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FOUR NEW SPECIES OF *DIASPIDIOTUS*
AND *QUADRASPIDIOTUS*

(Homoptera, Coccoidea)

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Up to the present time the genera *Diaspidiotus* LEONARDI (1898) and *Quadraspidiotus* MACGILLIVRAY (1921) of the family Diaspididae have been represented in Japan by two species respectively; *Diaspidiotus makii* (KUWANA 1932), *Diaspidiotus kuwanai* TAKAHASHI (1952), *Quadraspidiotus perniciosus* (COMSTOCK 1881) and *Quadraspidiotus cryptoxanthus* (COCKERELL 1900). In the present paper are described four new species. All the types herein dealt were collected by the writer and will be deposited in the collection of the Entomological Institute, Hokkaido University.

Before going further, the writer wishes to acknowledge his indebtedness to Prof. Dr. R. TAKAHASHI for his very helpful suggestions. He also takes this opportunity of thanking Prof. Dr. T. UCHIDA and Prof. Dr. C. WATANABE for their continuous kind guidance.

Diaspidiotus naracola sp. nov.

Adult female—Body pyriform. Cephalothorax tending to be sclerotized at maturity. Prosomatic tubercles present, much smaller than antennal tubercle, cylindrical or tubercular, sometimes divided at apex. Perivulvar pores in 4 groups of 2-8 pores. Anus elliptical, equal to or a littler smaller than length of median lobe in longitudinal diameter, removed from bases of median lobes by 1-1.5 times this diameter. Anal furrow sclerotized along lateral margins.

Median lobes large and stout, asymmetrical, parallel or nearly so on inner margins, convergent posteriorly on outer margins which are serrate or almost entire, apex being round. Second lobe absent or at most represented by a slight prominence. A pair of spines in each pygidial incision; spines in median incision minute and simple, and those in lateral incisions short but robust, pointed or divided apically, those in outer lateral incision becoming often wider and dentate apically. Paraphyses in both lateral incisions, quite small; outer pair of paraphyses smaller than the inner. Pygidial dorsal macroducts slender, their orifices being arranged as follows: 1 between median lobes; 6 or 7, rarely 5 or 8, between median and second lobes, closely clustered; 1 at outer base of second lobe; 9-13 in an irregularly double or triple row between sixth and seventh abdominal segments; 1 or 2 on sixth abdominal segment near pygidial margin; 9-17 in an irregularly double or triple or partly single row between fifth and sixth abdominal segments, anterior elements of this series attaining laterobasal

scar; and 1-4 on fifth abdominal segment. Fourth abdominal segment with 2-6 dorsal macroducts on submarginal region. Orifices of dorsal macroducts near pygidial margin highly sclerotized on rim. Loosely clustered ventral microducts on fourth and fifth abdominal segments, their orifices being opened marginally or submarginally. First to third abdominal segments and meso- and metathorax with a few short pleural macroducts. Submarginal dorsal microducts which occur on first to third abdominal segments and thoracic region becoming sometimes rather numerous.

Holotype (♀) and Paratypes (8 ♀♀); Kamidaki, Toyama-ken, Honsyu, 18. IV, 1956, host—*Quercus serrata* THUNBERG.

Habit—The types were collected on the bark of the host. The scale is of the type common to the genus, being gray.

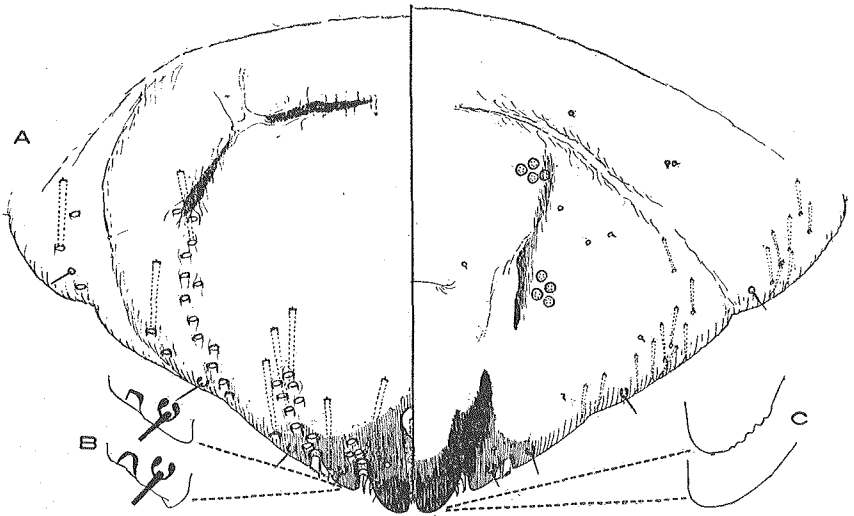


Fig. 1. *Diaspidiotus naracola* sp. nov. ♀.

A: Pygidium. B: Second lobes. C: Median lobes.

Notes—This species may be allied to *Diaspidiotus osborni* (NEWELL et COCKERELL 1898) and *Diaspidiotus wiinni* (LINDINGER 1911), both *Quercus*-infesting species from which it is distinct by having some dorsal macroducts on the fourth abdominal segment. Furthermore, it has the distinct prosomatic tubercles and a pair of minute spines in the median incision of the pygidium differing by these characters from *D. osborni*, and has the perivulvar pores differing in this point from *D. wiinni*. The present species is also much similar to *Diaspidiotus ehrhorni* (COLEMAN 1903) which occurs on *Abies* or other Coniferae in California, but distinguishable from the latter in having the prosomatic tubercles and a pair of spines between the median lobes.

Diaspidiotus spiraspinae sp. nov.

Adult female—Body subcircular or pyriform. Derm remaining membranous except for pygidium. Prosomatic tubercles rudimentary but apparently present. Usually 2 spines present on ventrum laterad of anterior stigma, robust, tubercular or pointed apically. Scale-like markings of derm appearing around mentum and between posterior stigmata. Perivulvar pores absent. Anus quite smaller in diameter than length of median lobe, removed from bases of median lobes by about 2-6 times this diameter.

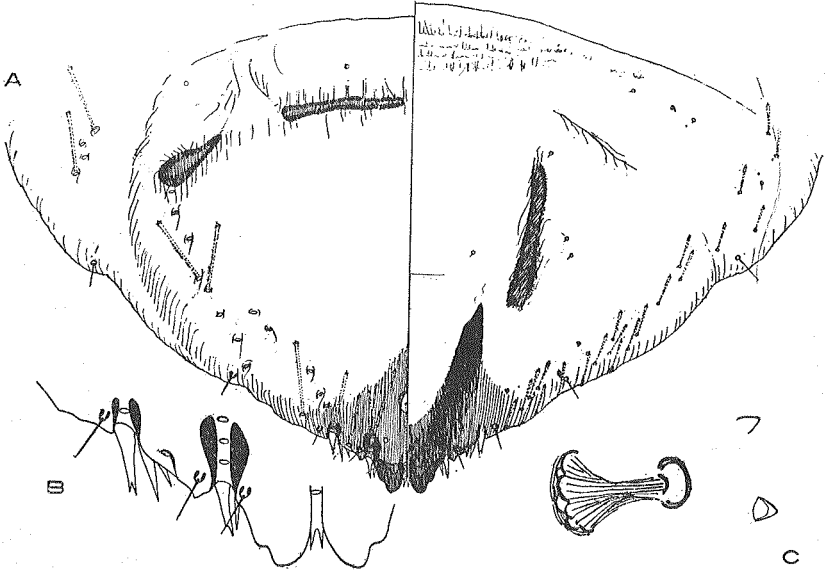


Fig. 2. *Diaspidiotus spiraspinae* sp. nov. ♀.

A: Pygidium. B: Pygidial margin in dorsal aspect.
C: Anterior stigma with accompanying spines.

Median lobe stout, strongly projecting, convergent on inner and outer margins, distinctly notched once on outer margin, sometimes also notched once on inner margin, but faintly and a little posteriorly than on the outer, apex being round. Second lobe represented by a slight prominence. Pygidial marginal spines rather robust, simple or divided apically, arranged as follows: 2 between median lobes, 2 in incision between median and second lobes, and 3 in next incision, inner one of this group being usually much smaller. Paraphyses in both lateral incisions, slender or more or less fusiform; inner pair well developed, elements of this pair being subequal in size; outer pair smaller than the inner, outer paraphysis of this pair being subequal to the inner in size or reduced. Macroducts slender, and their orifices quite small. Pygidial dorsal macroducts

few, their orifices being arranged as follows: 1 between median lobes; 3 in incision between median and second lobes; 1 at outer base of second lobe; 3-5 in a row between sixth and seventh abdominal segments; 2 or 3 on sixth abdominal segment, 1 of them being located near pygidial margin; and 5-9 in a row between fifth and sixth abdominal segments, this series often attaining laterobasal scar. Fifth abdominal segment usually lacking dorsal macroducts. Some submarginal dorsal macroducts arranged on third and fourth abdominal segments. First to third abdominal segments and meso- and metathorax with a few short pleural macroducts. Pygidial microducts present, opened submarginally on ventrum or marginally.

Holotype (♀): Toyama, Toyama-ken, Honsyu, 8. V, 1956, host—*Ilex crenata* THUNBERG. Paratypes (8 ♀♀): 6 ♀♀, Toyama, Toyama-ken, Honsyu, 8. V, 1956, host—*Ilex crenata* THUNBERG; 2 ♀♀, Namerikawa, Toyama-ken, Honsyu, 16. IV, 1956, host—*Viburnum Wrightii* MIQUEL.

Habit—This species occurs on the bark of the hosts. It tends to be covered by the epidermis of the host when it occurs on *Viburnum*, and the scales are, on this occasion, hardly recognizable. While on *Ilex*, of which the bark is hard and smooth, they are entirely exposed. The scale is of the type common to the genus, being gray.

Notes—The present species is characterized by the spines which are accompanied with the anterior stigmata. In the pygidial characters, it seems to be allied to certain species from the Central Asia, especially *Diaspidiotus transcaspensis* (MARLATT 1908), *Diaspidiotus prunorm* (LAING 1931) and *Diaspidiotus leguminosum* (ARKHANGELSKAIA 1937). It may be distinguishable from these species by having the well developed marginal spines in each pygidial incision.

Quadraspidotus macroporanus sp. nov.

Adult female—Body subcircular. Cephalothorax not sclerotized at maturity. Perivulvar pores absent. Anus amygdaloid, quite large, anal length being distinctly larger than length of median lobe; distance between anus and bases of median lobes usually smaller than anal length, at most not larger than 1.5 times this length. Anal furrow broad, sclerotized along lateral margins.

Median lobes stout, convergent but clearly separated, asymmetrical, with a deep notch on outer margin, sometimes with a faint notch near apex on inner margin, rounded apically. Second lobe strong but smaller than the median, asymmetrical, with 2 or 3 dentations on outer side, rounded apically. Third lobe rudimentary, represented by a pointed prominence. Marginal spines in pygidial incisions slender, finely fimbriate or entire, arranged as follows: 2 between median lobes, 2 between median and second lobes, and 3 in next incision. Gland spines beyond third lobe, usually 3, robust, bifurcate apically. A few small processes bearing a microduct sometimes appearing on fifth abdominal segment. Pair of paraphyses along inner margins of median lobes more or less divergent anteriorly, elongate, slightly curved. Paraphyses in both lateral incisions fusiform or slender; elements in each pair clearly separated. Dorsal macroducts on pygidium slender,

their orifices being arranged as follows: 1 or most often 2 in median incision; 3-6 in incision between median and second lobes; 1 at outer base of second lobe, highly sclerotized on rim; 6-11 in intersegmental furrow between sixth and seventh abdominal segments; 2-5 on sixth abdominal segment, divided into 2 groups, one of these groups which contains 1 or 2 orifices being located near pygidial margin; 4-10 in intersegmental furrow between fifth and sixth abdominal segments, no element of this series attaining laterobasal scar; and 1-5 on fifth abdominal segment. First to third abdominal segments and even meso- and metathorax with a few pleural macroducts which are quite much shorter than pygidial macroducts. Clustered submarginal microducts on fourth and fifth abdominal segments, their orifices being opened on ventrum.

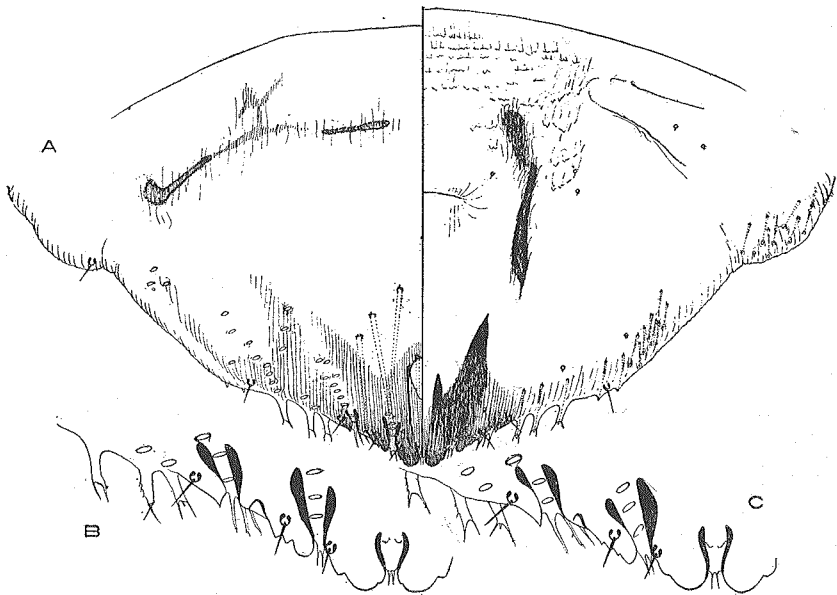


Fig. 3. *Quadraspidiotus macroporanus* sp. nov. ♀.

A: Pygidium. B, C: Pygidial margins in dorsal aspect.

Holotype (♀): Sapporo, Hokkaido, 18. IV, 1956, host—*Cercidiphyllum japonicum* SIEBOLD et ZUCCARINI. Paratypes (7 ♀♀): 2 ♀♀, Sapporo, Hokkaido, 18. IV, 1956, host—*Cercidiphyllum japonicum* SIEBOLD et ZUCCARINI; 5 ♀♀, Sapporo, Hokkaido, 7. VIII, 1955, host—*Tilia japonica* (MIQUEL) SIMONKAI.

Habit—The types were collected on the branches of the hosts. The scale of the female is flat or slightly convex, and dull brown; that of the male is not identified.

Notes—The present scale is very similar to *Q. perniciosus*, but regarded

here as a distinct species on account of the presence of the prepygidial macroducts. The dentate second lobes and the quite larger anal opening may be also characteristic of this species. Furthermore, it seems that the median incision of the pygidium is provided usually with two macropores, though among the paratypes there are two specimens in which a single macropore is seen between the median lobes which seem, in this case, to be set more closely than in the other specimens.

Quadraspidotus paraphyses sp. nov.

Adult female—Body subcircular. Prepygidial derm remaining membranous. Many ventral microducts clustered around mentum and stigmata. Perivulvar pores absent. Anus elliptical, equal to length of median lobe in longitudinal diameter, removed from bases of median lobes by 1.5-3 times this diameter.

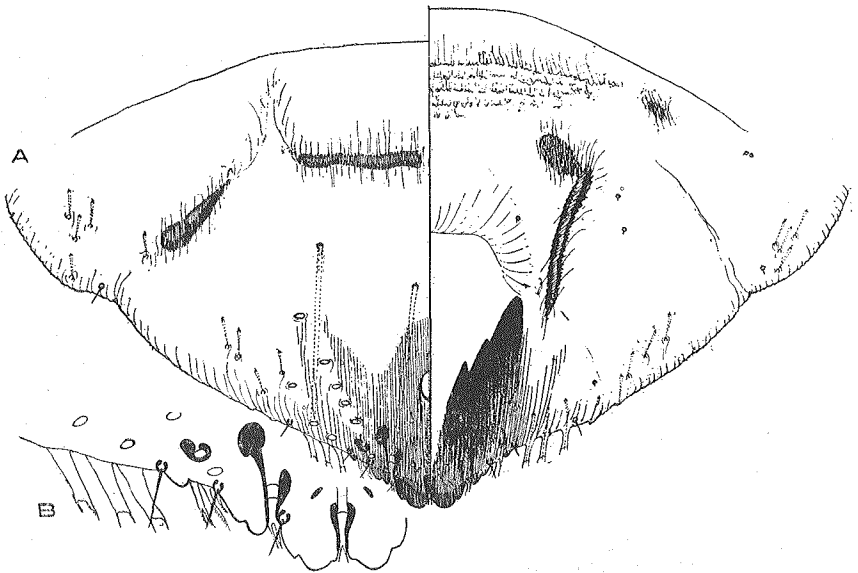


Fig. 4. *Quadraspidotus paraphyses* sp. nov. ♀.

A: Pygidium. B: Pygidial margin in dorsal aspect.

Median lobes set close, stout, asymmetrical, deeply notched once on outer margin, sometimes also notched once on inner margin, but not so deeply and a little posteriorly than on outer margin, apex being round. Second lobe similar to median lobe in form, but smaller, with a deep notch on outer side alone. Third lobe represented by a slight prominence. Marginal spines in pygidial incisions slender, simple or finely fimbriate, arranged as follows: 2 in median incision, 2 between median and second lobes, and 3 in next incision, outer 2 of

this group being well developed. Remarkable gland spines beyond third lobe, 3, long, usually bifurcate apically. A few small processes on margin of fifth abdominal segment, bearing a microduct. Paraphyses well developed. Paraphyses along inner margins of median lobes parallel or nearly so, slender, a little widened anteriorly. Pair of paraphyses occurring in incision between median and second lobes strongly developed; outer paraphysis of this pair prominent, elongate and terminating in a remarkable subcircular piece; inner one about half length of the outer, fusiform. Paraphyses between sixth and seventh abdominal segments much smaller, fused, forming more or less of a U, detached from pygidial margin. Dorsal macroducts on pygidium quite few, long, their orifices being arranged as follows: 1 in median incision; 2 or 3 in incision between median and second lobes; 5-8 in intersegmental furrow between sixth and seventh abdominal segments, penultimate orifice of this series being enclosed by U-shaped pair of paraphyses; and 1-3 in next series. First to third abdominal segments and metathorax with a few pleural macroducts which are quite much shorter than pygidial macroducts. Loosely clustered submarginal microducts on third to fifth abdominal segments, opened on both faces.

Holotype (♀): Toyama, Toyama-ken, Honsyu, 1. V, 1956, host—*Castanopsis cuspidata* (THUNBERG) SCHOTTKY. Paratypes (15 ♀♀): 10 ♀♀, 1. V, 1956, 5 ♀♀, 27. VIII, 1955, Toyama, Toyama-ken, Honsyu, host—*Castanopsis cuspidata* (THUNBERG) SCHOTTKY.

Habit—The types were collected on the branches of the host. The scale of the female is of the type common to the genus, being dark brown; that of the male is not identified.

Notes—This species is quite unique in having the paraphyses of distinct form at the inner bases of the second lobes. These paraphyses, which differ from the claviform ones of *Quadraspidotus lenticularis* (LINDINGER 1912), are similar to those which occur at the outer bases of the median lobes in certain species including the type of *Clavaspis* MACGILLIVRAY (1921). Though this species is here referred to *Quadraspidotus*, further study is, of course, necessary to determine its definite taxonomic position.