Acarological Studies
Vol 2 (1): 18-23

RESEARCH ARTICLE

Description of *Prozercon miraci* sp. nov. (Acari: Mesostigmata: Zerconidae) from Coastal Aegean Section in Turkey, with a key to the Turkish species

Raşit URHAN [1], Mehmet KARACA [2,3], Elif Hilal DURAN[1]

[1] *Department of Biology, Faculty of Science & Arts, Pamukkale University, Denizli, Turkey*
[2] *Department of Electronic & Automation, Denizli Vocational School of Technical Sciences, Denizli, Turkey*
[3] Corresponding author: karacamehmet@pau.edu.tr

Received: 12 November 2019 Accepted: 28 November 2019 Available online: 31 January 2020

ABSTRACT: Specimens of *Prozercon miraci* sp. nov. were collected from oak forest habitats in Coastal Aegean Section in Turkey and their identifications and illustrations were made. Definitions and drawings of female and male specimens, and immature stages were also given. In addition, an updated key to the species known from Turkey of this genus was included in this study.

Keywords: Acari, Mesostigmata, *Prozercon*, zerconid mite, new species, updated key.
Zoobank: http://zoobank.org/3C419586-A39F-43B6-9F87-9A397874752C

INTRODUCTION

Prozercon Sellnick, 1943 is one of the intensive genera of zerconid mites in terms of number of species in the world. Moreover, it is the second crowded genus of this family in Turkey. Thirty-five species of *Prozercon* have been recorded in Turkey up to now (Urhan and Duran, 2019; Urhan et al., 2019a,b). In the present study, *Prozercon miraci* sp. nov. was defined. The materials of new species were found during a research on diversity of zerconid mites in Coastal Aegean Section in Turkey. Identification of this new species will contribute to the acarological richness of our country.

MATERIALS AND METHODS

Examined specimens of *Prozercon miraci* sp. nov. in this study were found from forestland areas of Coastal Aegean Section. Different litter and soil samples including mites were collected from research area and GPS (Garmin GPSmap 62s) information were taken. Collected samples were carried to acarology laboratory and were put in Berlese funnels for extracting mites. Samples were kept for about 1 week in these funnels. After that, bottles including extracted mites were taken to Petri dishes. Then, zerconid mites were selected and collected under a stereo-microscope (Nikon SMZ745T). Collected mites were taken in 60% lactic acid. The illustrating of zerconids were done using a light-microscope (Olympus CX41) with DP25 camera. Examined specimens and holotype were taken in 70% ethanol and stored in Acarology Laboratory of Pamukkale University, Denizli (Turkey). During examinations of new specimens, Mašán and Fend'a (2004) terminology were used. Measurements of different body parts were presented as micrometers (µm). The characters of that new species were used to construct an updated key for Turkish *Prozercon* species.

RESULTS

Family: Zerconidae Canestrini, 1891

Genus: *Prozercon* Sellnick, 1943

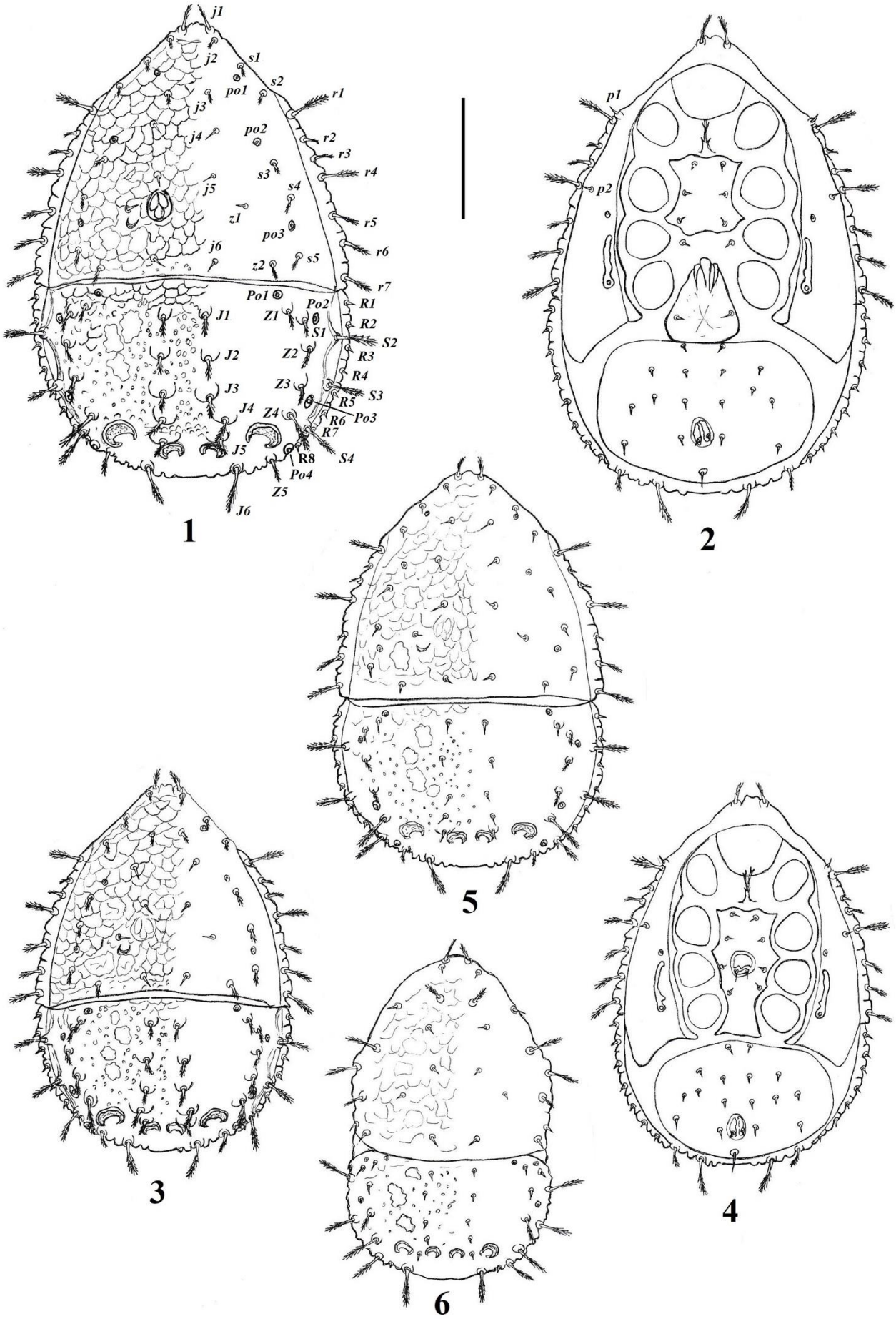
Type species: *Zercon fimbriatus* C.L. Koch, 1839

Prozercon miraci sp. nov. (Figs 1-6)

Type material. Holotype (female), soil and litter samples under oak trees (*Quercus* sp.), 39°18.321' N, 27°54.697' E, 395 m, Fırdanlar village of Manisa province, 7 January 2019. Paratypes: 11 females, 8 males, 6 deutonymphs and 3 protonymphs. All of them were collected from same locality with holotype.

Description. Female. Dorsal site (Fig. 1). Length (without gnathosoma) and width in holotype 337 and 240, respectively. Measurement of 11 paratypes; length 335–351, width 236–245. Shapes of idiosomal shields were illustrated in Figure 1. Dorsal fossae are clear and well developed. Moreover, outer cavities is 2–4 times larger than inners.

Dorsal setae (Fig. 1). 20 pairs of various setae present on podonotum: Number of setae in *j* series with 6 pairs, *z* series with 2 pairs, *s* series with 5 pairs and *r* series with 7 pairs. Setae j_1, r_1, r_4–r_7 markedly elongated, densely plumose, brush-like and apically rounded. Setae j_4–j_6 and z_1 short, smooth and needle-like. Remaining podonotal setae pilose or plumose. 23 pairs of various setae present on opisthonotum: Number of setae in *J* series with 6 pairs, *Z* series with 5 pairs, *S* series with 4 pairs and *R* series with 8 pairs. Setae J_1–J_5, Z_1–Z_3, Z_5 and S_1 plumose and apically tapering. Setae J_6, Z_4 and S_2–S_4 densely plumose, brush-like and apically rounded. Marginal setae R_1–R_8 short, smooth and thorn-like. Setae J_1–J_2 not reaching to insertion of following setae in related rows. Setae J_3 and J_4 reaching to insertion of next setae. Setae J_5 not reaching to posterior margin of opisthonotum. The interval between



Figures 1-6. General views of *Prozercon miraci* sp. nov. 1. Dorsal appearance of female. 2. Ventral appearance of female. 3. Dorsal appearance of male. 4. Ventral appearance of male. 5. Dorsal appearance of deutonymph. 6. Dorsal appearance of protonymph (Scale bar is equal to 100 micrometers).

Table 1. Mean lengths of opisthonotal setae and the distances between their bases in *J*, *Z*, and *S* rows of *Prozercon miraci* sp. nov. (Abbreviations: F: female, M: male, DN: deutonymph, PN: protonymph).

Setae	F	M	DN	PN	Setae	F	M	DN	PN	Setae	F	M	DN	PN
S_1	16	14	8	6	Z_1	16	13	8	6	J_1	16	15	9	5
S_1-S_2	26	24	18	14	Z_1-Z_2	34	26	28	20	J_1-J_2	32	30	26	21
S_2	30	24	27	27	Z_2	18	13	10	8	J_2	18	13	8	5
S_2-S_3	36	32	33	33	Z_2-Z_3	29	21	25	19	J_2-J_3	32	26	29	22
S_3	30	24	28	27	Z_3	20	15	15	18	J_3	17	14	7	5
S_3-S_4	42	30	36	34	Z_3-Z_4	26	19	23	21	J_3-J_4	20	16	16	15
S_4	28	24	28	26	Z_4	36	20	30	32	J_4	15	13	6	4
					Z_4-Z_5	40	25	26	24	J_4-J_5	18	12	12	12
					Z_5	22	15	12	3	J_5	10	9	5	3
										J_5-J_6	26	18	19	15
										J_6	32	26	28	27

Table 2. Comparison of *P. miraci* sp. nov., *P. buraki* and *P. sellnicki*.

	***P. miraci* sp. nov.**	***P. buraki***	***P. sellnicki***
Setae j_2 and j_3	plumose	smooth	plumose
Setae j_4, j_6 and z_1	smooth	smooth	plumose
Setae s_1-s_4	plumose	smooth	plumose
Setae S_1 and Z_5	long and plumose	short and smooth	long and plumose
Setae S_2 and S_3	plumose and reaching beyond the lateral margin of opisthonotum	pilose and not reaching beyond the lateral margin of opisthonotum	plumose and reaching beyond the lateral margin of opisthonotum
Seta Z_4	long, plumose and reaching beyond the lateral margin of opisthonotum	short, plumose and not reaching beyond the lateral margin of opisthonotum	short, plumose and not reaching beyond the lateral margin of opisthonotum

setae J_6 and J_6 is 62–68 apart. None of setae in *Z* series not reaching the insertion of next setae. Setae Z_4 are the longest of idiosoma and protrudes beyond posterior margin of opisthonotum. The interval between setae Z_5 and J_6 is 29–32 apart. Setae S_1 not reaching the insertion of setae Z_2. Setae S_2–S_4 reaching to beyond of lateral margin of opisthonotum.

Pores (Fig. 1). Pores po_1 are located on the line connecting setae s_1–j_3 closer to s_1. Pores po_2 are located above the line connecting setae s_3–j_4 closer to s_3. Pores po_3 are located on the line connecting setae s_4–s_5. Pores Po_1 are located anteroparaxially to insertion of setae Z_1. Pores Po_2 are located outside the line connecting setae S_1–Z_2 or located on the line connecting setae S_1–S_2 closer to S_1. Pores Po_3 are located on the line connecting setae S_3 and Z_4. Pores Po_4 are located on the line connecting setae S_4–Z_5.

Ventral site (Fig. 2). Chaetotaxy and shape of the peritrematal shield are characteristical for *Prozercon* species (Mašán and Fend'a, 2004).

Male (Figs 3-4). Length of idiosoma in 8 paratypes 272–290, width 191–203. Chaetotaxy of idiosomal setae, location of pores on idiosoma and ornamentation of dorsal

shields like in females. Interval between setae J_6 and J_6 is 49–54. The interval between setae Z_5 and J_6 is 20–26.

Deutonymph (Fig. 5). Length of idiosoma in 6 paratypes 268–290, width 189–200.

Podonotal setae j_1, r_1, r_4, r_6 and r_7 markedly elongated, densely plumose, brush-like and apically rounded. Setae r_3 and r_5 pilose or plumose, other podonotal setae short, smooth and needle-like. Opisthonotal setae J_1–J_5, Z_1 and setae in *R* series short, smooth and needle-like, setae S_1, Z_2, Z_3 and Z_5 plumose and other opisthonotal setae similar to r_1. The interval between setae J_6 and J_6 is 57–63. The interval between setae Z_5 and J_6 is 20–21.

Protonymph (Fig. 6). Length of idiosoma in 3 paratypes 208–253, width 137–161.

Podonotal setae j_1, j_3, r_3, r_4, r_6 and r_7 markedly elongated, densely plumose, brush-like and apically rounded. Other podonotal setae short, smooth and needle-like. Opisthonotal setae J_1–J_5, Z_1, Z_2, Z_5 and S_1 short, smooth and needle-like, other opisthonotal setae similar to r_3. The interval between setae J_6 and J_6 is 45–57. The interval between setae Z_5 and J_6 is 10–12.

Etymology. The name of the new species is dedicated to Miraç (son of the second author).

Remarks. Mean lengths and ranges of setae on opisthonotum are given in Table 1 for female, male, deutonymph and protonymph specimens. *Prozercon miraci* sp. nov. is quite similar to *P. buraki* Urhan 2008 and *P. sellnicki* Halašková, 1963. The distinctive morphological features of these three species are shown in Table 2.

Updated identification key for *Prozercon* species reported from Turkey (based on adult females)

1 (30) Marginal setae R_1 pilose, plumose and brush-like.

2 (5) An additional unpaired seta between setae J_4–J_4 usually present.

3 (4) Setae S_3 present ..... *P. bircanae* Urhan, 1998

4 (3) Setae S_3 absent ..... *P. kurui* Urhan, 1998

5 (2) An additional unpaired seta between setae J_4–J_4 absent.

6 (11) Setae S_3 absent.

7 (8) Podonotal setae different formed: in *j, z, s* and *r* setal rows smooth, pilose and plumose setae present .... *P. balikesirensis* Urhan, 2008

8 (7) All podonotal setae (except setae j_5) pilose or plumose.

9 (10) Marginal setae R_1 pilose or plumose, other *R* setae short and smooth ..... *P. yavuzi* Urhan, 1998

10 (9) All marginal setae of opisthonotum pilose or plumose ..... *P. erdogani* Urhan, 2010

11 (6) Setae S_3 present.

12 (25) All podonotal setae (except setae j_5) pilose or plumose.

13 (14) Setae R_2–R_4 short, smooth and thorn-like .... *P. morazae* Ujvári, 2011

14 (13) Setae R_2–R_4 long and pilose or plumose.

15 (16) Pores Po_3 situated outside the line connecting setae Z_3–Z_4 ..... *P. martae* Ujvári, 2010

16 (15) Pores Po_3 situated inside the line connecting setae Z_3–Z_4.

17 (18) Setae J_6 and Z_5 unilateral pilose or plumose and reaching parallely to tip posterior margin of opisthonotum ..... *P. banazensis* Urhan et al. 2015

18 (17) Setae J_6 and Z_5 bilateral pilose or plumose and not reaching parallely to tip posterior margin of opisthonotum.

19 (20) Setae S_1 short and smooth. *P. murati* Urhan, 2013

20 (19) Setae S_1 pilose or plumose.

21 (22) Setae S_2 and S_3 long, plumose and brush-like .... *P. kamili* Urhan and Ayyıldız, 1996

22 (21) Setae S_2 and S_3 short, pilose or delicately barbed.

23 (24) Pores Po_2 situated outside the line connecting setae Z_1–S_2, setae S_4 short and delicately barbed, setae J_3 not reaching the base of setae J_4 ....*P. umidicola* Urhan, 2002

24 (23) Pores Po_2 situated outside the line connecting setae Z_1–S_1, setae S_4 long and brush-like, setae J_3 reaching the base of setae J_4 .....*P. orhani* Urhan and Ayyıldız, 1996

25 (12) Podonotal setae different formed: in *j, z, s* and *r* setal rows smooth, pilose and plumose setae present.

26 (29) Setae R_2–R_5 short and smooth ....*P. giresunensis* Urhan, 2013

27 (28) Setae R_2–R_5 long and plumose.

28 (27) Setae z_2, s_5, S_2 and S_3 smooth .... *P. boyacii* Urhan and Ayyıldız, 1996

29 (26) Setae z_2, s_5, S_2 and S_3 pilose or plumose ....*P. mersinensis* Urhan, 1998

30 (1) Marginal setae R_1 short, smooth and thorn-like.

31 (36) Outer cavities considerably larger than inners.

32 (33) Setae j_2–j_3, s_1–s_4, Z_5 and S_1 short and smooth, S_2 and S_3 short, pilose and not reaching beyond the lateral margin of opisthonotum .....*P. buraki* Urhan, 2008

33 (32) Setae j_2–j_3, s_1–s_4, Z_5 and S_1–S_3 long and plumose, setae S_2 and S_3 reaching beyond the lateral margin of opisthonotum.

34 (35) Podonotal setae j_4, j_6, z_1 pilose or plumose, opisthonotal setae Z_4 pilose or plumose and not reaching to posterior margin of opisthonotum ....*P. sellnicki* Halašková, 1963

35 (34) Podonotal setae j_4, j_6, z_1 smooth, opisthonotal setae Z_4 strongly plumose and brush-like, reaching to posterior margin of opisthonotum ..... ***P. miraci* sp. nov.**

36 (31) All dorsal fossae uniform.

37 (40) Setae S_3 absent.

38 (39) Podonotal setae j_3–j_4, j_6, z_1–z_2, s_1–s_5 and opisthonotal setae Z_5 smooth ..... *P. celali* Urhan, 2010

39 (38) Podonotal setae j_3–j_4, j_6, z_1–z_2, s_1–s_5 and opisthonotal setae Z_5 pilose or plumose ....*P. denizliensis* Urhan, 2002

40 (37) Setae S_3 present.

41 (44) Setae j_5 pilose or plumose.

42 (43) Postero-lateral tip of peritrematal shield longer and reaching between the bases of marginal setae R_5 and R_6 ..... *P. graecus* Ujvári, 2011

43 (42) Postero-lateral tip of peritrematal shield shorter and reaching beyond the bases of marginal setae R_2 ....*P. plumosus* Ivan and Călugăr, 2004

44 (41) Setae j_5 smooth.

45 (46) Sternal shield divided 2 seperate parts . *P. blaszaki* (Urhan and Ayyıldız, 1996)

46 (45) Sternal shield not divided 2 seperate parts.

47 (48) Bases of *J* and *Z* setal rows large and bulb-like ....*P. bulbiferus* Ujvári, 2011

48 (47) Bases of *J* and *Z* setal rows uniform.

49 (50) Setae Z_3 short and not reaching posterior margin of opisthonotum .....*P. tragardhi* (Halbert, 1923)

50 (49) Setae Z_3 long and reaching posterior margin of opisthonotum.

51 (52) Setae r_2 short and smooth, J_1 not reaching the base of setae J_2 ..... *P. sultani* Duran and Urhan, 2015

52 (51) Setae r_2 pilose or plumose, J_1 reaching the base of setae J_2 ..... *P. satapliae* Petrova, 1977

53 (62) Setae S_1 smooth.

54 (57) Setae S_2 short, smooth and not reaching lateral margin of opisthonotum.

55 (56) Setae Z_5 plumose, z_2 and s_5 short and smooth ....*P. luxtoni* Urhan and Ayyıldız, 1996

56 (55) Setae Z_5 short and smooth, z_2 and s_5 plumose .... *P. turcicus* Urhan and Ayyıldız, 1996

57 (54) Setae S_2 long, plumose and reaching beyond the lateral margin of opisthonotum.

58 (59) Setae Z_1 smooth ..... *P. rekaae* Ujvári, 2008

59 (58) Setae Z_5 pilose or plumose.

60 (61) Postero-lateral tip of peritrematal shield shorter and reaching beyond the bases of marginal setae R_4 ....*P. fimbriatus* (C. L. Koch, 1839)

61 (60) Postero-lateral tip of peritrematal shield longer and reaching between the bases of marginal setae R_7 or R_8 ..... *P. carpathofimbriatus* Mašán and Fend'a, 2004

62 (53) Setae S_1 pilose or plumose.

63 (64) Setae S_1 with antero-lateral position the base of setae Z_1, pores Po_2 on the line connecting setae S_1–S_2 .... *P. rafalskii* Blaszak, 1971

64 (63) Setae S_1 with postero-lateral position the base of setae Z_1, pores Po_2 situated inside the line connecting setae Z_1–Z_2.

65 (66) Setae r_2 and Z_5 short and smooth ....*P. demirsoyi* Urhan and Ayyıldız, 1996

66 (65) Setae r_2 and Z_5 pilose or plumose.

67 (68) Podonotal setae j_1, z_2, s_5 and r_1–r_7 pilose and plumose, j_2–j_6, z_1, s_1–s_4 short and smooth with needle-like ....*P. artvinensis* Urhan and Ayyıldız, 1996

68 (67) Podonotal setae j_1, j_2, j_6, z_1, s_1, s_2, s_4, s_5 and r_1–r_7 pilose and plumose, j_3–j_5 and s_3 short and smooth .... *P. kafkasoricus* Urhan, 1998

Acknowledgements

Present study was supported by TÜBİTAK with 118Z101 project number. We also thank to Prof. Dr. Şevki ARSLAN (Department of Biology, Pamukkale University, Denizli, Turkey) for his linguistic corrections on manuscript.

REFERENCES

Halašková, V. 1963. On the genus *Prozercon* Sellnick 1943. Acta Societatis Entomologicae Cechosloveniae, 60: 145-169.

Mašán, P. and Fenďa, P. 2004. Zerconid mites of Slovakia (Acari, Mesostigmata, Zerconidae). Slovak Academy of Sciences, Institute of Zoology, Bratislava, 238 pp.

Urhan, R. 2008. Contributions to the genus *Prozercon* Sellnick, 1943 (Acari: Zerconidae) from Turkey, with the description of two new species and a key to species. Zoology in the Middle East, 45: 97-104.

doi: 10.1080/09397140.2008.10638312

Urhan, R. and Duran, E.H. 2019. Zerconid mites (Acari, Zerconidae) in Inner Aegean Region, with a new record for the Turkish fauna. Zootaxa, 4568: 323-336. doi: 10.11646/zootaxa.4568.2.7

Urhan, R., Karaca, M., Duran, E.H., Aksu, B. and Bilki, K. 2019a. A new record of the family Zerconidae (Acari: Mesostigmata) from Turkey: *Prozercon rekaae* Ujvári, 2008. 5th International Conference on Engineering and Natural Science, 12-16 June 2019, Prague, Czech Republic, 100-104.

Urhan, R., Karaca, M., Duran, E.H., Aksu, B. and Bilki, K. 2019b. *Prozercon sellnicki* Halašková, 1963: A new record of zerconid mite (Acari, Zerconidae) for Turkish fauna. 8th International Congress on Mathematics, Engineering, Natural and Health Sciences, 5-8 September 2019, Erzurum, Turkey, 259-260. [In Turkish]

Edited by: Salih Doğan
Reviewed by: Three anonymous referees

Citation: Urhan, R., Karaca, M. and Duran, E.H. 2020. Description of *Prozercon miraci* sp. nov. (Acari: Mesostigmata: Zerconidae) from Coastal Aegean Section in Turkey, with a key to the Turkish species. Acarological Studies, 2 (1): 18-23.