

Studies on Mesostigmatid Mites Parasitic on Mammals and Birds in Japan

VIII. Bat Mites of the Genus *Eyndhovenia* RUDNICK, 1960, with Redescription of *Eyndhovenia euryalis euryalis* (CANESTRINI, 1884)

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In the revision of the family Spinturnicidae, RUDNICK (1960) erected the genus *Eyndhovenia* for *Pteroptus euryalis* CANESTRINI, 1884, which had been described as a parasite of *Rhinolophus euryale*, and reduced several specific and subspecific names theretofore described as parasites on *Rhinolophus* spp. to synonyms of the type-species. RUDNICK (1960) found that specimens from *R. euryale* and *R. cornutus cornutus* were consistently smaller than those from *R. ferrumequinum*, and noted that this difference in size seemed to be a host-dependent variation. Although RUDNICK (1960) suspended further investigations, any host-dependent variation should not be overlooked, since it reflects a step in the course of speciation of parasites that are isolated on or in different hosts.

BAKER and DELFINADO (1964), then, introduced subspecies to *Eyndhovenia euryalis* (CANESTRINI) *sensu* RUDNICK (1960) on the basis of the differences in the ventral structures as well as size. The present authors have examined several mites of the genus parasitic on *Rhinolophus* spp. from Europe, Oriental Region and Japan, and recognized evidently host-dependent variations, which are sufficient for declaring that *E. euryalis sensu* RUDNICK (1960) should be separated into several subspecies. Appreciating these variations and according to the above view-point, the authors intend to re-examine the species or subspecies synonymized with or lumped under *E. euryalis* (CANESTRINI) *sensu* RUDNICK (1960), which has been succeeded by DOMROW (1972), and to discuss the subspecies described by BAKER and DELFINADO (1964) as parasites of Korean *Rhinolophus* bats that are also distributed in Japan.

AS BAKER and DELFINADO (1964) justified a subspecies from *R. cornutus cornutus* as *E. euryalis euryalis*, probably without comparing it with the nominate form from *R. euryale*, the definite understanding of morphology of *E. euryalis euryalis* from the

type-host is of a prior necessity. The redescription and figures of *E. euryalis* (CANESTRINI) are properly presented in RUDNICK (1960, pl. 28), but additional morphological accounts are still necessary for discussing the mite at subspecific level. The present paper deals with the definition of the nominate subspecies of *E. euryalis* and, then, presents Japanese subspecies, as a preliminary study on the genus *Eyndhovenia* RUDNICK.

Eyndhovenia euryalis euryalis (CANESTRINI, 1884)

(Figs. 1-5)

Eyndhovenia euryalis (CANESTRINI, 1884) RUDNICK, 1960, Univ. Calif. Publ. Ent., 17: 188, pl. 28.

Female (Fig. 1). Measurements are presented in Table 1. Idiosomal size and form varied according to state of engorgement and gravidity; widest at level between coxae II and III and tapered to rounded posterior margin in unfed specimens, but lateral margins almost parallel and broadly rounded posteriorly in fed and gravid specimens. Eleven pairs of pores present on dorsal shield. Tritosternal shield large, with prominent postero-lateral lobes. Sternal shield consisting of anterior, strongly chitinized and posterior, weakly sclerotized parts with a prominent demarcation between them at level of 3rd sternal setae. Ventral soft integument armored with numerous spinelets arranged as in Fig. 1B. Other structures as in RUDNICK (1960).

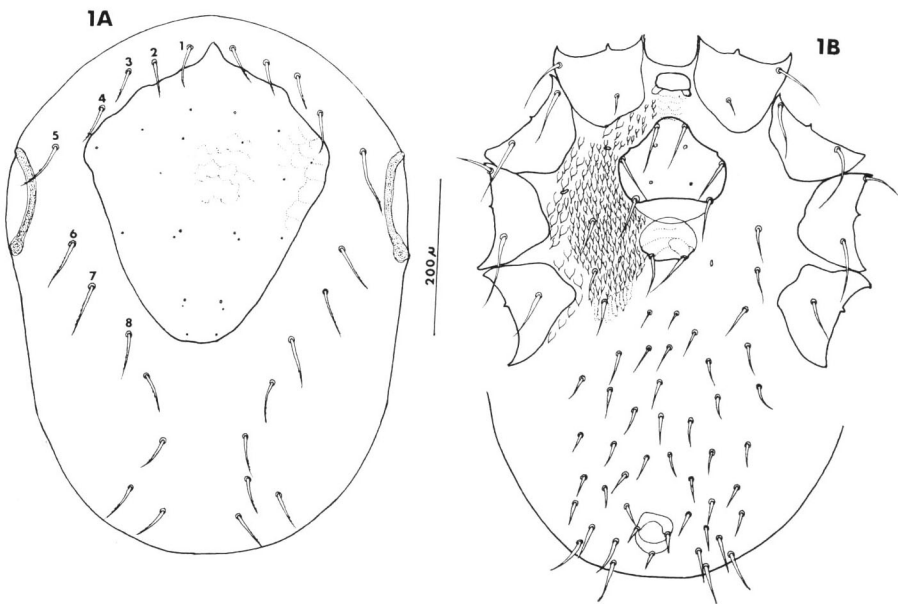


Fig. 1. Idiosoma of *Eyndhovenia euryalis euryalis* (CANESTRINI, 1884), female; A, dorsum; B, venter.

Male (Fig. 2). Measurements as in Table 2. Sternal shield flask-shaped; 3rd

Table 1. Measurements in microns for females of *Eynhoventia euryalis* subsp. from *Rhinolophus* spp. (ranges followed by means in parentheses).

Host species Locality Mite subspecies n	<i>R. euryalis</i> Europe <i>euryalis</i>		<i>R. cornutus</i> Japan <i>cornuti</i>		<i>Rhinolophus</i> sp. Japan (triotome) <i>cornuti</i>		<i>R. ferrumequinum</i> Europe <i>oudemansi</i>		<i>R. ferrumequinum</i> Japan <i>oudemansi</i>	
	10	10	26	7	5	15				
Idiosoma										
Length	550-708(619.1)	475-680(558.2)	580-810(733.3)	510-642(565.4)	525-740(567.1)					
Width	395-500(426.7)	370-490(405.4)	425-590(520.8)	405-465(429.4)	390-460(413.0)					
Dorsal shield										
Length	340-384(361.6)	300-410(332.8)	360-410(381.4)	390-421(402.6)	370-405(389.0)					
Width	270-300(285.0)	240-310(272.8)	290-330(308.3)	285-320(300.2)	270-310(284.3)					
Seta										
1	45-54(49.6)	48-73(56.4)	55-65(60.3)	55-65(60.4)	48-63(56.1)					
2	45-54(49.3)	45-70(53.8)	55-65(60.6)	53-63(56.6)	49-58(54.1)					
3	43-56(47.8)	43-70(53.3)	55-63(58.4)	53-60(56.4)	46-55(52.5)					
4	48-59(54.8)	42-65(53.7)	63-70(63.8)	55-60(58.0)	48-63(57.3)					
5	73-86(77.4)	65-95(76.6)	73-80(77.1)	75-86(82.8)	77-90(83.1)					
6	65-76(71.9)	63-80(69.8)	71-83(76.1)	73-83(76.2)	68-83(75.8)					
7	65-76(71.4)	52-68(59.0)	60-75(66.3)	66-76(70.6)	63-76(70.7)					
8	55-66(60.5)	40-58(47.4)	45-64(56.7)	53-68(57.4)	45-57(52.6)					
Peritreme										
Length	123-143(129.1)	105-140(126.1)	123-145(135.6)	144-153(147.0)	140-163(149.9)					
Width	23-25(23.4)	20-30(22.9)	25-28(25.7)	24-25(24.8)	23-27(25.1)					
Tritosternum										
Length	41-50(44.8)	35-48(42.3)	45-50(48.0)	52-56(53.4)	45-55(50.6)					
Width	88-103(96.0)	88-118(104.7)	108-128(118.3)	118-144(130.2)	105-130(116.5)					
Sternal shield										
Length	113-138(121.1)	102-128(112.5)	118-138(126.0)	132-151(141.4)	120-135(126.7)					
Width	410-460(426.3)	380-480(420.8)	460-500(479.3)	475-520(481.8)	440-495(461.0)					
Leg										
I	355-410(381.0)	330-460(375.0)	410-445(427.1)	420-470(436.4)	400-430(410.0)					
II	370-421(378.9)	340-475(397.1)	440-480(459.3)	421-480(452.4)	400-450(415.7)					
III										
IV	460-510(473.1)	420-535(472.7)	545-580(563.6)	516-570(541.0)	455-520(493.8)					

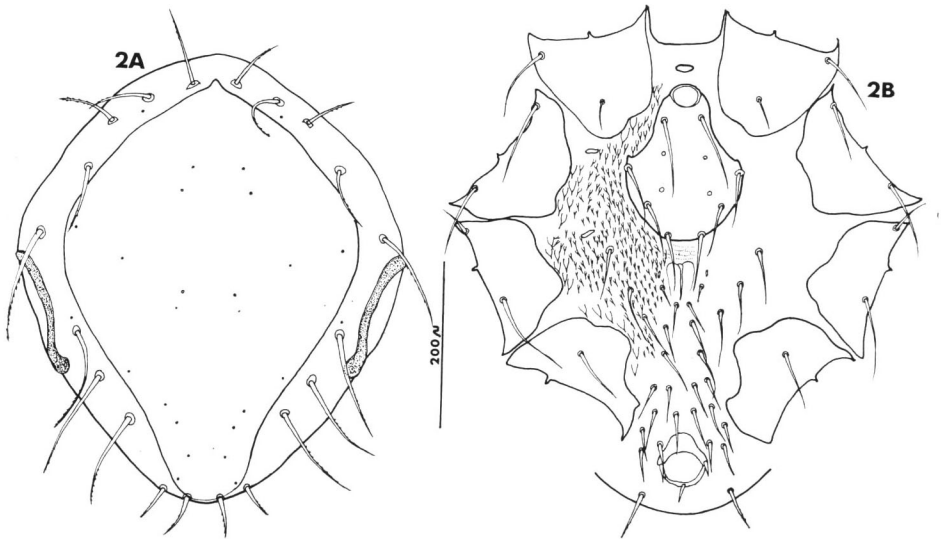


Fig. 2. Idiosoma of *Eynndhovenia euryalis euryalis* (CANESTRINI, 1884), male; A, dorsum; B, venter.

sternal setae distinctly apart interiorly from lateral margins of the shield. Three pairs of dorsal opisthosomal setae prominent and subequal in length. Caudalmost setae subequal in length. Tritosternal shield elongate oval. Ventral spinelets, and other structures essentially as in female.

Deutonymphs (Figs. 3 and 4). Measurements as in Tables 3 and 4. Dorsal

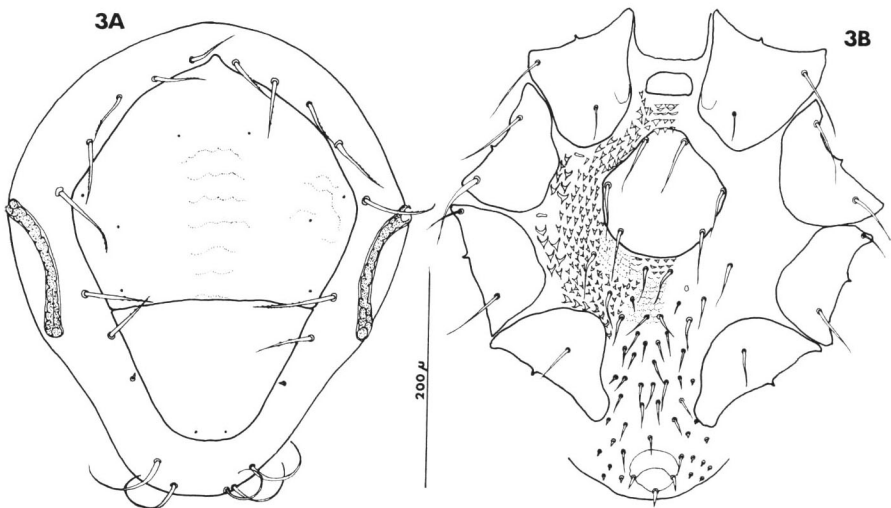


Fig. 3. Idiosoma of *Eynndhovenia euryalis euryalis* (CANESTRINI, 1884), female deutonymph; A, dorsum; B, venter.

Table 2. Measurements in microns for males of *Eyndhovenia euryalis* subsp. from *Rhinolophus* spp. (ranges followed by means in parentheses).

Host species Locality Mite subspecies n	<i>R. euryale</i>		<i>R. cornutus</i>		<i>Rhinolophus</i> sp. Japan (Triomote)		<i>R. ferrumequinum</i>	
	Europe <i>euryalis</i> 10	Japan <i>cornutus</i> 20	Japan <i>cornutus</i> 10	Europe <i>oudemansi</i> 3	Japan <i>oudemansi</i> 10	Japan <i>oudemansi</i> 10	Europe <i>oudemansi</i> 3	Japan <i>oudemansi</i> 10
Idiosoma								
Length	446-578(506.9)	370-500(414.5)	480-530(496.0)	440, 440, 445	450-550(479.1)		440, 440, 445	450-550(479.1)
Width	402-496(431.3)	330-440(366.5)	410-470(436.0)	380, 400, 410	380-430(394.0)		380, 400, 410	380-430(394.0)
Dorsal shield								
Length	415-480(449.1)	330-440(364.8)	445-480(455.0)	410, 410, 420	410-440(426.5)		410, 410, 420	410-440(426.5)
Width	283-340(310.1)	245-340(280.5)	330-360(340.5)	280, 280, 295	275-300(285.0)		280, 280, 295	275-300(285.0)
Seta								
1	56-78(68.6)	45-90(60.3)	75-100(81.9)	43, 50, 51	45-70(52.7)		43, 50, 51	45-70(52.7)
2	50-81(68.9)	45-88(59.9)	75-79(82.3)	48, 50, 53	45-70(51.9)		48, 50, 53	45-70(51.9)
3	46-71(59.9)	40-70(53.3)	70-90(76.9)	45, 48, 48	48-63(51.7)		45, 48, 48	48-63(51.7)
4	50-78(65.6)	40-78(54.8)	75-85(79.4)	50, 50, 53	40-63(50.5)		50, 50, 53	40-63(50.5)
5	83-123(103.0)	68-120(85.4)	103-113(107.8)	75, 82, —	75-105(84.9)		75, 82, —	75-105(84.9)
6	76-135(107.1)	50-120(83.8)	106-126(113.6)	68, 70, 72	73-110(80.9)		68, 70, 72	73-110(80.9)
7	78-130(107.5)	50-113(73.6)	86-105(95.5)	63, 68, 73	70-83(74.7)		63, 68, 73	70-83(74.7)
8	73-124(98.5)	38-90(58.4)	75-92(81.1)	53, 60, 65	40-62(49.8)		53, 60, 65	40-62(49.8)
Peritreme	134-150(142.2)	113-145(123.4)	133-145(141.1)	140, 153, 153	130-158(145.2)		140, 153, 153	130-158(145.2)
Tritosternum								
Length	7-10(8.6)	5-8(6.1)	8-10(8.5)	8, 8, 8	8-10(9.3)		8, 8, 8	8-10(9.3)
Width	19-25(22.0)	20-30(23.5)	18-25(22.0)	25, 25, 30	25-30(26.4)		25, 25, 30	25-30(26.4)
Sternal shield								
Length	154-177(164.6)	143-185(157.2)	170-192(182.5)	170, 173, 175	162-185(171.0)		170, 173, 175	162-185(171.0)
Width	119-133(121.9)	108-140(121.6)	128-150(137.3)	138, 138, 138	120-138(129.7)		138, 138, 138	120-138(129.7)
Leg								
I	471-580(523.7)	390-540(448.6)	520-610(562.5)	490, 505, 540	450-490(472.0)		490, 505, 540	450-490(472.0)
II	408-528(462.8)	340-480(398.2)	460-530(500.0)	425, 430, 440	400-435(414.5)		425, 430, 440	400-435(414.5)
III	390-520(456.5)	360-515(414.2)	500-550(534.5)	440, 460, 470	400-435(414.5)		440, 460, 470	400-435(414.5)
IV	490-650(567.3)	420-630(502.3)	630-720(661.2)	530, 530, 550	470-510(493.5)		530, 530, 550	470-510(493.5)

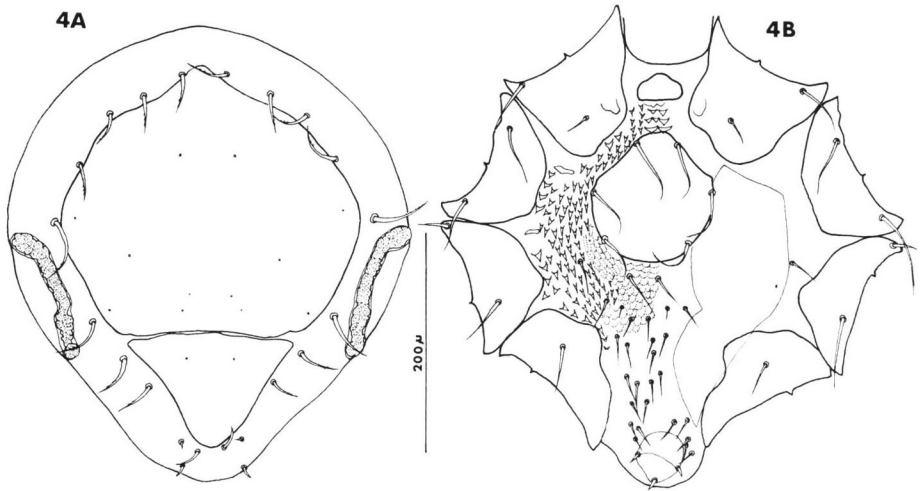


Fig. 4. Idiosoma of *Eynndhovenia euryalis euryalis* (CANESTRINI, 1884), male deutonymph; A, dorsum; B, venter.

Table 3. Measurements in microns for female deutonymphs of *Eynndhovenia euryalis* subsp. from *Rhinolophus* spp. (ranges followed by means in parentheses).

Host species		<i>R. euryale</i>	<i>R. cornutus</i>	<i>Rhinolophus</i> sp.
Locality		Europe	Japan	Japan (Iriomote)
Mite subspecies		<i>euryalis</i>	<i>cornuti</i>	<i>cornuti</i>
	n	5	4	1
Idiosoma	Length	420–490(464.6)	410–500(457.5)	490
	Width	360–402(390.0)	380–425(412.5)	390
Dorsal shield	Length	325–391(373.8*)	350–400(382.5)	390
	Width	255–263(260.0*)	265–310(297.5)	290
Dorsal seta	1	48– 56(51.2)	50– 70(59.5)	69
	2	48– 55(51.8)	50– 70(59.0)	70
	3	48– 53(50.8)	50– 60(55.8)	63
	4	58– 66(61.2)	53– 65(58.3)	73
	5	66– 81(75.2)	68– 90(80.8)	83
	6	73– 81(75.8)	73– 87(79.5)	80
	7	53– 61(57.8)	53– 70(57.8)	60
	8	7– 12(10.0)	14– 17(15.3)	15
Peritreme		126–144(138.0)	140–155(148.8)	150
Tritosternal	Length	25 (25.0)	25– 30(28.3)	23
	Width	38– 40(38.4)	35– 45(40.3)	40
Sternal shield	Length	106–115(109.8)	98–115(106.0)	120
	Width	106–113(109.2)	108–118(114.3)	120
Leg	I	434–459(445.2)	410–540(458.0)	470
	II	384–415(396.0)	370–470(405.0)	420
	III	377–415(396.8)	370–510(420.6)	440
	IV	447–472(467.8)	440–610(507.5)	525

* Podonotal shield L 215–227(221.3)
W 256–263(260.0)

* Pygidial shield L 164–167(164.8)
W 179–189(183.0)

Table 4. Measurements in microns for male deutonymph of *Eyndhovenia euryalis* subsp. from *Rhinolophus* spp. (ranges followed by means in parentheses).

Host species Locality Mite subspecies n		<i>R. euryale</i> Europe <i>euryalis</i> 5	<i>R. cornutus</i> Japan <i>cornuti</i> 6	<i>Rhinolophus</i> sp. Japan (Iriomote) <i>cornuti</i> 5
Idiosoma	Length	410–540(482.2)	405–510(470.0)	420–485(456.0)
	Width	370–465(424.8)	350–465(406.7)	400–430(418.0)
Dorsal shield	Length	350–407(389.4*)	330–450(394.2)	380–400(388.0)
	Width	270–306(293.8*)	250–335(300.0)	290–305(298.0)
Seta	1	41– 53(46.8)	48– 68(57.5)	61– 70(64.6)
	2	40– 48(45.4)	50– 65(56.7)	65– 69(67.0)
	3	40– 48(47.5)	48– 60(53.0)	56– 61(59.4)
	4	42– 53(49.8)	48– 68(56.8)	68– 70(69.0)
	5	70– 81(76.0)	65– 85(77.8)	78– 83(80.8)
	6	60– 70(65.0)	68– 85(76.0)	80– 83(82.2)
	7	55– 63(57.6)	38– 60(51.7)	55– 62(58.8)
	8	40– 52(45.0)	21– 38(30.4)	20– 28(24.8)
Peritreme		133–152(145.0)	133–158(144.8)	140–155(147.6)
Tritosternum	Length	25– 30(27.0)	20– 33(27.7)	25– 28(25.8)
	Width	40– 48(43.4)	40– 45(41.3)	38– 45(42.2)
Sternal shield	Length	118–139(123.4)	103–125(115.8)	118–140(125.2)
	Width	111–126(119.0)	95–145(119.7)	120–130(124.8)
Leg	I	490–515(499.5)	410–540(458.0)	480–510(496.0)
	II	440–452(443.0)	370–470(405.0)	425–460(438.8)
	III	438–452(442.5)	370–510(420.6)	430–480(452.5)
	IV	522–541(526.8)	440–610(507.5)	530–565(545.0)
* Podonotal shield	L 247–263(252.8) W 296–306(299.8)			
* Pygidial shield	L 144–149(146.5) W 180–202(190.3)			

shield not entire, divided into podonotal and pygidial shields. Female deutonymph (Fig. 3) bearing conspicuous caudal setae and minute 3rd opisthosomal setae dorsally and 35 long and 15 minute setae ventrally on soft integument. Male deutonymph (Fig. 4) dorsally with rather long 3rd opisthosomal setae and 3 pairs of weak caudal setae, and ventrally with only 29 setae on soft integument. Other structures essentially the same in both the potential sexes. Ventral spinelets almost as in adults.

Protonymph (Fig. 5). Measurements as in Table 5. Dorsum with large podonotal shield and 3 constituent pygidial shieldlets. Five pairs of stout setae surrounding podonotal shield anteriorly; a pair of strong setae close to stigmata and 2 pairs of short caudal setae present. Ventral spinelets arranged as in advanced stages, but less numerous. Four pairs of setae on ventral soft integument.

Material examined. Four ♂♂, 2 ♀♀, 2 female deutonymphs, 1 male deutonymph and 4 protonymphs ex *Rhinolophus euryale*, Cave Ardovo, Slovakian Karst, Czechoslovakia, 29–V–1959; 1 ♂ from the same host and locality, 5–II–1958; 5 ♂♂, 1 ♀, 2 female deutonymphs, 3 male deutonymphs and 4 protonymphs, from the same host, Drienovec

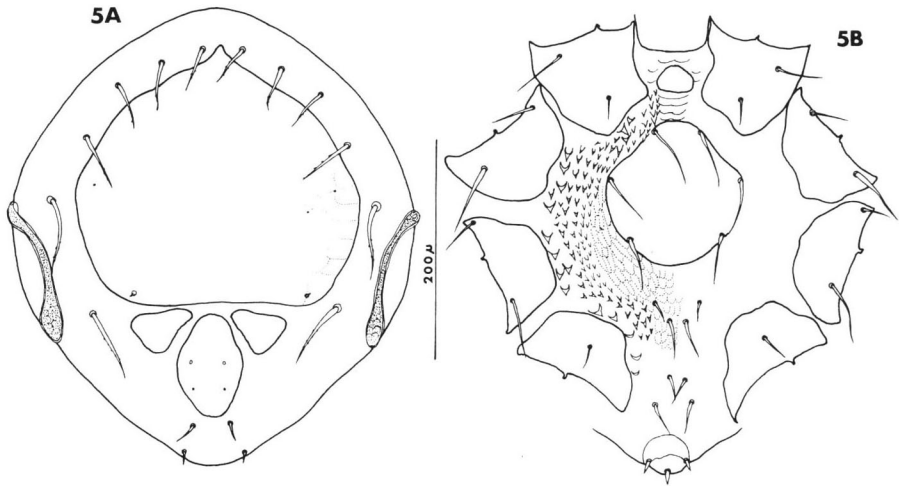


Fig. 5. Idiosoma of *Eyndhovenia euryalis euryalis* (CANESTRINI, 1884), protonymph; A, dorsum; B, venter.

Table 5. Measurements in microns for protonymphs of *Eyndhovenia euryalis* subsp. from *Rhinolophus* spp. (ranges followed by means in parentheses).

Host Species		<i>R. euryale</i>	<i>R. cornutus</i>	<i>Rhinolophus</i> sp.	<i>R. ferrumequinum</i>
Locality		Europe	Japan	Japan (Iriomote)	Japan
Mite subspecies		<i>euryalis</i>	<i>cornuti</i>	<i>cornuti</i>	<i>oudemansi</i>
	n	10	10	3	2
Idiosoma	Length	370–447(414.6)	340–470(387.5)	395–430(411.7)	455–460
	Width	330–402(364.4)	295–410(350.4)	350–372(364.0)	375–393
Podonotal shield	Length	210–250(230.3)	213–250(226.3)	230–233(232.0)	240–248
	Width	238–260(251.3)	225–270(251.9)	245–260(254.3)	248–255
Pygidial shield (median)	Length	93–111(103.0)	83–90(86.0)	88–100(94.0)	95–95
	Width	65–73(69.6)	73–78(75.0)	68–73(70.3)	80–95
Dorsal seta	1	39–45(41.4)	35–50(41.6)	42–45(43.3)	43–43
	2	38–44(40.8)	38–46(41.8)	45–47(45.7)	40–40
	3	38–43(39.2)	33–46(38.9)	38–45(41.0)	35–41
	4	50–58(53.8)	42–50(47.3)	50–55(52.7)	55–55
	5	58–75(64.7)	55–68(60.4)	60–66(62.0)	60–65
	6	63–73(68.9)	60–70(63.7)	65–70(67.3)	63–65
Peritreme		123–135(130.5)	115–150(129.9)	128–140(132.7)	130–138
Tritosternum	Length	25–30(28.7)	23–30(26.4)	24–28(25.7)	28–28
	Width	35–38(35.6)	30–40(35.0)	35–40(37.7)	38–40
Sternal shield	Length	113–131(121.7)	103–128(113.0)	113–140(125.3)	115–135
	Width	106–128(111.0)	95–115(108.0)	114–125(119.0)	115–123
Leg	I	380–434(404.9)	355–420(378.9)	410–425(420.0)	410–411
	II	335–389(355.9)	300–350(327.2)	350–370(361.7)	350–360
	III	315–374(345.6)	315–370(333.9)	365–385(373.3)	350–355
	IV	371–430(398.4)	345–410(376.1)	410–430(423.3)	400–400

Cave, Czechoslovakia, 1–VI–1959.

The following specimens were examined through the courtesy of Dr. F. LUKOSCHUS: Two ♀♀, 1 female deutonymph and 2 protonymphs from the same host, *Zinzulusa*, 25–VIII–1969; 1 ♂ ex *Miniopterus schreibersii* from the same locality and date; 2 ♂♂, 11 ♀♀ and 1 male deutonymph ex *Rhinolophus mehelyi* from the same locality and date; 1 ♂ and 1 ♀ ex *R. euryale* from the same locality, 25–VIII–1970; 2 ♀♀ from the same host, Olevano, 3–III–1966. The mites from *R. mehelyi* were identical with *Eyndhovenia euryalis euryalis*, and *M. schreibersii* was regarded as an accidental host.

Eyndhovenia euryalis cornuti subsp. nov.

(Figs. 6–11)

Eyndhovenia euryalis (CANESTRINI, 1884) RUDNICK, 1960, Univ. Calif. Publ. Ent., 17: 188, pl. 28.

Eyndhovenia euryalis euryalis: BAKER & DELFINADO, 1964, Pacif. Ins., 6: 25; UCHIKAWA, 1974, Jap. J. sanit. Zool., 24: 292.

Eyndhovenia euryalis subsp.: UCHIKAWA, 1975, Proc. Jap. Assoc. Acarology, 2: 11–12.

Female (Figs. 6, 8). Measurements as in Table 1. Eleven pairs of pores on dorsal shield. A pair of distinct pores each at levels of 3rd podosomal shield and 1st opisthosomal setae off the shield. Tritosternum almost trapezoid; postero-lateral lobes vestigial or completely absent. Sternal shield with tail of weak sclerite but demarcation between anterior and posterior parts not prominent. Spinelets on ventral soft integument sparse; only 2 spinelets close to coxa I, 7–8 in 2 rows each in juxtaposition to coxae II and III, and 5 in a row surrounding interior margin of coxa IV (Fig. 6 B). About 23 pairs of setae ventrally on soft integument.

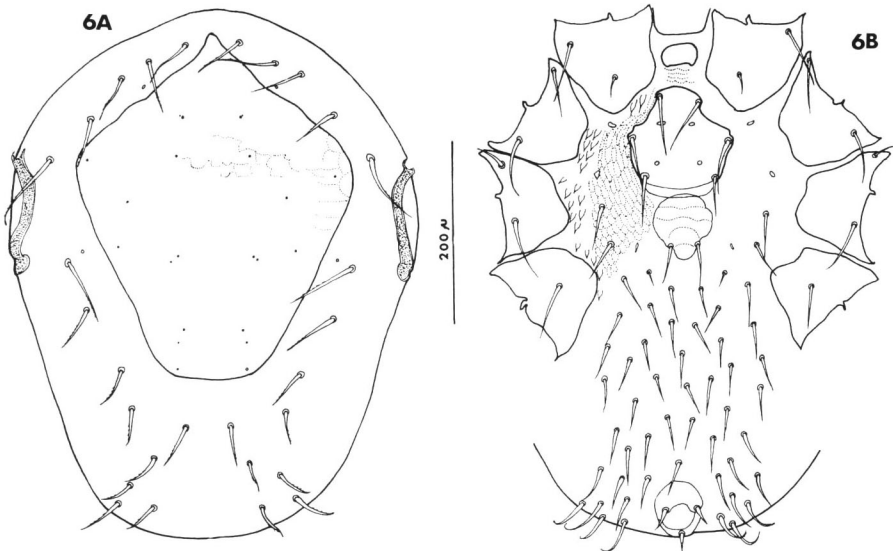


Fig. 6. Idiosoma of *Eyndhovenia euryalis cornuti* subsp. nov., female; A, dorsum; B, venter.

Male (Figs. 7, 8). Measurements as in Table 2. Opisthosomal setae 1–3 lessening length in this order. Three pairs of caudalmost setae distinctly different in size from one another. Sternal shield widest at second sternal setae and sharply narrowed posteriorly; 3rd sternal setae on lateral margins of sternal shield. Fourteen pairs of setae ventrally on soft integument. Ventral spinelets as in female. Other structures as in the nominate subspecies.

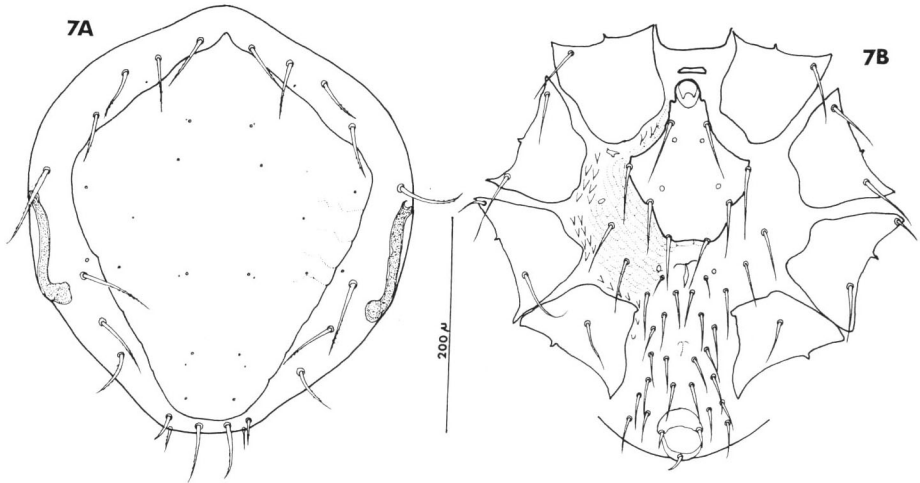


Fig. 7. Idiosoma of *Eynndhovenia euryalis cornuti* subsp. nov., male; A, dorsum; B, venter.

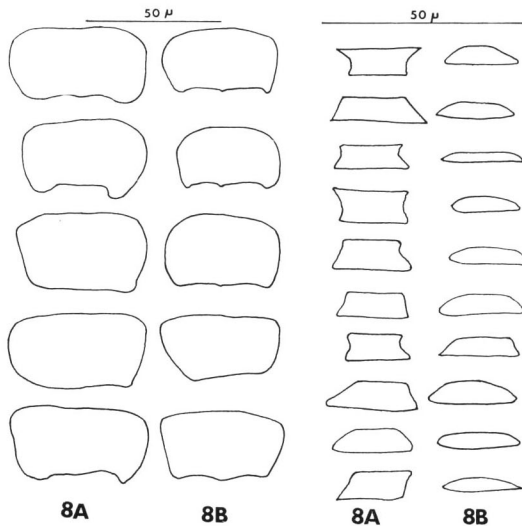


Fig. 8. Tritosternal shield of *Eynndhovenia euryalis cornuti* subsp. nov., left, female; right, male. A, Examples on mites from *Rhinolphus* sp. from Iriomote, Okinawa Pref., Japan; B, from *Rhinolphus cornutus* from various localities in Japan.

The outline of the tritosternal shield of both the sexes slightly varied among populations on *R. cornutus* from several localities and on *Rhinolophus* sp. as shown in Fig. 8. However, this difference seemed transitional and not significant.

Deutonymphs (Figs. 9 and 10). Measurements as in Tables 3 and 4. Dorsal shield entire. Female deutonymph (Fig. 9) with minute 3rd dorsal opisthosomal setae. Caudal setae consisting of a pair of long setae and 5 pairs of very minute setae. About 25 pairs of conspicuous setae ventrally on soft integument, with caudalmost 5 pairs being the longest. Male deutonymph (Fig. 10) with 3rd opisthosomal setae slightly longer than those of female deutonymph. A pair of long and 2 pairs of very minute caudalmost setae present. Fourteen pairs of setae ventrally on soft integument. Ventral spinelets and other structures essentially the same in the 2 deutonymphs, and as in those of the nominate subspecies.

The specimens parasitic on *Rhinolophus* sp. from Iriomote, Okinawa Prefecture, Japan, are slightly different in the length of the caudalmost minute setae from the specimens taken from *R. cornutus* (Figs. 9 and 10, C).

Protonymph (Fig. 11). Measurements as in Table 5. Caudalmost setae consisting of a pair of strong setae and a pair of very minute setae. Ventral spinelets sparse. Other structures as in the nominate subspecies.

Material examined. The following specimens were taken from *Rhinolophus cornutus*. The holotype female, allotype male, 5 pairs of paratype females and males, 2 ♂♂, 6 ♀♀ and 5 protonymphs (PN), Shôjô-dô, Kashiwazaki, Niigata Pref., 7-VIII-1976; 2 ♀♀ and 1 PN, 20-X-1974, 2 ♂♂, 26-X-1975, Otari, Nagano Pref.; 3 ♂♂ and 4 ♀♀, Nagano, Nagano Pref., 3-XI-1965; 4 ♀♀, 5-XII-1976, and 1 ♂, 9 ♀♀,

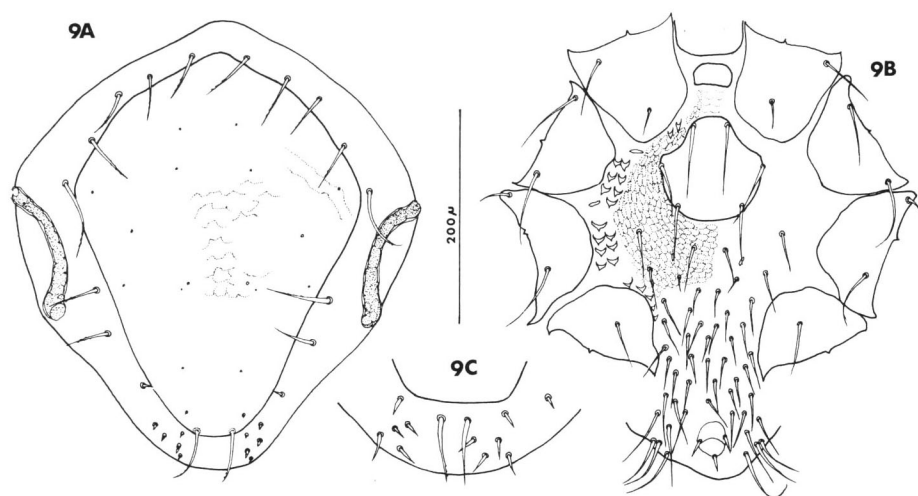


Fig. 9. Idiosoma of *Eyndhovenia euryalis cornuti* subsp. nov., female deutonymph; A, dorsum; B, venter; C, caudal part of dorsum of mite parasitic on *Rhinolophus* sp. from Iriomote, Okinawa Pref., Japan.

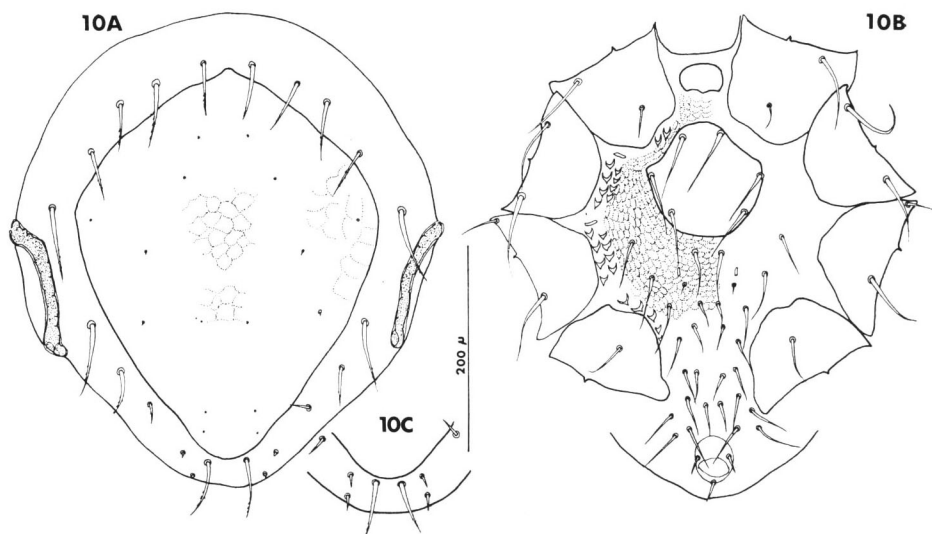


Fig. 10. Idiosoma of *Eynndhovenia euryalis cornuti* subsp. nov., male deutonymph; A, dorsum; B, venter; C, caudal part of dorsum of mite parasitic on *Rhinolophus* sp. from Iriomote, Okinawa Pref., Japan.

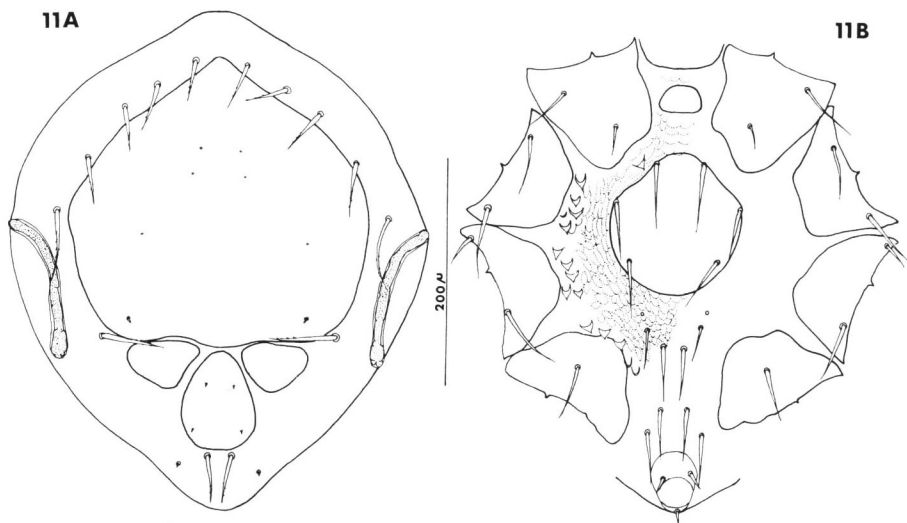


Fig. 11. Idiosoma of *Eynndhovenia euryalis cornuti* subsp. nov., protonymph; A, dorsum; B, venter.

25-III-1977, Shimashima-dani, Nagano Pref.; 2 ♂♂, 7 ♀♀, Chitose, Hokkaido, 19-IX-1974, 1 ♂, 1 ♀, 14-XII-1974, 1 ♂, 3 ♀♀ and 3 PN, 10-VIII-1975, 4 ♂♂, 5 ♀♀, 1 male deutonymph (DN), 1 ♂-DN and 6 PN, Tsushima, Nagasaki Pref.; 1 ♀, Nara

Pref., 30-IV-1952; 1 ♂, 7 ♀♀, 3 ♂-DN, 4 ♀-DN and 1 PN, Kôchi Pref., 1-VIII-1969; 1 ♂, 1 ♂-DN, Miyazaki Pref., 9-IV-1972; 3 ♂♂, 7 ♀♀, 1 ♂-DN, 1 ♀-DN and 2 PN, Tokunoshima, Kagoshima Pref., 26-VIII-1975.

The following specimens were parasitic on *Rhinolophus* sp. from Iriomote, Okinawa Pref., Japan: 20 ♂♂, 14 ♀♀, 6 ♂-DN, 2 ♀-DN and 6 PN, 19-VI-1974.

The holotype and allotype are deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo, Japan (NSMT-Ac 9276-9277), 3 pairs of the male and female paratypes in the collection of K. UCHIKAWA, and 2 pairs of the paratypes in the collection of the Institute of Parasitology, Czechoslovak Academy of Sciences, Prague (PaÚ ČSAV 1802-1805).

Eyndhovenia euryalis oudemansi (EYNDHOVEN, 1941)

(Figs. 12-14)

Spinturnix oudemansi EYNDHOVEN, 1941, Tijdschr. Ent., **84**: 54.

Eyndhovenia euryalis (CANESTRINI, 1884) RUDNICK, 1960, Univ. Calif. Publ. Ent., **17**: 188.

Eyndhovenia euryalis ahi BAKER et DELFINADO, 1964, Pacif. Ins., **6**: 585. — PRASAD, 1969, Acarologia, **11**: 676. — UCHIKAWA, 1975, Proc. Jap. Assoc. Acarology, **2**: 11-12. (New synonymy.)

Female (Fig. 12). Dorsal shield with 11 pairs of pores. Postero-lateral lobes of tritosternal shield distinct but minute. Sternal shield possessing weakly sclerotized portion anterior to 3rd sternal setae, but the demarcation between anterior and posterior parts is not so prominent. Ventral integument armored with spinelets more

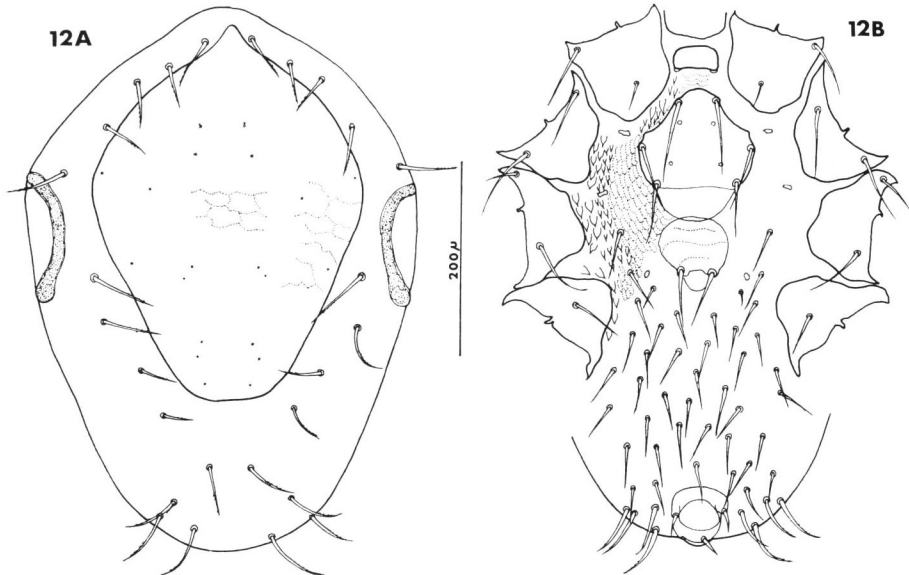


Fig. 12. Idiosoma of *Eyndhovenia euryalis oudemansi* (EYNDHOVEN, 1941), female; A, dorsum; B, venter (Japanese specimen).

sparsely than in the nominate subspecies, but distinctly more heavily than in *E. euryalis cornuti*. About 23 pairs of setae present ventrally on soft integument, of which caudalmost 4 pairs are stout and well developed.

Male (Fig. 13). Measurement as in Table 2. Opisthosomal setae 1–3 decreasing in length in this order. Dorsal caudalmost setae subequal in length. Third sternal setae situated on lateral margins of sternal shield. Ventral spinelets as in female. Other structures as in the nominate form.

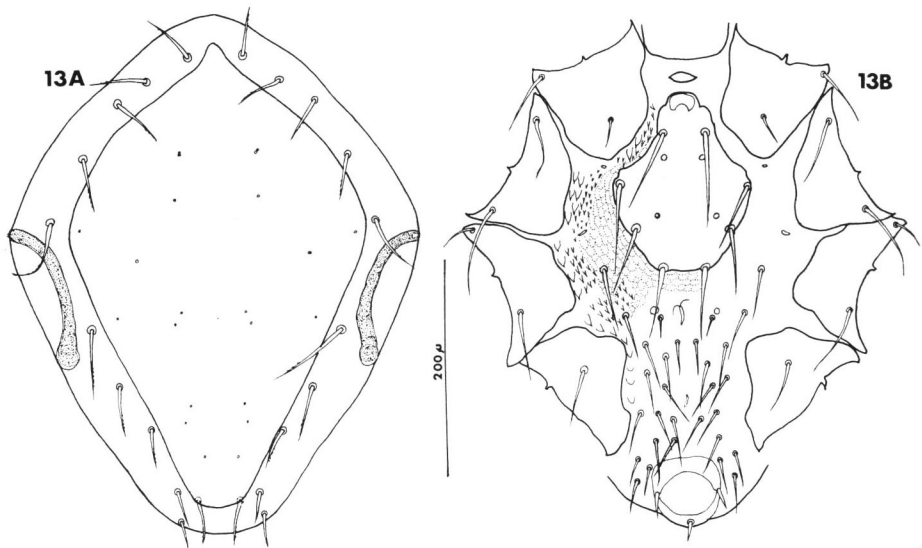


Fig. 13. Idiosoma of *Eynndhovenia euryalis oudemansi* (EYNDHOVEN, 1941), male; A, dorsum; B, venter (Japanese specimen).

Deutonymph. Not examined in the present study. The female deutonymph has been presented in EYNDHOVEN (1941).

Protonymph (Fig. 14). Measurements as in Table 5. A pair of moderate or minute setae present close to median pygidial shieldlet and caudalmost setae vestigial. Ventral spinelets not well developed.

Material examined. Two ♀♀ from *R. ferrumequinum*, Cave Stará Domica, Slovakian Karst, Czechoslovakia, 11–II–1971. Three pairs of the male and female specimens from *R. ferrumequinum* from Maine-et-Loire, France, were examined through the courtesy of Dr. J. DEUNFF.

The following specimens were taken from *R. ferrumequinum* subsp. distributed in Japan. Four ♂♂, 10 ♀♀ and 2 PN, Akashina, Nagano Pref.; 4–IX–1974; 2 ♂♂, 2 ♀♀, 10–X–1970, and 2 ♂♂, 5 ♀♀, 5–XI–1976, Shiga Village, Nagano Pref.; 5 ♂♂, 5 ♀♀, Shimashima-dani, Nagano Pref., 5–XII–1976; 3 ♂♂, 2 ♀♀, Nagano, Nagano Pref., 29–III–1968; 7 ♂♂, 7 ♀♀, Chitose, Hokkaido, 9–X–1963.

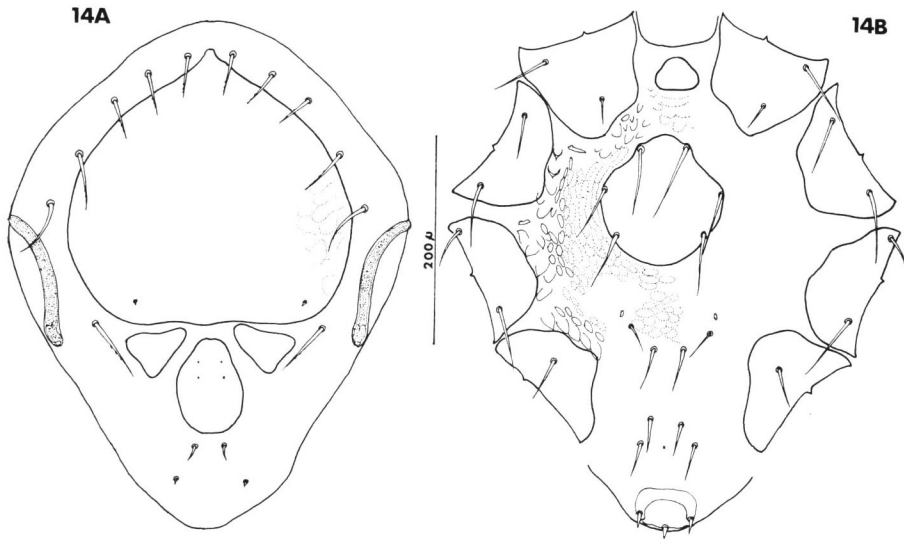


Fig. 14. Idiosoma of *Eyndhovenia euryalis oudemansi* (EYNDHOVEN, 1941), protonymph; A, dorsum; B, venter (Japanese specimen).

Discussion

Contrary to the observations by the previous authors (EYNDHOVEN, 1941; RUDNICK, 1960), the *Eyndhovenia* mite parasitic on *Rhinolophus euryale* was not smaller than that occurring on *R. ferrumequinum*, that is, measurements for mites from the 2 bats fell within the same range, though means differed considerably (Tables 1–5). The mites from the 3 Japanese *Rhinolophus* bats also lay within the size range for the above 2 European mites. Accordingly, it was concluded that the host-dependent variation in size was not real for the *Eyndhovenia* mites parasitic on as far as the 6 European and Japanese *Rhinolophus* bats dealt with in the present paper.

On the other hand, as already pointed out by BAKER and DELFINADO (1964), the structure on the ventral soft integument of the mites varied among the specimens from different kinds of host bats. The 3 different patterns of spinelet arrangements were observed on the mites from European and Japanese *Rhinolophus* bats. This difference was clearly host-dependent one that was carried through all the parasitic stages. In addition, the 3 mites with different spinelet arrangements are armored with subtly different tritosternal and sternal shields as shown in Figs. 1–2, 6–7 and 12–13.

The present authors noticed that an *Eyndhovenia* mite significantly smaller than those presented above occurs on bats from Thailand and Borneo, and that another mite parasitic on *Rhinolophus megaphyllus*, which was examined through the courtesy of Dr. R. DOMROW, also differs conspicuously in size and morphology from those

infesting the European and Japanese *Rhinolophus* bats. As compared with the above striking differences, the host-dependent variations in the spinelet arrangement on the ventral integument and the form of the tritosternal and sternal shields were regarded as criteria to separate subspecies.

The nominate subspecies infesting *R. euryale* carries spinelets heavily, and differs from the mite occurring on *R. cornutus*, which bears only a few spinelets. As the latter mite was dealt with as *E. euryalis euryalis* by BAKER and DELFINADO (1964), a proper subspecific name should be proposed. It is reminded that an *Eyndhovenia* mite from Indian *R. rouxi* was named *E. euryalis orientalis* (HIREGAUDAR et BAL, 1956), and that its female idiosoma was measured 0.8–1.8 mm long (HIREGAUDAR and BAL, 1956). This mite seems to lie outside the size range for all the mites examined in the present study. No other mite to be compared with the *Eyndhovenia* from *R. cornutus* has so far been presented. Thus, the mite is newly named *E. euryalis cornuti*.

The *Eyndhovenia* occurring on *R. ferrumequinum* constitutes another subspecies. The mite bears significantly more ventral spinelets than *E. euryalis cornuti* subsp. nov., but distinctly less than the nominate subspecies. Although BAKER and DELFINADO (1964) named this subspecies *E. euryalis ahi*, it is appropriate to adopt *oudemansi* as the subspecific name for this mite, because of its priority.

Other than the above difference in the ventral integumental structure, a few remarkable characteristics appear in some developmental stages of the 3 subspecies. Stout dorso-caudal setae and several pairs of minute, spiniform ventral setae are found only on the female deutonymph of the nominate subspecies. A pair of stout and long setae are characteristic only of the male deutonymph and protonymph of *E. euryalis cornuti* subsp. nov. Combination of these characteristics and ventral integumental spinelets makes the introduction of the subspecies to *E. euryalis sensu* RUDNICK concrete.

As presented in the tables, and as shown in Figs. 8 and 9, the mites taken from *Rhinolophus* sp., which is thought to be a valid bat species (MAEDA, in press), are larger than those from *R. cornutus*, especially so in the length of some dorsal setae in the adults and deutonymphs. The reasons why the authors included them in *E. euryalis cornuti* subsp. nov. were as follows: Their spinelet arrangement was typical for this subspecies, and some transitional forms were detected among specimens from Tokunoshima, Kagoshima Prefecture, southern Japan, where only *R. cornutus* is distributed.

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Dr. R. DOMROW, The Queensland Institute of Medical Research, Australia.

Summary

Eyndhovenia euryalis (CANESTRINI, 1884) *sensu* RUDNICK (1960) was considered to be separated into several subspecies. Morphological accounts of *E. euryalis* (CANESTRINI) were added to the redescription by RUDNICK (1960) as the criteria for re-examining some mites of the genus at the subspecific level. *E. euryalis cornuti* subsp. nov. and *E. euryalis oudemansi* (EYNDHOVEN, 1941) were recorded as the parasites of the bats of the genus *Rhinolophus* distributed in Japan.

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