



Two new species of *Gaeolaelaps* (Acari: Laelapidae) from Iran

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Abstract

This paper reports on two new species of mites of the genus *Gaeolaelaps* in soil from Iran, *G. farajii* sp. nov., and *G. orbiculatus* sp. nov.. A key to the species of *Gaeolaelaps* with short peritremes is presented.

Key words: Taxonomy, soil, mite, chaetotaxy, Iran

Introduction

The family Laelapidae Berlese includes a multitude of morphologically and behaviourally diverse mites that are free-living or associated with arthropods, mammals and birds (Strong & Halliday, 1994; Faraji & Halliday, 2009; Lindquist *et al.*, 2009). Hypotheses concerning the evolutionary history of this family and its relatives are minimally developed and the classification of the group is consequently inadequate (Casanueva, 1993). *Gaeolaelaps* is one of the largest genera of laelapid mites (Kavianpour *et al.*, 2013). Over 80 species are currently included in the genus (Evans & Till, 1966; Karg, 1979, 1982, 1993, 2006; Beaulieu, 2009; Walter & Moser, 2010; Trach, 2012; Kavianpour *et al.*, 2013; Nemati & Kavianpour, 2013), 14 of which have been recorded in Iran (Faraji *et al.*, 2008; Kavianpour *et al.*, 2013; Nemati & Kavianpour, 2013). Two species of this genus, *G. jondishapouri* Nemati & Kavianpour, 2013 and *G. iranicus* Kavianpour *et al.*, 2013 have been described from soil and litter in Iran (Nemati & Kavianpour, 2013; Kavianpour *et al.*, 2013). In this paper we describe two new species of *Gaeolaelaps* that have the unusual property of short peritremes, and provide a world-wide to the species that share this character state.

Materials and methods

Mites were collected from soil and litter samples in Chaharmahal Va Bakhtiari and Khuzestan provinces in Iran. Mites were extracted from samples using Berlese funnels, cleared in lactic acid at 55 °C and slide-mounted in Hoyer's medium. Line drawings were made by use of a drawing tube and figures were prepared with Corel X-draw software, based on the scanned line drawings. Measurements of structures expressed as minimum-maximum ranges in micrometres (µm). The dorsal setal notation follows that of Lindquist & Evans (1965). Leg setal notation and chaetotactic formulae are based on Evans (1963). Length of the dorsal shield is the distance from its anteromedian edge anterior to the bases of setae *jl* to its posteromedian edge posterior to bases of setae *Z5*; width of the dorsal shield was measured at its widest part; length of the sternal shield was measured along the midline from its anterior edge to its posterior margin; its width was measured between coxae II (widest point) and slightly above the insertion of *st2* (narrowest point). The length of the anal shield is in the midline from the anterior margin to the posterior edge of the cribrum, and its width was measured at the widest point. Setae were measured from their insertions to their tips, and distance between setae as the distance between their insertions. Lengths of leg segments were measured dorsomedially, and tarsi were measured without the stalk and pretarsus. The holotypes and some of the paratypes are deposited in the Acarological Laboratory, Department of Plant Protection,

	length/width= 3:1; dorsal setae nearly equal in length (28–33 µm); idiosoma 400–480 µm long, 180–220 µm wide	
 <i>G. macra</i> (Karg, 1978)	
-	Dorsal shield with 39 pairs of setae; anal shield nearly rounded and wider than long; genital shield not as above, length/width= 2:1; dorsal setae nearly equal in length (15–20 µm); idiosoma 489–491 µm long, 270–276 µm wide	<i>G. orbiculatus</i> sp. n.
4.	Except <i>j1</i> and <i>Z5</i> all dorsal setae extremely reduced (5–7 µm long); <i>Z5</i> thrice the length of <i>J5</i> ; dorsal shield with 38 pairs of setae, 21 pairs on podonotum (lacks <i>s1</i>) and 17 pairs on opisthonotum; idiosoma 430–450 µm	<i>G. gleba</i> (Karg, 1979)
-	Dorsal setae not extremely reduced; <i>Z5</i> not as above	5
5.	Dorsal shield with 37 pairs of setae	6
-	Dorsal shield with 38–39 pairs of setae	8
6.	Podonotum with 20 or 22 pairs of setae	7
-	Podonotum with 19 (lacks <i>z2</i> , <i>s1</i> and <i>r3</i>) and opisthonotum with 18 pairs of setae (<i>R5</i> located on dorsal shield between <i>S4–5</i>); without <i>R</i> series on lateral cuticle; idiosoma 420–460 µm	<i>G. vertisimilis</i> (Karg, 1994)
7.	Podonotum with 20 (lacks <i>s1–2</i> , and has <i>r2–5</i>) and opisthonotum with 17 pairs of setae (with <i>Px1–2</i>); opisthonotum wider than podonotum; with <i>R1–2</i> and <i>R4</i> on lateral cuticle; idiosoma 350–360 µm	<i>G. verticis</i> (Karg, 1979)
-	Podonotum with 22 pairs of setae, with complete <i>s</i> - series; opisthonotum with 15 pairs of setae (without <i>Px1–2</i>); podonotum wider than opisthonotum; idiosoma 483–540 µm	<i>G. zhoumanshuai</i> (Ma, 1997)
8.	Dorsal shield with 38 pairs of setae (without <i>Px3</i>); dorsal shield smooth; without exopodal plates; with very thin peritrematal plate, poststigmatal plate narrow and expanded posteriorly to surround coxa IV	<i>G. orientalis</i> (Hafez <i>et al.</i> , 1982)
-	Dorsal shield with 39 pairs of setae (with <i>Px2–3</i>); dorsal shield reticulated; with exopodal plates; poststigmatal plate not surrounded coxa IV	9
9.	Genital shield extending close to anal shield, length/width nearly 3:1; <i>iv2</i> slit-like; <i>J2</i> located well laterad <i>J1</i>	10
-	Genital shield not extending close to anal shield, length/width nearly 2:1; <i>iv2</i> pore-like; <i>J2</i> located behind of <i>J1</i>	11
10.	Genital shield as wide as anal shield; <i>z3</i> absent; with <i>r2–5</i> ; margin of epistome like a pointed roof and serrate, <i>Z5</i> = 45–52 µm; idiosoma 650–670 µm	<i>G. cerata</i> (Karg, 1982)
-	Genital shield distinctly wider than anal shield; <i>z3</i> present; with <i>r2–4</i> ; margin of epistome arcuated and fine serrate, <i>Z5</i> = 50–56 µm; idiosoma 660–720 µm	<i>G. loksai</i> (Karg, 2000)
11.	With one pair of <i>zx</i> setae on podonotum, between <i>z4</i> and <i>z5</i>	<i>G. latopuga</i> (Karg, 2006)
-	Without <i>zx</i> setae on podonotum, between <i>z4</i> and <i>z5</i>	12
12.	Dorsal shield setae long enough to reach well past the base of next posterior seta, the length of <i>j5</i> is longer than distance between <i>j5</i> and <i>j6</i> , exterior margin of post-stigmatal plate with deep incision, sternal setae long enough to reach to the base of the next	<i>G. dailingensis</i> (Ma & Yin, 1998)
-	Dorsal shield setae shorter, central opisthonotal setae short, sometimes reaching base of next posterior seta but never past it, the length of <i>j5</i> is shorter than distance between <i>j5</i> and <i>j6</i> ; sternal setae shorter and not reach to the base of next	13
13.	Palp apotele 3-tined	<i>G. bregetovae</i> (Shereef & Afifi, 1980)
-	Palp apotele 2-tined	14
14.	Lateral margins of genital shield parallel	15
-	Lateral margins of genital shield not parallel, the widest area of genital shield located behind genital setae	16
15.	Surface of genital and sternal shields smooth; sternal shield with no defined anterior margin; the length of anal shield is 1.5 times as its width	<i>G. arabicus</i> (Hafez <i>et al.</i> , 1982)
-	Surface of genital shield with polygonal reticulation; sternal shields reticulated in lateral surfaces; sternal shield with well defined anterior margin; anal shield nearly as long as wide	<i>G. nolli</i> (Karg, 1962)
16.	Genital shield with scale-like reticulation, the distance between <i>j5–j6</i> 1.5 the length of <i>j5</i> ; <i>Z5</i> as long as other dorsal setae; setae <i>st4</i> located in soft cuticle	<i>G. koseii</i> (Hafez <i>et al.</i> , 1982)
-	Genital shield with polygonal reticulation, the distance between <i>j5–j6</i> is thrice the length of <i>j5</i> ; <i>Z5</i> longer than other dorsal setae; setae <i>st4</i> located on minute platelets	<i>G. similisetae</i> (Karg, 1965)

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