12 sensory attributes. Colors represent Z-scored intensities (blue = low, red = high). Dendrograms are based on Euclidean distance and Ward's method. Samples with similar botanical origins generally clustered together, confirming the PCA results. B. vulgaris and T. begoniifolia formed a cluster with high bitterness and vegetal notes, while C. aurantium and Z. jujuba clustered based on floral and aromatic attributes.

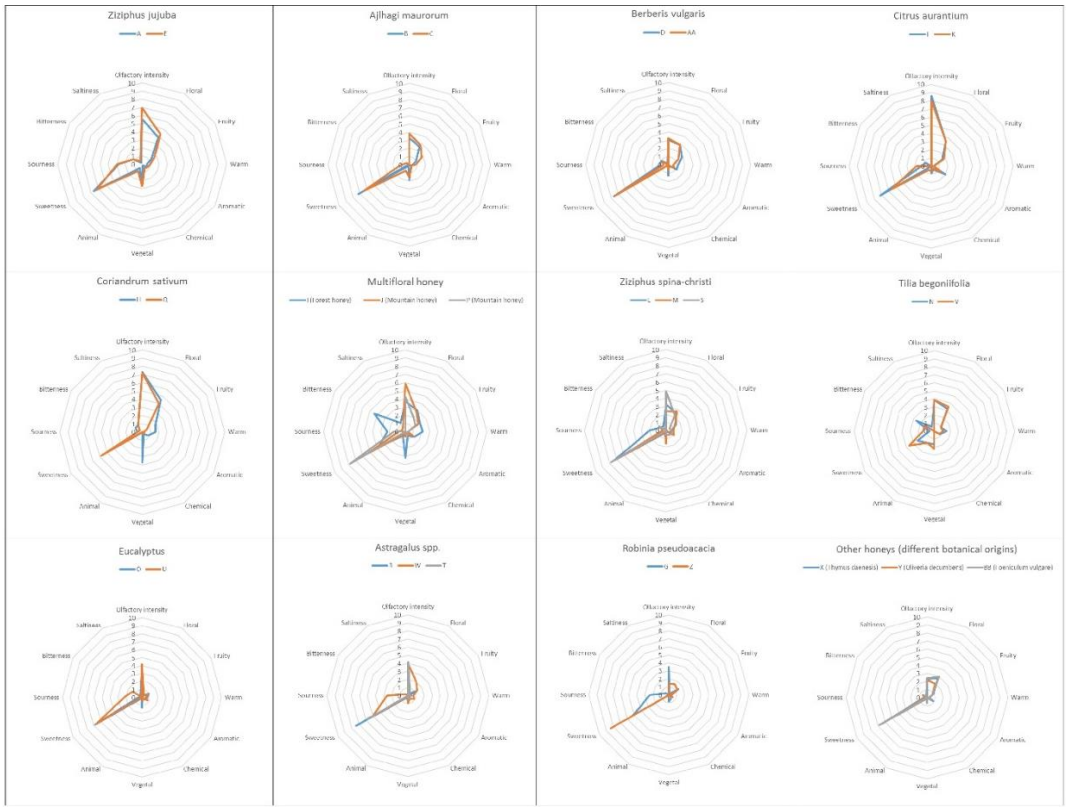


Figure S3. Radar plots illustrating the sensory profiles of honey samples according to botanical origin.