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ACAROID MITES OF NORTHERN AND EASTERN ASIA (ACARI: ACAROIDEA)

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ABSTRACT: Acaroid mites (superfamily Acaroidea) are economically and veterinary important pests. We give a list of 5 families 49 genera, and 180 species of acaroid mites recorded in the Northern and Eastern Asia (Asian part of Russia, South Korea, Japan, and China). One new genus, *Sphecacarus* Klimov gen. n., is described. The following new synonymies and combinations are proposed: *Tortonia* Oudemans, 1911 (=*Hyohondania* Sasa, 1952, syn. nov.); *Sancassania polyphyllae* (Zachvatkin, 1941) (=*Sancassania berteanaeursae* Samšiňák, 1970 syn. nov.); *Mezorhizoglyphus* Kadzhaja, 1966 (=*Boletacarus* Volgin et Mironov, 1980 syn. nov.); *Tortonia kanoi* (Sasa, 1952) comb. nov. (from *Hyohondania*), *Tortonia jinyunensis* (Zhang at Li, 2003) comb. nov. (from *Sinosuidasia*).

KEY WORDS: Acaroidea, Siberia, Russian Far East, South Korea, China, Japan

INTRODUCTION

Acaroid mites exploit a variety of patchy habitats. They can be found in nests of vertebrates (birds, mammals) and invertebrates (termites, beetles, bees, wasps, ants), fungal sporocarps, decomposing organic matter (such us carrion, various plant materials, animal manure and guano), under bark, in treeholes, and in seaweeds. A few species are aquatic or parasitic on gills of fresh-water crabs. Being serious pests of stored food and products, and a common component of house dust mites, acaroid mites are of economical, medical, and veterinary importance. Such taxa as *Acarus*, *Mycetoglyphus*, *Tyrophagus*, *Rhizoglyphus*, and *Sancassania* (=*Caloglyphus*) are damaging subterranean parts and young leaves of various crops, and are serious agricultural pests and subject to quarantine in many countries (Diaz et al. 2000; Fan and Zhang 2004, 2007; Kasuga and Amano 2006; Nakao 1991; Nakao and Kurosa 1988; Olsen 1983; Rojas and Klimov 2007; Shinkaji et al. 1986).

Some acaroid mites live continuously in a soil environment, disperse through soil and exploit various patchy habitats. Others use soil to disperse to patchy habitats as adults or, indirectly, as deutonymphs. For example, *Sapracarus tuberculatus* (Suidasiidae) lives in deep soil in the Holarctic and occasionally colonizes bird nests. Species of *Sancassania* (*Rhizoglyphoides*) inhabit fruiting bodies of mushrooms and only reproduce several weeks each year when mushrooms are available; they spend the remaining time inactive in soil waiting for the new mushroom season (Klimov and OConnor 2003). Some species of *Tyrophagus*, *Rhizoglyphus*, *Schwiebea*, and *Sancassania* are habitat generalists, and they are common in both soil and patchy habitats, indicating that they may adopt both strategies. These species are usually the most serious agricultural and stored product pests, and they may cause respiratory diseases or allergic reactions to individuals who come into direct contact with these materials. They can easily extend their ranges via commercial trade and establish themselves in new countries and habitats.

The following list summarizes taxonomic information about mites of the superfamily Acaroidea found in Northern (Asian part of Russia) and Eastern Asia (Japan, China, South and North Korea). The list is based primarily on the senior author original investigations made in 1993–2001 in Central Siberia and the Russian Far East and literature records. We also include some literature records on *Tyrophagus*, *Rhizoglyphus*, *Sancassania* which can not be independently verified at this time. They may be useful as a starting point for future research. Here we note that the superfamily itself may no be non-monophyletc, Horsiindae may be artificial and not part of Acaridae (with *Sennertionyx* is close to *Cerophagus*, currently in Gaudiellidae), Acarinae plus Tyrophaginae plus *Sancassania* and related genera may be monophyletic, and the two genera with two setae on the chelicera (*Viedebanttia* and an undescribed genus from *Lycoperdon*) may represent a family-level lineage (Klimov and OConnor 2008; unpubl.).

Abbreviations: ZIN = Zoological Institute of the Russian Academy of Sciences, Saint Petersburg.

Superfam. ACAROIDEA Latreille, 1802

I. Fam. **SCATOGLYPHIDAE** Zachvatkin et Volgin, 1955

1. *Scatoglyphus* Berlese, 1913

1. *Scatoglyphus polytrematus* Berlese, 1913: China (Wang 1964)

II. Fam. **GAUDIELLIDAE** Atyeo, Baker et Delfinado, 1974

2. *Cerophagus* Oudemans, 1904

2. *Cerophagus granulatus* (Dujardin, 1849): Primorskiy Kray, ZIN

III. Fam. **SUIDASIIDAE** Fain et Philips, 1978

3. *Suidasia* Oudemans**,** 1905 (=*Aphelenia* Oudemans, 1923; *Chibidania* Sasa, 1952)

3. *Suidasia nesbitti* Hughes, 1948 (=*Chibidania tokyoensis* Sasa, 1952): Russian Far East; Japan (Sasa 1952); China (Olsen 1983; Wang 1964), incl. Hong Kong (Olsen 1983); South Korea (Chu et al. 1967; Lee and Choi 1980)

4. *Suidasia pontifica* Oudemans, 1905 (=*Suidasia medanensis* Oudemans, 1924; *Suidasia insectorum* Fox, 1950): Japan (Noge et al. 2005; Oshima 1980); China (Fan et al. 2010; Wang 1964), incl. Hong Kong (Olsen 1983) and Taiwan (Olsen 1983); South Korea (Chu et al. 1967; Jung et al. 2010b)

4. *Sinosuidasia* Jiang, 1996 (differs from *Tortonia* by presence of male paraanal suckers)

5. *Sinosuidasia orientalis* Jiang, 1996: China (Jiang, 1996)

5. *Tortonia* Oudemans, 1911 (=*Ebertia* Oudemans, 1924 (OConnor, pers. comm.); *Neottiglyphus* Volgin, 1974 (OConnor, pers. comm.); *Hyohondania* Sasa, 1952, **syn. nov.**)

6. *Tortonia intermedia* (Oudemans, 1902): "Siberia, basin of Nel'kan river" (Zachvatkin 1941); Yakutia or Khabarovskiy Kray

7. *Tortonia kanoi* (Sasa, 1952) **comb. nov.** (from *Hyohondania*): Japan (Sasa 1952)

8. *Tortonia jinyunensis* (Zhang at Li, 2003) **comb. nov. (**from *Sinosuidasia*): China (Zhang and Li 2002)

9. *Tortonia* sp1. n.: Khabarovskiy Kray

10. *Tortonia* sp2. n.: Primorskiy Kray

11. *Tortonia* sp3. n.: Sakhalin

IV. Fam. **LARDOGLYPHIDAE** Oudemans, 1927

6. *Lardoglyphus* Oudemans, 1927

12. *Lardoglyphus angelinae* Olsen, 1982: China: Hong Kong (Olsen 1983); USA: California (introduced) (Olsen 1982; Olsen et al. 1987)

13. *Lardoglyphus konoi* (Sasa et Asanuma, 1951) (=*Hoshikadania konoi* Sasa et Asanuma, 1951): Japan (Noge et al. 2005; Olsen 1983; Sasa and Asanuma 1951); South Korea (Lee and Choi 1980); China (Fan et al. 2010), incl. Hong Kong (Olsen 1983)

14. *Lardoglyphus zacheri* Oudemans, 1927: Japan (this paper); China, incl. Hong Kong (Fan et al. 2010; Olsen 1983)

15. *Lardoglyphus* sp. n. aff. *zacheri*: ZIN, 1 HDN, 1 F Primorskiy Kray; probably *Lardoglyphus zacheri* in this ref. (Tareev 1970)

7. *Sinolardoglyphus* Jiang, 1991

16. *Sinolardoglyphus nanchangensis* Jiang, 1991: China: Jiangxi (Jiang 1991a)

V. Fam. **ACARIDAE** Latreille, 1802

Subfam. **HORSTIINAE** Fain, 1984

8. *Horstia* Oudemans, 1905

17. *Horstia ornata* (Oudemans, 1900): Japan (Oudemans 1900; Zachvatkin 1941) (our data)

18. *Horstia helenae* (Oudemans, 1902): Japan (Zachvatkin 1941) (probably from a historical mainland colony of Japan)

9. *Sennertionyx* Zachvatkin, 1941

19. *Sennertionyx manicati* (Giard, 1890): Primorskiy Kray

10. *Cerophagopsis* Zachvatkin, 1941

20. *Cerophagopsis skorikovi* Zachvatkin, 1941 (=*Cerophagus skorikovi* (Zachvatkin, 1941): Japan (Kurosa 2000; Zachvatkin 1941)

21. *Cerophagopsis indicus* (Potter et Olsen, 1987): China: Taiwan (Fan et al. 2010)

22. *Cerophagopsis* sp. n.: Japan

Subfam. **ACARINAE** Latreille, 1802

11. *Acarus* Linnaeus, 1758

23. *Acarus bomiensis* Wang, 1982: China (Wang 1982)

24. *Acarus chaetoxysilos* Griffiths, 1970: Japan (Griffiths 1970)

25. *Acarus farris* (Oudemans, 1905) (?=*A. lushanensis* Jiang, 1992; China: Jiangxi OConnor, pers. comm.): Primorskiy Kray, Irkutskaya Oblast' (our data); China (Fan et al. 2010; Jiang 1992)

26. *Acarus fengxianensis* Wang, 1985: China (Wang 1985)

27. *Acarus gracilis* Hughes, 1957: China (Fan et al. 2010)

28. *Acarus immobilis* Griffiths, 1964: Primorskiy Kray, Irkutskaya Oblast' (our data); China (Fan et al. 2010)

29. *Acarus mirabilis* Volgin, 1965: China (Fan et al. 2010)

30. *Acarus siro* Linnaeus, 1758: Primorskiy Kray (Tareev 1970) (may be misidentification); China (Fan et al. 2010) (some records may be misidentifications)

Subfam. **TYROPHAGINAE** Oudemans, 1923

12. *Bembidioglyphus* Klimov, 1998

31. *Bembidioglyphus acinacisetosus* Klimov, 1998: Kuril Islands: Paramushir (Klimov 1998d)

13. *Aleuroglyphus* Zachvatkin, 1941

32. *Aleuroglyphus ovatus* (Troupeau, 1879): Primorskiy Kray (Tareev 1970); Japan (Oshima 1980); South Korea (Lee and Choi 1980); China (Fan et al. 2010)
33. *Aleuroglyphus chinensis* Jiang, 1994: China (Jiang 1994)
34. *Aleuroglyphagus formosanus* Tseng, 1972: China: Taiwan (Tseng 1989)

14. *Garsaultia* Oudemans, 1916

35. *Garsaultia* sp.: Japan (Kurosa 2000)

15. *Kuzinia* Zachvatkin, 1941

36. *Kuzinia laevis* (Dujardin, 1849): Primorskiy Kray, Irkutskaya Oblast', Kuril Islands (Klimov 1998d); Japan (Kurosa 2000)
37. *Kuzinia* sp. n.: Primorskiy Kray, ex *Lygaeus sjostedti*

16. *Lackerbaueria* Zachvatkin, 1941

38. *Lackerbaueria cribratissima* Zachvatkin, 1941: Sakhalin, Kuril Islands (Klimov 1997)

17. *Mycetoglyphus* Oudemans, 1932

39. *Mycetoglyphus fungivorus* Oudemans, 1932: Primorskiy Kray (Tareev 1970), Irkutskaya Oblast' (Zachvatkin 1953b), Tomskaya Oblast' (Sorokin 1953); Japan (Nakao and Kurosa 1988); China (Fan et al. 2010)

18. *Forcellinia* Oudemans, 1924

40. *Forcellinia diamesa* Zachvatkin, 1941: Primorskiy Kray
41. *Forcellinia wasmanni* (Moniez, 1892): Primorskiy Kray (Tareev 1970), Kamchatka Kuril, Islands (Klimov 1997)

19. *Schulzea* Zachvatkin, 1941

42. *Schulzea caucasica* Zachvatkin, 1941: Irkutskaya oblast', Primorskiy Kray, Sakhalin (Klimov 1997)
43. *Schulzea pamirensis* Zachvatkin, 1941: "Pamir"

20. *Sphecacarus* Klimov gen. n.

44. *Sphecacarus psenuli* Vitzthum, 1931 (=*Tyroglyphus psenuli* Vitzthum, 1931, *Lackerbaueria psenuli* (Vitzthum, 1931)): Sakhalin (our data); Japan (Kurosa 2000)
45. *Sphecacarus* sp. n.: Primorskiy Kray, ex *Carinostigmus rhinocerus*

21. *Tyrolichus* Oudemans, 1923

46. *Tyrolichus casei* Oudemans, 1923: Primorskiy Kray (Tareev 1970), Irkutskaya Oblast' (Zachvatkin 1953b); China (Fan et al. 2010)

22. *Tyrophagus* Oudemans, 1924

47. *Tyrophagus brevicrinatus* Robertson, 1959: China (Fan et al. 2010)
48. *Tyrophagus ganjiangensis* Jiang, 1993: China (Jiang, 1993c)
49. *Tyrophagus fanetzhangorum* Klimov et OConnor, 2010: China (intercepted in New Zealand) (Fan and Zhang 2007); Japan (intercepted in New Zealand) (Fan and Zhang 2007)
50. *Tyrophagus formicetorum* Volgin, 1948: Irkutskaya oblast', ZIN
51. *Tyrophagus jingdezhenensis* Jiang, 1993: China: Jiangxi (Jiang 1993b)
52. *Tyrophagus kentinus* Tseng, 1973: China: Taiwan (Tseng 1989)
53. *Tyrophagus bambusae* Tseng, 1973: China: Taiwan (Tseng 1989)
54. *Tyrophagus longior* (Gervias, 1844): Primorskiy Kray (Tareev 1970), Irkutskaya Oblast' (Zachvatkin 1953b), Novosibirskaya Oblast' (Zachvatkin 1953b); Japan (Noguchi et al. 1998); China (Fan et al. 2010), incl. Taiwan (Tseng 1989)
55. *Tyrophagus mimlongior* Jiang, 1993: China: Jiangxi (Jiang 1993a)
56. *Tyrophagus mixtus* Volgin, 1948: Tomskaya Oblast' (Volgin 1975)
57. *Tyrophagus neiswanderi* Johnston et Bruce, 1965: Japan (Kurosa and Nakao 1993; Nakao, 1991); China (Fan et al. 2010; Jiang 1989)
58. *Tyrophagus perniciosus* Zachvatkin, 1941: Primorskiy Kray (Tareev 1970), Novosibirskaya Oblast' (Zachvatkin 1953b), Altayskiy Kray (Zachvatkin 1941); Japan (Nakao 1991; Nakao and Kurosa 1988); China (Fan et al. 2010)
59. *Tyrophagus putrescentiae* (Schrank, 1781) (=*T. communis* Fan et Zhang, 2007. Probable synonyms (may be also *T. fanetzhangorum*): *Tyroglyphus muscae* Sasaki, 1921; *Tyroglyphus longior* var. *taiwanensis* Sugimoto, 1938 (Klimov and OConnor, 2009a, b)): Primorskiy Kray (Zachvatkin 1941), Irkutskaya Oblast' (our data), Novosibirskaya Oblast' (Zachvatkin 1953b); South Korea (Jeong et al. 2010; Kim et al. 2003; Lee and Choi 1980; Ree and Lee 1997); Japan (Fan and Zhang 2007; Okabe et al. 2001; Oshima 1980); China, incl. Hong Kong and Taiwan (Fan et al. 2010; Fan and Zhang 2007; Olsen 1983) (records published before 2007 need re-verification to distinguish from *T. fanetzhangorum*)
60. *Tyrophagus silvester* Zachvatkin, 1941 (=*Tyrophagus humerosus silvester* Zachvatkin, 1941): Primorskiy Kray (Tareev 1970), Irkutskaya Oblast' (Zachvatkin 1953b) (our data), Novosibirskaya Oblast' (Zachvatkin 1953b)

61. *Tyrophagus similis* Volgin, 1949: Korea (Jung et al. 2010a); Japan (Nakao and Kurosa 1988); China (Fan et al. 2010)
62. *Tyrophagus tropicus* Robertson, 1959: China (Fan et al. 2010; Wang 1985)
63. *Tyrophagus vanheurni* Oudemans, 1924 (=*T. palmarum* sensu Roberson (Fan and Zhang, 2007); ? *T. parvulus* Volgin, 1949 (Volgin, 1975)): "European and Siberian part of the [former] USSR" (as *parvulus*) (Volgin 1966b); China (Jiang 1989), incl. Taiwan (Tseng 1989)

23. *Tyroborus* Oudemans, 1923

64. *Tyroborus lini* Oudemans, 1923: Japan (Tomita et al. 2003); China (Fan et al. 2010; Fan and Zhang 2006; Jiang 1989)

24. *Paulacarellus* Fain, 1977

65. *Paulacarellus faini* Klimov, 2001: Primorskiy Kray (Klimov 2000 (2001)b)

Subfam. **RHIZOGLYPHINAE** Oudemans, 1923

25. *Australhypopus* Fain et Friend, 1984

66. *Australhypopus formosani* (Phillipsen et Coppel, 1977) (=*Acotyledon formosani* Phillipsen et Coppel, 1977): termite culture brought to USA from Japan (Phillipsen and Coppel 1977)
67. *Australhypopus* sp.: China (Wang et al. 2002)

26. gen. n. (ex *Lycoperdon* spp.)

68. gen. n., sp. n. Primorskiy Kray (our data); Japan (Fig. 27) (Kurosa 2000)

27. *Viedebanttia* Oudemans, 1929

69. *Viedebanttia* sp. n. (Primorskiy Kray, ex *Silpha peforata*)
70. *Viedebanttia egorovi* Klimov, 1998: Primorskiy Kray, Irkutskaya Oblast' (our data); South Korea (Klimov 1998e)
71. *Viedebanttia macrocnemis* (Zachvatkin, 1941): Primorskiy Kray (Tareev 1970)

28. *Apiacarus* Volgin, 1974

72. *Apiacarus inflatus* Volgin, 1974: ZIN, Irkutskaya Oblast' (Note: *ve* on the middle of lateral edges of propodosoma shield, *aa* present in this genus)

29. *Carabidobius* Volgin, 1953

73. *Carabidobius* sp. n.: Primorskiy Kray

30. *Acotyledon* Oudemans, 1903

74. *Acotyledon paradoxa* Oudemans, 1903: Primorskiy Kray (Tareev 1970); China (Fan et al. 2010; Zou and Wang 1991)
75. *Acotyledon corporis* Ishikawa et Morikawa, 1964: Japan (Ishikawa and Morikawa 1964)

31. *Neoacotyledon* Samšiňák, 1982

76. *Neoacotyledon rhizoglyphoides* (Zachvatkin, 1937): Primorskiy Kray (Tareev 1970), Tomskaya Oblast' (Sorokin 1953), Novosibirskaya Oblast' (Zachvatkin 1941); China (Fan et al. 2010), including Taiwan (Tseng 1989); records need to be verified following incorrect interpretations of this species by Hughes (Hughes 1976) and Türk and Türk (Türk and Türk 1957)
77. *Neoacotyledon sokolovi* (Zachvatkin, 1940): Primorskiy Kray (Tareev 1970), Tomskaya Oblast' (Sorokin 1953), Novosibirskaya Oblast' (Zachvatkin 1941)

32. *Cosmoglyphus* Oudemans, 1932

78. *Cosmoglyphus absoloni* (Samšiňák, 1961): South China (Samšiňák 1961), Turkmenistan
79. *Cosmoglyphus batsylevi* (Zachvatkin, 1941) (=*Acotyledon batsylevi* Zachvatkin, 1941): China (Fan et al. 2010)
80. *Cosmoglyphus chinensis* Samšiňák, 1966: China (Samšiňák 1966)
81. *Cosmoglyphus hosoyai* (Kugoh, 1957) (=*Murodania hosoyai*): Japan (Kugoh 1957)
82. *Cosmoglyphus hughesi* Samšinák, 1966: Japan (Noge et al. 2005; Ryono et al. 2001), China (Fan et al. 2010)
83. *Cosmoglyphus krameri* (Berlese, 1881): South Korea (our data); China: Taiwan (Tseng 1989)
84. *Cosmoglyphus kunshanensis* Zou et Wang, 1991 (=*Sancassania kunshanensis*): China: Jiangsu (Zou and Wang 1991) (see notes for *Cosmoglyphus volgini*)
85. *Cosmoglyphus lishihmeii* (Samšiňák, 1961): China (Samšiňák 1961) (see notes for *Cosmoglyphus volgini*)
86. *Cosmoglyphus oudemansi* (Zachvatkin, 1937): China (Fan et al. 2010)
87. *Cosmoglyphus redikorzevi* (Zachvatkin, 1937): Irkutskaya Oblast'(Zachvatkin 1937)
88. *Cosmoglyphus volgini* (Zachvatkin, 1941): Primorskiy Kray (Tareev 1970) (HDNs similar but do not match exactly "*Caloglyphus feytaudi*" sensu Türk and Türk (Türk and Türk 1957) non Oudemans, 1928 and *Sancassania kunshanensis*. *C. volgini*, *C. lishihmeii* and *C. kunshanensis* differ from typical *Cosmoglyphus* by genu IV not distinctly longer than femur (distinctly longer in *Cosmoglyphus*), however, hind borders of coxal fields II are close to fore edges of coxal fields III and separated by small, thin, equal on all its length space, and small, shifted to the anterior attachment organ as in true *Cosmoglyphus*. These character states suggests for close affinities of the group including

C. volgini with *Australhypopus*. Adults of "*C. feytaudi*" sensu Türk and Türk and *C. kunshanensis* are more similar to *Sancassania* by filiform *scx*, some tarsal setae dilated at tips (not figured in *kunshanensis*), and anus shifted anteriorly (not so much in *kunshanensis*)

33. *Sancassania* Oudemans, 1916 (=*Caloglyphus* Berlese, 1923, *Isoglyphus* Zachvatkin, 1937; *Mycetosancassania* Klimov, 2000, *Rhizoglyphoides* Volgin, 1978) (Klimov and OConnor, 2003)

89. *Sancassania caroli* (ChannaBasavanna et Krishna Rao, 1982): China: Jiangxi (Tu et al. 2003); India (Channabasavanna et al. 1981)
90. *Sancassania chelone* Oudemans, 1916 (=*Caloglyphus moniezi* Zachvatkin, 1937): Primorskiy Kray (Klimov 1997), Sakhalin, the Republic of Buryatia; Japan (our data)
91. *Sancassania coprophila* Mahunka, 1968: China: Fujian (Zou and Wang 1991); Hungary (Fan et al. 2010)
92. *Sancassania fujianensis* (Zou, Wang et Chang 1987): China (Zhang et al. 1997; Zou et al. 1987), morphologically and biologically very close to *S. chelone*
93. *Sancassania geotruporum* (Zachvatkin, 1941): Sakhalin, Kuril Islands: Kunashir (Klimov 1997); Japan (Klimov 1997; Kurosa 2000)
94. *Sancassania grifolapholiotae* (Klimov, 2000) (=*Mycetosancassania grifolapholiotae*): Irkutskaya oblast', Khabarovskiy Kray (Klimov 2000a; Klimov and OConnor 2003)
95. *Sancassania mandzhur* (Zachvatkin, 1940): Primorskiy Kray (Tareev 1970); China (garlic from Harbin intercepted in USSR) (Zachvatkin 1940)
96. *Sancassania mironovi* Klimov et OConnor, 2003: Irkutskaya oblast', Khabarovskiy Kray (Klimov and OConnor 2003)
97. *Sancassania phyllophagiana* (Oseto et Mayo, 1975): known from USA; record from South Korea (Ree et al. 1997) is probably a misidentification
98. *Sancassania polyphyllae* (Zachvatkin, 1941) (=*Sancassania berteanaeursae* Samšiňák, 1970 **syn. nov.**, types of *polyphyllae* studied): Georgia (Zachvatkin 1941); Turkey (our data); China (Samšiňák 1957); probably records of "*Caloglyphus polyphyllae"* from Japan (Kuwahara et al. 1989; Leal et al. 1989; Noge et al. 2005) belong to *C. polyphyllae* sensu Türk and Türk 1957 non Zachvatkin
99. *Sancassania rodionovi* (Zachvatkin, 1935) (=*S. berlesei*, auct. non Michael): China, incl. Taiwan (Fan et al. 2010); Primorskiy Kray (Tareev 1970), Irkutskaya Oblast' (our data), Altayskiy Kray (Zachvatkin 1953a); South Korea (Lee and Choi 1980); China (Fan et al. 2010; Timms et al. 1981): incl. Taiwan (Tseng 1989)
100. *Sancassania* sp1. n.: Primorskiy Kray, ex *Lasiopsis golovjankoi*
101. *Sancassania* sp2. n.: South Korea, ex *Rhombonyx testaceipes*
102. *Sancassania shanghaiensis*: China (Zou and Wang 1989); Japan (Noge et al. 2005; Sakata et al. 2001) (close to *S. sphaerogaster*)
103. *Sancassania sphaerogaster* (Zachvatkin, 1937) (=*Caloglyphus michaeli* non Oudeamns, 1924 sensu Türk and Türk 1957; *Caloglyphus mycophagus* sensu Hughes, 1976 non Mégnin, 1874; *Caloglyphus striatus* Klimov, 1996): Primorskiy Kray (Klimov 1996b; Tareev 1970); South Korea; Japan (our data); China, including Taiwan (Fan et al. 2010)
104. *Sancassania spinitarsus* (Herman, 1804): Primorskiy Kray (Klimov 1997); Japan (Kurosa 2000; Noge et al. 2005)
105. *Sancassania rodriguezi* Samšiňák, 1980: Japan (Mori et al. 1998; Noge et al. 2005)

Sancassania karnatakaensis (Krishna Rao et Ranganath, 1982) (excluded): known from India only (Krishna Rao et al. 1982). Recorded for China (Fan et al. 2010) with reference to (Zou et al. 1987), however, this work only compares *fujianensis* with *karnatakaensis.*

34. *Acarotalpa* Volgin, 1966

106. *Acarotalpa* sp. n.: Japan (Okabe, pers. comm.)

35. *Rhizoglyphus* Claparede, 1869

107. *Rhizoglyphus actinidia* Zhang, 1994: China: Hubei (Zhang et al. 1994) (may be *Schwiebea*)
108. *Rhizoglyphus allii* Bu et Wang, 1995: China (Bu and Liu 1997; Bu and Wang 1995)
109. *Rhizoglyphus caladii* Manson, 1972 (=*R. longispinosus* Ho et Chen, 2001): China: Taiwan (Fan and Zhang 2004; Ho and Chen 2001; Tseng 1989)
110. *Rhizoglyphus echinopus* (Fumouze et Robin, 1868) (=*R. callae* Oudemans, 1924; *R. zachvatkini* Volgin, 1952): Japan (Fan and Zhang 2004); China (Bu and Liu 1997; Lin and Ding 1990; Fan et al. 2010), incl. Hong Kong (Manson 1972a) and Taiwan (Tseng 1989)
111.*Rhizoglyphus huainanensis* Zhang, Li et Zhuge, 2000: China (Zhang et al. 2000)
112. *Rhizoglyphus kangdingensis* Wang X.-z., 1983: China (Bu and Liu 1997; Bu and Li 1998; Wang 1983)

113. *Rhizoglyphus narcissi* Lin et Ding, 1990: China (Bu and Liu 1997; Lin and Ding 1990)
114. *Rhizoglyphus robini* Claparède, 1869: Primorskiy Kray (as *echinopus*) (Tareev 1970), Irkutskaya Oblast' (our data), Tomskaya Oblast' (Sorokin 1953); Japan (Fan and Zhang 2004; Kurosa and Nakao 1993; Manson 1972a; Oshima 1980); South Korea (Chu et al. 1967; Lee and Choi 1980; Ree et al. 1997); China (Fan et al. 2010), incl. Taiwan (Tseng 1989)
115. *Rhizoglyphus setosus* Manson, 1972: Japan (*Cycas revolute*) (Fan and Zhang 2004) and imported on rotten rhizomes of *Curcuma roscoeana* from Thailand (Akiyama et al. 1997; Mizoguchi et al 2005); China: Hong Kong (Manson 1972a) and Taiwan (Fan et al. 2007; Fan and Zhang 2004; Ho and Chen 1987)
116. *Rhizoglyphus singularis* Manson, 1972 (=*R. tsutienensis* Ho et Chen, 2000): China: Taiwan (Fan and Zhang 2004; Ho and Chen 2000)
117. *Rhizoglyphus tardus* Volgin, 1952: Novosibirskaya Oblast' (Volgin 1952)

36. *Mezorhizoglyphus* Kadzhaja, 1966 (=*Boletacarus* Volgin et Mironov, 1980 syn. nov.)

118. *Mezorhizoglyphus bratskensis* Klimov, 1996: Irkutskaya Oblast' (Klimov 1996a)
119. *Mezorhizoglyphus colchicus* Kadzhaja, 1966: Magadanskiy Kray (Volgin 1975), Primorskiy Kray, Irkutskaya Oblast' (Klimov 1996a)
120. *Mezorhizoglyphus sibiricus* (Volgin et Mironov, 1980) (=*Boletacarus sibiricus* Volgin et Mironov, 1980): the Republic of Buryatia (Volgin and Mironov 1980)
121. *Mezorhizoglyphus* sp1. n.: Primorskiy Kray (our data); Japan (Okabe coll.)
122. *Mezorhizoglyphus* sp2. n. aff. *sibiricus*: Primorskiy Kray

37. *Kanekobia* Fain, Yunker, van Goethem, et Johnston, 1982

123. *Kanekobia potamona* (Kaneke et Kadosaka, 1978) (=*Ewingia potamona* Kaneke et Kadosaka, 1978): Japan (Fain et al. 1982; Kaneko and Kadosaka 1978)

38. *Boletoglyphus* Volgin, 1953 (=*Fantovia* Samšiňák, 1957; *Ellipsopus* Fain and Ide, 1976; *Lindquistia* Mahunka, 1977)

124. *Boletoglyphus boletophagi* (F. Türk et S. Türk, 1952) (=*Schwiebea boletophagi* F. Türk et S. Türk, 1952; *Boletoglyphus cribrosus* Volgin, 1953): Irkutskaya Oblast' (Klimov 1998b)
125. *Boletoglyphus extremiorientalis* Klimov, 1998: Primorskiy Kray, Khabarovskiy Kray, Sakhalin (Klimov 1998b); Japan (Klimov 1998b) (as *boletophagi*) (Kurosa 2000)

39. *Capillaroglyphus* Klimov, 1998

126. *Capillaroglyphus polypori* Klimov, 1998: Primorskiy Kray (Klimov 1998a); Japan (Klimov 1998a) (Fig. 29) (Kurosa 2000)

40. *Terglyphus* Samšiňák, 1965

127. *Terglyphus padrtorum* Samšiňák, 1965: China (Samšiňák, 1965)

41. *Schwiebea* Oudemans, 1916 (=*Megninietta* Jacot, 1936; *Robinisca* Zachvatkin, 1941; *Troupeauia* Zachvatkin, 1941)

128. *Schwiebea araujoae* Fain, 1977: Japan (Okabe et al. 2008), China: Taiwan (Ho 1993)
129. *Schwiebea callae* Jiang, 1991: China (Jiang 1991b)
130. *Schwiebea chinica* Samšiňák, 1965: China (Samšiňák 1965)
131. *Schwiebea cuncta* Ho, 1993: China: Taiwan (Ho 1993)
132. *Schwiebea danielopoli* Fain, 1982: Sakha (Yakutia) Republic; Eastern Siberia, Western Sayan Mountains (Bugrov 1995)
133. *Schwiebea elongata* (Banks, 1906) (=*S. athiasae* Fain 1977, *S. barbei* Cooremani 1959, *S. codognoensis* Fain et Pagani 1989, *S. obesa* Fain et Fauvel 1988, *S. receptacula* Manson 1972): Kuril Islands: Kunashir (as *receptacula*) (Bugrov 1995); Japan (Okabe et al. 2008; Okabe and Oconnor 2000)
134. *Schwiebea estradai* Fain et Ferrando, 1991: Japan (Okabe et al. 2008)
135. *Schwiebea falticis* Woodring, 1966: Japan (tentatively identified) (Woodring 1966)
136. *Schwiebea jiangxiensis* Jiang, 1995: China: Jiangxi (Jiang 1995)
137. *Schwiebea kurilensis* Bugrov, 1995: Kuril Islands: Kunashir (Bugrov 1995)
138. *Schwiebea lebruni* Fain, 1977: Japan (Okabe et al. 2008)
139. *Schwiebea longibursata* Fain et Wauthy, 1979: Sakhalin (Bugrov 1995), Primorskiy Kray, Irkutskaya Obalst' (Bugrov 1995, 1997)
140. *Schwiebea meilingensis* Jiang, 1997: China (Jiang 1997)
141. *Schwiebea mertzis* Woodring, 1966: Japan (tentative identification) (Woodring 1966); China: Taiwan (Tseng 1989)
142. *Schwiebea neomycolicha* Klimov, 1998: Primorskiy Kray (Klimov 1998c)
143. *Schwiebea nova* (Oudemans, 1906) (=*Schwiebea rossica* Zachvatkin, 1941): Primorskiy Kray

(Tareev 1970); Irkutskaya Oblast', Novosibirskaya Oblast' (Klimov 1998c)

144. *Schwiebea parallela* (J. Müller, 1860) (=*Schwiebea tshernyshevi* Zachvatkin, 1941; *Schwiebea eurynymphae* (non Oudemans, 1910) sensu F. Türk, E. Türk 1957): Kamchatka (Klimov 1998c), Kuril Islands: Kunashir (Bugrov 1995), Paramushir (Klimov 1998c), Primorskiy Kray (Tareev 1970), Novosibirskaya Oblast' (Bugrov 1995)
145. *Schwiebea ruienensis* Fain et Wauthy, 1979: Sakhalin, Irkutskaya oblast', Western Sayan Mountains (Bugrov 1995)
146. *Schwiebea sakhalinensis* Bugrov, 1995: Sakhalin (Bugrov 1995)
147. *Schwiebea similis* Manson, 1972: Japan (Okabe et al. 2008); China, incl. Hong Kong (Manson 1972b; Fan et al. 2010)
148. *Schwiebea* sp1. n.: Primorsky Kray (heavily sclerotized)
149. *Schwiebea* sp2 n.: South Korea, ex *Necrodes asiaticus*
150. *Schwiebea* sp3. n.: Primorsky Kray
151. *Schwiebea* sp4. n.: Primorsky Kray
152. *Schwiebea* sp5. n.: Kuril Islands, ex *Sphecodes* sp.
153. *Schwiebea taiwanensis* Ho, 1993: China: Taiwan (Ho 1993)
154. *Schwiebea talpa* Oudemans, 1906 (=*Schwiebea pachyderma* Zachvatkin, 1941): Primorskiy Kray (Tareev 1970), Irkutskaya Oblast' (our data)
155. *Schwiebea xianggangensis* Jiang, 1998: China (Jiang 1998)
156. *Schwiebea zhangzhouensis* Lin et Lin, 2000: China: Fujian (Lin and Lin 2000)
157. *Schwiebea zingiberi* Manson, 1972: China: Hong Kong (Manson 1972b)

42. *Lamtoglyphus* Fain, 1974

158. *Lamtoglyphus longiretinalis* (Klimov, 1998) (=*Michaelopus longiretinalis* Klimov, 1998): South Korea (Klimov 1998 (1999)) (this genus is different from *Schwiebea* only by the presence of eye spots in heteropmorphic deutonymphs, and has been implicitly synonymized with *Schwiebea* (Okabe et al. 2008). In addition, *Lamtoglyphus aff. coineaui* (Okabe et al. 2008) and *Lamtoglyphus* sp. (Kurosa 2000) were recorded for Japan.

43. *Fagacarus* Fain et Norton, 1979

159. *Fagacarus* sp. n.: Primorskiy Kray (Klimov 2000 (2001)a)

44. *Histiogaster* Berlese, 1883 (=*Tyroglyphopsis* Vitzthum, 1926)

160. *Histiogaster carpio* (Kramer, 1881): China (Jiang 1994)
161. *Histiogaster cercus* (Zhang, 1994) (=*Thyreophagus cercus* Zhang, 1994): China: Hubei (Zhang et al. 1994). Tentative generic assignment; the posterior lobe resembles that of *Reckiacarus*, however, the incomplete dorsal setation suggest close affinities with *Histiogaster.*
162. *Histiogaster filippovi* Zachvatkin, 1941: Primorskiy Kray (Zachvatkin 1941)
163. *Histiogaster hylecoeti* Cooreman, 1952: Japan (Kurosa 2000)
164. *Histiogaster orientalis* Volgin, 1966: Khabarovskiy Kray (Volgin 1966a)
165. *Histiogaster ornatus* Volgin, 1966: Primorskiy Kray (Volgin 1966a)
166. *Histiogaster rotundus* Woodring, 1966: Japan (Hiroyuki et al. 2003)
167. *Histiogaster* sp1. n.: Primorskiy Kray, decaying wood on beach
168. *Histiogaster* sp2. n.: Primorskiy Kray, oak sap flow

45. *Reckiacarus* Kadzhaja, 1972

169. *Reckiacarus* sp1. n.: Irkutskaya Oblast'
170. *Reckiacarus* sp2. n.: Primorskiy Kray
171. *Reckiacarus* sp3. n.: Sakhalin and Kuril Islands, ex *Rhopalum*. Tentative generic assignment.

46. *Calvoliella* Samšiňák, 1961

172. *Calvoliella laphriae* (Samšiňák, 1956): Khabarovskiy Kray, Primorskiy Kray, Amurskaya Oblast', Irkutskaya Oblast', Kemerovskaya Oblast' (Klimov 2000b); probably Japan (Fig. 28) (Kurosa 2000)

47. *Umakefeq* Klimov, 2000

173. *Umakefeq macroophtalmus* Klimov, 2000: Primorskiy Kray (Klimov 1999 (2000))
174. *Umakefeq mesoophtalmus* Klimov, 2000: Primorskiy Kray (Klimov 1999 (2000))
175. *Umakefeq microophtalmus* Klimov, 2000: Primorskiy Kray (Klimov, 1999 (2000))

48. *Thyreophagus* Rondani, 1874 (=*Monieziella* Berlese, 1897; *Fumouzea* Zachvatkin, 1953; *Michaelopus* Fain et Johnston, 1974)

176. *Thyreophagus corticalis* Michael, 1885: Primorskiy Kray
177. *Thyreophagus entomophagus* (Laboulbène, 1852): Novosibirskaya Oblast' (Zachvatkin 1953b); China (Fan et al. 2010), incl. Taiwan (Olsen 1983; Tseng 1989)
178. *Thyreophagus gallegoi* Portus et Gomez, 1982: China (Fan et al. 2010; Jiang 1991b), incl. Hong Kong (Olsen 1983)

49. gen. n.

179. gen. n. sp. n.: Primorskiy Kray, ex *Lycoperdina mandarinea*

Incertae sedis

180. *Tyroglyphus eriocheir* Pearse, 1930: China (Pearse 1930). This taxon has some resemblance to *Pontoppidania*, and probably, like this genus, belongs to the subfamily Tyrophaginae, family Acaridae.

Sinoglyphus lentinusi Zou et Wang, 1989: probably nom. nud.; cited in this ref. (Zhaopeng 1992), then in this ref. (Fan et al. 2010) for ref. (Zou and Wang 1989), but not found in ref. (Zou and Wang 1989).

Sphecacarus Klimov gen. n.

Type species *Tyroglyphus psenuli* Vitzthum, 1931 (=*Sphecacarus psenuli* (Vitzthum, 1931), comb. n.)

Diagnosis. *Adults*. By short, filiform *ve* (situated at same transverse line with *vi*) and heavily barbed *scx* resembles *Paraforcellinia* Kadzhaja, 1973 and *Aleuroglyphus* Zachvatkin, 1941. From these taxa differs by solenidion σ' shorter than σ" (longer in *Aleuroglyphus*, all *Forcellinia*, unknown in *Paraforcellinia*). We anticipate that in *Paraforcellinia* (briefly described, ex ant nest, very similar to *Forcellinia*) solenidion σ' is shorter than σ". Setae *vi* 2–2.5 times shorter than *ve* in *Paraforcellinia*, while in *Sphecacarus ve* are more than 3 times shorter than *vi*. *Sphecacarus* differs from *Aleuroglyphus* by the following (character states of *Aleuroglyphus* are in parentheses): *si* as long as *se* (*si* distinctly shorter); *scx* not flattened, evenly barbed (flattened, with barbed edges); dorsal hysterosomal setae nearly the same in length, barbed (c_1, c_2, d_1, d_2, e_1, e_2, h_1 distinctly shorter than other hysterosomal setae, smooth); *u*, *v*, *s* I–II spiniform, with normal ends (spiniform, with hooked ends).

Heteromorphic deutonymphs. Similar to *Forecellinia*, *Mycetoglyphus*, and *Tyrohagus* in having conoids ps_2 completely anterior to median sucker ad_{1+2}. By this character state can be readily distinguished from *Lackerbaueria* (which has ps_2 nearly on the same level as ad_{1+2}). Differs from *Forcellinia* and the two related genera by filiform and pectinated seate *cG* and *mG* I–II, and the absence of solenidion ω_2 (*cG* and *mG* I–II spiniforrm and smooth; ω_2 present in *Forecellinia*, *Mycetoglyphus*, and *Tyrohagus*).

Species included. *Sphecacarus americanus* (Baker, 1962) comb. n. (=*Lackerbaueria americana* Baker, 1962); *S. psenuli* (Vitzthum, 1931) comb. n. (=*Sphecacarus psenuli* Vitzthum, 1931, ?= *Lackerbaueria krombeini* Baker, 1962).

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