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A checklist to the Parasitid mites (Mesostigmata, Parasitidae) of Iran with nine new records and a key for Guilan Province Parasitidae species

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Abstract

The fauna of parasitid mites (Mesostigmata: Parasitidae) were studied in Guilan province, Northern Iran. A total of 14 species belonging to 5 genera from the family Parasitidae were collected and identified, of which nine species, *Cornigamasus lunaris*, *Eugamasus berlese*, *Eugamasus cavernicola*, *Gamasodes fimbriatus*, *Gamasodes spiniger*, *Parasitus kempersi*, *Parasitus loricatus*, *Vulgarogamasus kraepelili* and *Vulgarogamasus oudemansi*, are newly recorded from Iran. A checklist for Iranian parasitid mites and a identification key for Guilan Province Parasitidae species are provided.

Key words: Parasitidae, Mesostigmata, Fauna, key, Guilan, Iran.

Zusammenfassung

Die Fauna der parasitären Milben (Mesostigmata: Parasitidae) in der Provinz Guilan im Nord-Iran wird vorgestellt. Insgesamt 14 Arten aus fünf Gattungen der Familie Parasitidae konnten gesammelt und identifiziert werden, von denen neun Arten, *Cornigamasus lunaris*, *Eugamasus berlese*, *Eugamasus cavernicola*, *Gamasodes fimbriatus*, *Gamasodes spiniger*, *Parasitus kempersi*, *Parasitus loricatus*, *Vulgarogamasus kraepelili* und *Vulgarogamasus oudemansi* neu für die Fauna Irans nachgewiesen wurden.

Introduction

The parasitid mites fauna of Iran has poorly been studied. Up to now, 22 Parasitidae species (Acari: Mesostigmata) have been reported in Iran (KAMALI et al. 2001; PAKYARI 2006; KHEZRI 2006; RAHMANI 2011). These species belong to seven genera (Table 1).

Parasitidae is a family of predatory mites in the order Mesostigmata that has worldwide distribution. They are the only family in the superfamily Parasitoidea. Relatively large for mites, their color is often yellowish to dark brown. The family as a whole preys on a wide variety of microarthropods and nematodes, with individual species usually having a narrower range of prey. The family contains two subfamilies, 32 genera, and 363 species. The subfamily Pergamasinae is normally found in the soil, and dispersal via phoresy is not known in this subfamily. It contains 5 genera. Most species are bisexual. The subfamily Parasitinae is normally found in nests of small animals or insects or in decaying organic matter, from seaweed to forest litter. This subfamily contains 27 genera. These mites disperse via phoresy in the deuteronymph stage of their life cycle. The genus *Parasitellus* is associated with bumblebees, and other genus with other bees, leading to the common name "bee mites". Other genus disperses on various beetles, leading to the name "beetle mites" (HYAAT 1980; HALLAN 2008; LINDQUIST et al. 2009).

Materials and methods

A fanal study on parasitid mites was carried out in Guilan Province, Northern Iran during 2011-2012. Soil, debris, litters and plant foliage samples were collected from different parts of Guilan Province. Parasitid mites were extracted from samples by Berlese funnel. Specimens were cleared in Nesbitt fluids and mounted on microscopic slides using Hoyer's medium. The parasitid mites were identified by the relevant taxonomic keys and papers. The dorsal chaetotactic pattern is widely used as a taxonomic criterion in the Mesostigmata, and the system followed in the present work is that of LINDQUIST & EVANS (1965). The voucher material which comprises slide mounted specimens are deposited in the Department of Plant Protection at University of Guilan, Rasht, Iran.

Results

In the current study 13 species belonging to 4 genera from the family parasitidae were reported from Guilan province, Northern Iran. Nine species are new records for parasitid mites fauna of Iran. A checklist for known species of Iranian parasitid mites and a key for Guilan Province Parasitidae species are also provided. Detailed information of thirteen Parasitidae species from Guilan province with nine new species for Iran parasitid mites fauna are presented as below:

Table 1: Checklist of parasitid mite (Acari: Parasitidae) species in Iran.

NO	Species	Reference
1	<i>Holoparasitus minimus</i> (HOLZMANN 1955)	KAMALI et al. 2001
2	<i>Neogamasus cervicornis</i> (VANDAELE 1975)	KHEZRI 2006
3	<i>Parasitus americanus</i> (BERLESE 1905)	KAMALI et al. 2001
4	<i>Parasitus cavernicolus</i> (TRÄGÄRDH 1912)	KAMALI et al. 2001
5	<i>Parasitus concors</i> OUDEMANS & VOIGTS 1904	KAMALI et al. 2001
6	<i>Parasitus congener</i> OUDEMANS & VOIGTS 1904	KAMALI et al. 2001
13	<i>Parasitus consanguineus</i> (OUDEMANS & VOIGTS 1904)	KAMALI et al. 2001
8	<i>Parasitus eta</i> OUDEMANS & VOIGTS 1904	KAMALI et al. 2001
9	<i>Parasitus fimetorum</i> (BERLESE 1904)	KAMALI et al. 2001
10	<i>Parasitus furcatus</i> (G.& R. CANESTRINI 1882)	KAMALI et al. 2001
11	<i>Parasitus hyalinus</i> (WILLMANN 1949)	KAMALI et al. 2001
12	<i>Parasitus insignis</i> (HOLZMANN 1969)	KAMALI et al. 2001; PAKYARI 2006
13	<i>Parasitus islandicus</i> SELLNICK 1940	PAKYARI 2006
14	<i>Parasitus mammillatus</i> (BERLESE 1904)	KAMALI et al. 2001
15	<i>Parasitus mycophilus</i> KARG 1971	KAMALI et al. 2001
16	<i>Parasitus nollii</i> (KARG 1965)	KAMALI et al. 2001
17	<i>Pergamasus bidens</i> SELLNICK 1951	PAKYARI 2006
18	<i>Pergamasus faculiger</i> (BERLESE 1906)	KHEZRI 2006
19	<i>Pergamasus leruthi</i> COOREMAN 1951	KAMALI et al. 2001
20	<i>Poecilochirus necrophori</i> VITZTHUM 1930	RAHMANI 2011
21	<i>Rhabdocarpis mycophilus</i> (KARG 1965)	KAMALI et al. 2001
22	<i>Trachygamasus gracilis</i> (KARG 1965)	KAMALI et al. 2001

***Cornigamasus lunaris* (BERLESE 1882)**

Material examined: Deutonymph, Iran, Guilan province: Roudsar, Kelachay, -20m, 37°04'18"N 50°23'57"E, July 2011. Collected by M. Nazarari.

Distribution: Greenland, Iceland, Norway, Sweden, Holland, Belgium, Germany, Austria, Poland, Switzerland, Italy, former U.S.S.R.: Leningard district, Western Siberia and British Isles (KARG 1971; HYATT 1980).

***Eugamasus berlesei* WILLMANN 1935**

Material examined: Adult, Iran, Guilan province: Lahijan, 2m, 27° 15' 0" N, 50° 2' 0" E, July 2007; Fouman, Makluwan, 20m, 37°22'40"N 49°31'25"E, August 2007; Rasht, 4 m, 37°16'51"N, 49°34'59"E, July 2008, Rasht, Khomam, -18 m, 37°23'21"N, 49°39'30"E, July 2008; Sangar, Talem Seshanbeh 31 m, 37°10'56.10"N, 49°39'49.87"E, August 2010; Rasht, University of Guilan, 27 m, 37°11'55.03"N, 49°38'33.58"E, August 2010 Collected by J. Hajizadeh.

Distribution: Belgium, Germany, Poland, Austria, Italy, Western Siberia and British Isles (KARG 1971; HYATT 1980).

***Eugamasus cavernicola* TRÄGÄRDH 1912**

Material examined: Adult, Guilan province: Rasht, University of Guilan, 27 m, 37°11'55.03"N, 49°38'33.58"E, June 2007; Rasht, 4 m, 37°16'51"N, 49°34'59"E, June 2007; University of Guilan, 27 m, 37°11'55.03"N, 49°38'33.58"E, September 2007; Rasht, Saravan, 60 m, 37°07'41.08"N, 49°39'57.32"E, September 2009; Khomam, -18 m, 37°23'21"N, 49°39'30"E, April 2011; Lahijan, 2m, 27° 15' 0" N, 50° 2' 0" E, June 2012; Roudsar, -12m, 37° 13' 0" N, 50° 3' 0" E, June 2011; Roudbar, Rostamabad, Noghlebar, 1020m, 36° 88' 33" N, 49° 48' 33" E, May 2011; Fuman, Masouleh, 1001m, 37° 09' 1.16" N, 48° 59' 1.19" E, July 2011; Rasht, Emamzadeh Hashem, 107 m, 37°01'33.89"N, 49°37'44.62"E, July 2011. Collected by J. Hajizadeh.

Distribution: France, Belgium, Germany, Switzerland, Hungary, former Yugoslavia, Romania and British Isles (KARG 1971; HYATT 1980).

***Gamasodes fimbriatus* KARG 1971**

Material examined: Deutonymph, Iran, Guilan province: Sowme'e-Sara, Kelidbar, -20m, 37°18'0"N, 49°18'0"E, August 2007; Roudbar, Rostamabad, 1020m, 36° 88' 33" N, 49° 48' 33" E, May 2011. Collected by J. Hajizadeh.

Distribution: Baltic Coast and British Isles (KARG 1971; HYATT 1980).

***Gamasodes spiniger* (TRÄGÄRDH 1910)**

Material examined: Deutonymph, Chaboksar, 216m, 36° 58' 0" N, 50° 35' 0" E, July 2011. Collected by M. Nazarari.

Distribution: Sweden, France, Belgium, Germany, Austria, Switzerland, Italy, former U.S.S.R., Western Siberia, Poland and British Isles (HYATT 1980).

***Holoparasitus* sp.**

Material examined: Adult, Iran, Guilan province: Rasht, Saravan, 60 m, 37°07'41.08"N, 49°39'57.32"E, June 2007; Saravan, 60 m, 37°07'41.08"N, 49°39'57.32"E, July 2008; Kuchesfahan, -1 m, 37°16'42"N, 49°46'22"E, May 2009; Roudbar, 1050m, 36°32'00"N, 49°11'00"E, July 2010; Roudbar, Loushan, 491m, 36°65'00"N, 49°53'33"E, July 2010; Rasht, University of Guilan, 27 m, 37°11'55.03"N, 49°38'33.58"E, September 2009; Shaft, Emamzadeh Ebrahim, 1840m, 37°02'0"N, 49°26'0"E, July 2010; Rasht, Emamzadeh Hashem, 107 m, 37°01'33.89"N, 49°37'44.62"E, July 2010; Rasht, Kuchesfahan, -1 m, 37°16'42"N, 49°46'22"E, May 2011; Saravan, 60 m, 37°07'41.08"N, 49°39'57.32"E, May 2011. Collected by J. Hajizadeh. Chaboksar, Chayjan, 216m, 36° 58' 0" N, 50° 35' 0" E, July 2011; Langarud, 21m, 30° 10' 50" N, 11° 37' 0" E, October 2011. Collected by M. Nazarari.

***Paragamasus* sp.**

Material examined: Adult, Iran, Guilan province: Rasht, Kuchesfahan, Jafarabad, 0.91 m, 37°12'0"N, 50°20'0"E, July 2008; Rasht, 4 m, 37°16'51"N, 49°34'59"E, August 2008. Collected by J. Hajizadeh. Lahijan, 2m, 37° 12' 0" N, 50° 0' 0" E, July 2011, Collected by M. Nazarari.

***Parasitus coleopratorum* (LINNAEUS 1758)**

Material examined: Deutonymph, Iran, Guilan province: Rasht, Sangar, Shahrestan, 27 m, 37°09'71"N, 49°41'54"E, June 2007;. Amlash, 13m, 37°06'0"N, 50°11'0"E, July 2007. Collected by J. Hajizadeh.

Distribution: Iceland, the Faeroes, Finland, Holland, Belgium, Germany, Austria, Switzerland, Italy, Hungary, former Czechoslovakia, Poland, Western Siberia, Chile, British Isles (KARG 1971; HYATT 1980).

***Parasitus consanguineus* OUDEMANS & VOIGTS 1904**

Material examined: Deutonymph, Iran, Guilan province: Rasht, Aqa Seyyed Sharif, 30 m, 37°11'01.04"N, 49°30'57.42"E, August 2007; Fuman, Lishavandan, 20m, 37°22'40"N, 49°31'25"E, August 2007; Fuman, Masouleh, Makluwan, 1001m, 37° 09' 1.16" N, 48° 59' 1.19" E, July 2007; Rudbar, Lowshan, 491m, 36°65'00"N, 49°53'33"E, July 2010; Collected by J. Hajizadeh. Langarud, 21m, 37° 11' 0" N, 50° 9' 0" E, June 2011. Collected by M. Nazarari.

Distribution: Iceland, Sweden, Holland, Belgium, Germany, former U.S.S.R., Ukraine, Western Siberia, Greece, British Isles, Slovakia and Iran (KARG 1971; HYATT 1980; KAMALI et al. 2001; MAŠAN & HALLIDAY 2009).

***Parasitus fimetorum* (BERLESE 1903)**

Material examined: Adult, Iran, Guilan province: Manjil, 396m, , 36°44'0"N, 49°25'0"E, August 2007; Talesh, Hovigh, 45m, 48°53'38.26"N, 38°8'48.83"E, September 2007; Rasht, Sangar, 27 m, 37°09'71"N, 49°41'54"E, April 2011; Rudbar, Lowshan, 491m, 36°65'00"N, 49°53'33"E, June 2011; Roudbar, Rostamabad, 1020m, 36° 88' 33" N, 49° 48' 33" E, June 2011; Langarud, 21m, 37° 11' 0" N, 50° 9' 0" E, 27.VI.2011; Hashtpar, Asalem, 29m, 37°73'54"N, 48°95'33"E, June 2011. Collected by J. Hajizadeh. Roudsar, Rahimabad, 12m, 37°01'67"N, 50°31'67"E, July 2011. Collected by M. Nazarari.

Distribution: Iceland, Holland, Belgium, Germany, Austria, Switzerland, Italy, Poland, the U.S.S.R., Western Siberia, Canada, British Isles, Slovakia, Turkey, Iran (HYATT 1980; KAMALI et al. 2001; ÇOBANOĞLU 2001; MAŠAN & HALLIDAY 2009).

***Parasitus hyalinus* (WILLMANN 1949)**

Material examined: Adult, Iran, Guilan province: Shaft, Choubar, 47m, 37°09'24"N, 49°24'26"E, August 2007; Fuman, Masouleh, Makluwan, 1001m, 37° 09' 1.16" N, 48° 59' 1.19" E, August 2007. Collected by J. Hajizadeh.

Distribution: Poland, Germany, British Isles, Iran (HYATT 1980; KAMALI et al. 2001).

***Parasitus insignis* (HOLZMANN 1969)**

Material examined: Adult, Iran, Guilan province: Rasht, 4 m, 37°16'51"N, 49°34'59"E, June 2007; Sangar, Shahrestan, 27 m, 37°09'71"N, 49°41'54"E, June 2007; Rasht, Saravan, 60 m, 37°07'41.08"N, 49°39'57.32"E, June 2007; Rasht, 4 m, 37°16'51"N, 49°34'59"E, June 2007; Hashtpar, Asalem, 29m, 37°73'54"N, 48°95'33"E, July 2007; Langarud, 21m, 37° 11' 0" N, 50° 9' 0" E, July 2007; Fuman, Masouleh, Makluwan, 1001m, 37° 09' 1.16" N, 48° 59' 1.19" E, August 2007; Sowme'e-Sara, Gysum, -20m, 37°18'0"N, 49°18'0"E, September 2007; Rasht, University of Guilan, 27 m, 37°11'55.03"N, 49°38'33.58"E, April 2008; Rasht, 4 m, 37°16'51"N, 49°34'59"E, May 2008; Rasht, Aqa Seyyed Sharif, 30 m, 37°11'01.04"N, 49°30'57.42"E, June 2008; Rasht, Falakdeh, 4 m, 37°16'51"N, 49°34'59"E, June 2008; Rasht, Kuchesfahan, Jafarabad, 0.91 m, 37°12'0"N, 50°20'0"E, July 2008; Rasht, Falakdeh, 4 m, 37°16'51"N, 49°34'59"E, August 2008; Rasht, University of Guilan, 27 m, 37°11'55.03"N, 49°38'33.58"E, September 2009; Rasht, 4 m, 37°16'51"N, 49°34'59"E, October 2009; Hashtpar, Asalem, 29m, 37°73'54"N, 48°95'33"E, June 2010; Shaft, Emamzadeh Ebrahim, 1840m, 37°02'0"N, 49°26'0"E, June 2010; Lahijan, 2m, 37° 12' 0" N, 50° 0' 0" E, July 2010; Rasht, 4 m, 37°16'51"N, 49°34'59"E, September 2010; Rasht, University of Guilan, 27 m, 37°11'55.03"N, 49°38'33.58"E, September 2010. Collected by J. Hajizadeh. Roudsar, Kelachay, -20m, 37°04'44"N 50°23'43"E, July 2011; Roudsar, Kelachay, Vajargah, -10m, 37° 02' 27" N, 50° 24' 31" E, July 2011; Chaboksar, Siahkhalroud, 216m, 36° 58' 0" N, 50° 35' 0" E, July 2011; Langarud, 21m, 37° 11' 0" N, 50° 9' 0" E, July 2011; Roudsar, Kelachay, 37°04'44"N 50°23'43"E, October 2011, Chaboksar, Ghasemabad, 216m, 36° 58' 0" N, 50° 35' 0" E, October 2011 Roudsar, Kelachay, Vajargah, -10m, 37° 02' 27" N, 50° 24' 31" E, October 2011. Collected by M. Nazarari. Deutonymph, Iran, Guilan province: Rasht, University of Guilan, 27 m, 37°11'55.03"N, 49°38'33.58"E, June 2007; Rasht, 4 m, 37°16'51"N, 49°34'59"E, June 2007; Hashtpar, Asalem, 29m, 37°73'54"N, 48°95'33"E, July 2007; Sowme'e-Sara, 5m, 37°18'0"N, 49°18'0"E, July 2007, Sowme'e-Sara, Gysoum, -20m, 37°18'0"N, 49°18'0"E, July 2007; Langarud, 21m, 37° 11' 0" N, 50° 9' 0" E, July 2007. Roudsar, Kelachay, Vajargah, -10m, 37° 02' 27" N, 50° 24' 31" E, July 2007. Collected by J. Hajizadeh. Langarud, 21m, 37° 11' 0" N, 50° 9' 0" E, June 2011; Roudsar, Kelachay, -20m, 37°04'44"N 50°23'43"E, July 2011, Chaboksar, Siahkhalroud, 216m, 36° 58' 0" N, 50° 35' 0" E, July 2011, Roudsar, Kelachay, Vajargah, -10m, 37° 02' 27" N, 50° 24' 31" E, October 2011. Collected by M. Nazarari.

Distribution: Germany, British Isles, Iran (KARG 1971; HYATT 1980; KAMALI et al. 2001).

***Parasitus kempersi* OUDEMANS 1902**

Material examined: Deutonymph, Iran, Guilan province: Shaft, 47m, 37°09'24"N, 49°24'26"E, August 2007; Rasht, Kuchesfahan, -1 m, 37°16'42"N, 49°46'22"E, July 2008; Rasht, Aqa Seyyed Sharif, 30 m, 37°11'01.04"N, 49°30'57.42"E, April 2011; Kuchesfahan, Lulaman, -3 m, 37°15'17.07"N, 49°49'00.15"E, May 2011; Lahijan, 2m, 37° 12' 0" N, 50° 0' 0" E, June 2011. Collected by J. Hajizadeh. Roudsar, Rahimabad, 12m, 37°01'67"N, 50°31'67"E, July 2011; Chaboksar, 216m, 36° 58' 0" N, 50° 35' 0" E, July 2011, Roudsar, Kelachay, Vajargah, -10m, 37° 02' 27" N, 50° 24' 31" E, July 2011, Langarud, 21m, 37° 11' 0" N, 50° 9' 0" E, July 2011; Chaboksar, Siahkhalroud, 216m, 36° 58' 0" N, 50° 35' 0" E, October 2011; Chaboksar, 216m, 36° 58' 0" N, 50° 35' 0" E, October 2011. Collected by M. Nazarari.

Distribution: Iceland, Norway, Holland, Germany, Italy, British Isles (KARG 1971; HYATT 1980).

***Parasitus loricatus* (WANKEL 1861)**

Material examined: Adult, Iran, Guilan province: Rasht, Saravan, 60 m, 37°07'41.08"N, 49°39'57.32"E, June 2007; Sowme'e-Sara, Behanbar, -20m, 37°18'0"N, 49°18'0"E, July 2007. Collected by J. Hajizadeh. Deutonymph, Iran, Guilan province: Rasht, 4 m, 37°16'51"N, 49°34'59"E, June 2007; Rasht, Khomam, Chapar Khaneh, -22 m, 37°25'81"N, 49°38'57"E, June 2007; Rasht, Sangar, 27 m, 37°09'71"N, 49°41'54"E, June 2007; Chaboksar, 216m, 36° 58' 0" N, 50° 35' 0" E, July 2007; Shanderman, 56 m, 37°20'12"N, 48°59'2"E, August 2007; Rasht, Aqa Seyyed Sharif, 30 m, 37°11'01.04"N, 49°30'57.42"E, August 2007; Fuman, Lishavandan, 20m, 37°22'40"N, 49°31'25"E, August 2007; Fuman, Masouleh, 1001m, 37° 09' 1.16" N, 48° 59' 1.19" E, August 2007; Fuman, Lavandevil, -10m, 37°22'41"N, 49°31'26"E, September 2007, Rasht, Falakdeh, 4 m, 37°16'51"N, 49°34'59"E, August 2008. Collected by J. Hajizadeh.

Distribution: The Faeroes, Iceland, Sweden, Finland, Holland, Belgium, France, Germany, Spain, Austria, Switzerland, Italy, Poland, former Czechoslovakia, former Yugoslavia, Romania, Western Siberia, Morocco, British Isles (HYATT 1980).

***Vulgarogamasus kraepelini* (BERLESE 1905)**

Material examined: Adult, Iran, Guilan province: Rasht, 4 m, 37°16'51"N, 49°34'59"E, June 2007; Sowme'e-Sara, Ziabar, -20m, 37°18'0"N, 49°18'0"E, July 2007; Roudsar, 12m, 37° 13' 0" N, 50° 3' 0" E, July 2007; Shanderman, 56 m, 37°20'12"N, 48°59'2"E, August 2007; Rasht, Emamzadeh Hashem, 107 m, 37°01'33.89"N, 49°37'44.62"E, August 2007; Shaft, Choubar, 47m, 37°09'24"N, 49°24'26"E, September 2007. Collected by J. Hajizadeh.

Distribution: Iceland, Finland, Sweden, Germany, Austria, Switzerland, Czechoslovakia, Hungary, Poland, former U.S.S.R., Western Siberia, British Isles (KARG 1971; HYATT 1980).

***Vulgarogamasus oudemansi* (BERLESE 1903)**

Material examined: Adult. Iran, Guilan province: Rasht, 4 m, 37°16'51"N, 49°34'59"E, June 2007; Asalem, 49m, 37°73'54"N, 48°95'13"E, July 2007; Lowshan, 491m, 36° 37' 14" N, 49° 30' 38" E July 2010; Rasht, Emamzadeh Hashem, 107 m, 37°01'33.89"N, 49°37'44.62"E, July 2010; Anzali, -26 m, 37°47'0"N, 49°45'0"E, April 2011. Collected by J. Hajizadeh.

Distribution: Iceland, Sweden, Holland, Germany, Austria, Poland, former Czechoslovakia, Western Siberia, British Isles (KARG 1971; HYATT 1980).

Key to subfamilies and species of Parasitidae in Guilan Province Iran

Key to subfamilies of family Parasitidae

- Females with separate podonotal and opistonotal shields, or occasionally a schizodorsal shield; tritosternum of male normal, similar to that of the female, or modified, or absent; setae z5 of dorsal hexagon in adults and deutonymph may differ markedly in form from j5 and j6, or only slightly, or the three pairs of setae may be homogeneous subfamily Parasitinae OUDEMANS 1901
- Females with dorsal shield entire; tritosternum of male always biramous with areduced base which is covered by the genital lamina; all setae of dorsal hexagon, that is z5, j5 and j6, of similar length and form subfamily Pergamasinae JUVARA-BALS 1972

Key to species of subfamily Parasitinae (deutonymphs)

- 1 Leg II with conspicuous ventral spurs, usually on the femur, genu, tibia and tarsus; dorsal setae mainly short, some may be stouter and pilose distally 2
 - Leg II without spurs; dorsal setae of extreme lengths 3
- 2 Femur and tibia II with one ventral spur each; ventral spur on femur II straight; all simple dorsal setae very short, rarely exceeding 20 µm; lateral prongs of tectum poorly developed *Gamasodes fimbriatus* KARG 1971
 - Femur and tibia II with one ventral spur each; ventral spur on femur II thumb-shaped; dorsal setae longer; lateral prongs of tectum well developed *Gamasodes spiniger* (TRÄGÄRDTH 1910)
- 3 Dorsal shields characteristically outlined; posterior margin of podonotal shield strongly convex meially and anterior margin of opistonotal shield strongly concavemedially; all dorsal setae relatively short; corniculi long and slender, reaching at least the mid-point of the palp femur; tectum a single central prong with denticulate sloping margins *Cornigamasus lunaris* (BERLESE 1882)
 - Dorsal shields otherwise; corniculi normally much shorter, triangular and only reaching the mid-point of the palp trochanter 4
- 4 Dorsal setae overall without extreme difference in length or stoutness although j1, z5 and r3 are generally the longest 6
 - Some dorsal setae in addition to j1, z5, and r3 conspicuously stouter and longer than the remaining setae which are generally very short 5
- 5 Tectum unique-spinate; opistonotal shield with 16 pairs of setae; setae j4 long and pilose distally; sterna shield blunt posteriorly and with setae st. IV situated near the posterior margin *Parasitus coleopratorum* (LINNAEUS 1758)
 - Tectum with median spine longer than lateral spines; opistonotal shield with 15 pairs of setae of which Z3 are long and stout and J5 are thornlike; sterna shield narrow; restricted to the seashore *Parasitus kempersi* OUDEMANS 1902
- 6 Anal shield with more than the usual three setae *Parasitus insignis* (HOLZMANN 1969)
 - Anal shield with only three setae 7

- 7 Lateral prongs of trispinate tectum broad and strongly bifurcate; presternal shields conspicuous, elongate, wider than the anterior margin of the sternal shield; sternal shield usually fragmented anteriorly, with st. I situated on isolated areas; colour normally dull brown..... *Parasitus consanguineus* OUDAMANS & VOIGTS 1904
- Lateral prongs of trispinate tectum not strongly bifurcate; presternal shields small or rudimentary and sternal shield normal, entire, with st. I not isolated..... 8
- 8 Tectum with lateral prongs either broad and tapering or if slender with central part characteristically lobed; all dorsal setae, except z1, s2, and r2, finely pilose
..... *Parasitus loricatus* (WANKEL 1861)
- Tectum with central prongs pointed and lateral prongs slender; few dorsal setae clearly pilose *Vulgarogamasus kraepelini* (BERLESE 1905)

Key to species of subfamily Parasitinae (females)

- 1 Podonotal setae relatively homogeneous, or with at least half longer than the remainder 2
- Podonotal setae j1, j4, z5 and r3 frequently stout and pilose and clearly longer than the remaining setae..... *Parasitus fimetorum* (BERLESE 1903)
- 2 Opistonotal shield with more than 35 pairs of setae..... 3
- Opistonotal shield with less than 30 pairs of setae 4
- 3 Opistonotal shield with about 60 pairs of setae; posterior margin of podonotal shield with four pairs of setae *Eugamasus cavernicola* (TRÄGARDTH 1912)
- Opistonotal shield with about 50 pairs of setae; posterior margin of podonotal shield with usually five pairs of setae..... *Eugamasus berlesei* WILLMANN 1935
- 4 Opisthogasteric shield with 8 pairs of setae; anterolateral setae on palp femur deeply bifurcate *Parasitus hyalinus* (WILLMANN 1949)
- Opisthogasteric shield with 9 pairs of setae; anterolateral setae on palp femur serrated..... 5
- 5 Peritreme not reaching coxa I; endogynium with medially directed hornlike processes; trochanter IV with small dorsal protuberance
..... *Parasitus insignis* (HOLZMANN 1969)
- Peritreme extending to coxa I; endogynium without hornlike processes; trochanter IV without protuberance 6
- 6 Tectum with median prong shorter than laterals
..... *Vulgarogamasus kraepelini* (BERLESE 1905)
- Tectum with median prong stouter and longer than laterals..... 7
- 7 Dorsal setae long, mostly reaching beyond the bases of the succeeding setae; podonotal shield less than 570 µm long; opisthogasteric shield with 10 or 11 pairs of seta; genital shield with lateral horns; sterno-genital shields with weak reticulations
..... *Vulgarogamasus oudemansi* (BERLESE 1903)
- Dorsal setae short, few reaching beyond the bases of the succeeding setae; podonotal shield more than 630 µm long; opisthogasteric shield with 9 pairs of seta; genital shield without lateral horns; sterno-genital shields conspicuously ornamented
..... *Parasitus loricatus* (WANKEL 1861)

Key to species of subfamily Pergamasinae (females)

- 1 Holodorsal shield separate from ventral opisthogastric shield posteriorly *Paragamasus* sp.
 - Dorsal shield fused to opisthogastric shield posteriorly *Holoparasitus* sp.

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