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FOUR NEW SPECIES OF THE GENUS GLIRICOPTES LAWRENCE, 1956, FROM EUROPEAN HOSTS (ACARINA : SARCOPTIFORMES)

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INTRODUCTION

This study is a continuation of a series of investigations on Myocoptidae, fur mites of rodents from The Netherlands and Belgium (FAIN, MUNTING and LUKOSCHUS, 1969, 1970), North-America (FAIN and HYLAND, 1970), Africa south of Sahara (FAIN, 1970a), and Asia and South America (FAIN, 1970b).

In systematical observations of European hosts one of us (F.L.) succeeded in finding further species, those of the genus *Gliricoptes* being described here.

The genus *Gliricoptes* has been erected by LAWRENCE, 1956 to arrange the typical species *Myocoptes glirinus* CANESTRINI, 1895 and *Gliricoptes lepidotus* LAWRENCE, 1956. FAIN, MUNTING and LUKOSCHUS (1970) redescribed typical species and gave a new genus definition. In his paper on African Myocoptidae, FAIN (1970) put the species *lepidotus* LAWRENCE, 1956 into the genus *Myocoptes* CLAPARÈDE, 1869, and described two new species *Gliricoptes vulcanorum* FAIN, 1970 and *Gliricoptes graphiuri* FAIN, 1970 from African Gliridae.

The species being described here have been collected from alcohol preserved hosts in the Naturhistorisches Museum Wien (Dr. K. Bauer), and from hosts kindly sent to us for observation by Dr. Z. Pucek, Mammals Research Institute of the Polish Academy of Science, Bialowieza, and Dr. O. Henze, Institut für angewandte Zoologie, München. We highly appreciate their kind co-operation.

The species correspond to most characteristics of definition of the genus *Gliricoptes*, given by FAIN *et al.* (1970) : General shape of body like the genus *Myocoptes*, but posterior border of male more strongly incised. Soft parts of surface striated, but no regions with scutes on coxae and ventrally and dorsally on idiosoma. Some isolated scutes, however, are present on certain parts (on propodosomatal shield and in region of coxae IV in males). In both sexes punctated hysterosomatal shield, epimerae I widely separated, anus ventral. Adanal suckers small, but well formed in males. Females with a distinct epigynium. Anterior legs not widely separated from posterior legs. Tarsi III and IV in females and III in males with movable finger-like appendages ending in a flagellum. Caruncles I

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and II in both sexes with small but well sclerified hooks. Palpi bordered with membranes.

Chaetotaxy of idiosoma : present are setae *v i, sc i, sc e, d 1, d 2, d 4, d 5, l 1 - l 5, h, sh* (except in *G. eliomys), cx I, cx III, g a, g m, g p, a i, a e, a 3.*

Chaetotaxy of legs : tarsi 8-8-4-3 (5 in males)
tibiae 1-1-1-1
genua 2-2-0-0
femora 1-1-0-0
trochanteres 1-1-1-0

Solenidiotaxy : Tarsi 2-1-0-0, tibiae 1-1-1-1, genua 0-0-0-0.

Solenidia on tibiae III short, broad. *

Definition of measurements

Length : from anterior point of palps to posterior point of idiosoma in females ; to connecting line of posterior lobes in males.

Width : maximum width of idiosoma.

a i - a e : a i at right angle to connection line of *a e - a e*

d 4 - d 5 : d 4 at right angle to connection line of *d 5 - d 5*

Penis : maximum length of sclerotized parts in median line.

Spermatheca length : sclerotized + soft parts.

Spermatheca width : maximum width of soft part.

Gliricoptes muscardinus spec. nov.

This species presents all the characteristics of the genus *Gliricoptes,* but it differs from other species of genus by the large size of the body, the largest hitherto known species, the small length of setae *l 5,* and in the males by the very short and widely separated posterior lobes.

Female (holotype) (fig. 1-3) : Length 333 μ, in 10 paratypes measured $\varnothing$ 365 μ (333-397), width 173 μ, in paratypes $\varnothing$ 181 (140-202).

Venter (fig. 1) : Epimerae I widely separated, connected to epimerae II and III with small sclerotizations, epimerae IV fused with genital apodemes. Vulva inverted Y-shaped, epigynium sickle-shaped. Soft parts of idiosoma regularly

* In another paper, one of us (FAIN, 1970) has described a new species representing a new subgenus of the genus *Gliricoptes*. This subgenus is characterized by the presence of a well-developed solenidion on the genua I and II and by the absence of the setae *l 3* and *l 4*. The host of this species is an Asiatic Gliridae.

Fig. 1. — *Gliricoptes muscardinus* spec. nov., holotype female venter.

striated without scales and scutes. Anus ventral subterminal with anterior duplication of epidermis. Distance setae genital posterior-anal internal relatively long, setae lateral 4 very short.

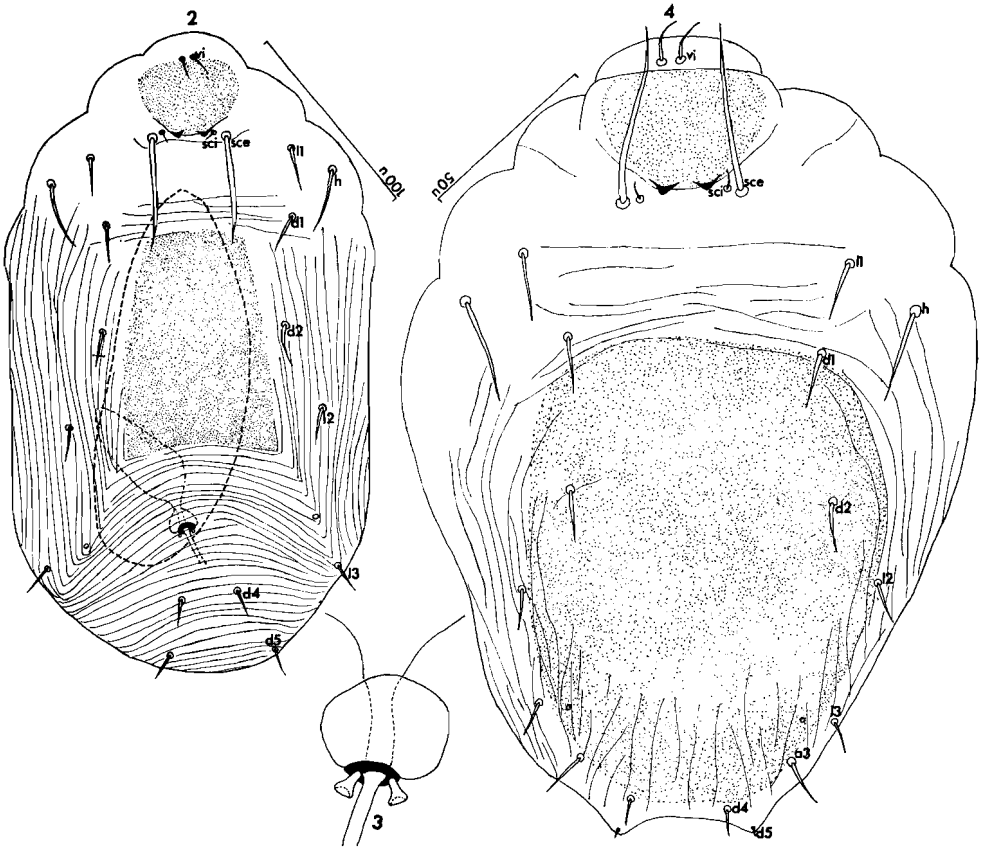

Fig. 2-4. — *Gliricoptes muscardinus* spec. nov., 2) female dorsum, 3) mouth of spermatheca, 4) allotype male dorsum.

Dorsum (fig. 2) : Propodosomatal shield with two sclerotized scutes at posterior border, podosomatal shield 102-126 μ long and 60-88 μ wide, not occupying all space between setae *d 1* and *l 2*. Setation as figured, measurements in table I. Spermatheca 74 μ long and 23 μ wide. Mouth of spermatheca surrounded by a strongly sclerified ring with two club-like appendages with enlarged deep excavated points (fig. 3).

Male (allotype) (fig. 4, 5): Shape and structure like *Gl. glirinus*. Length 241 μ, paratypes 230, 234 μ, width 150 μ paratypes 151, 150 μ. Hysterosomatal shield larger than in females. Legs IV smaller than legs III. Propodosomatal shield, epimerae, chaetotaxy and solenidiotaxy as in females with exception of tarsus IV.

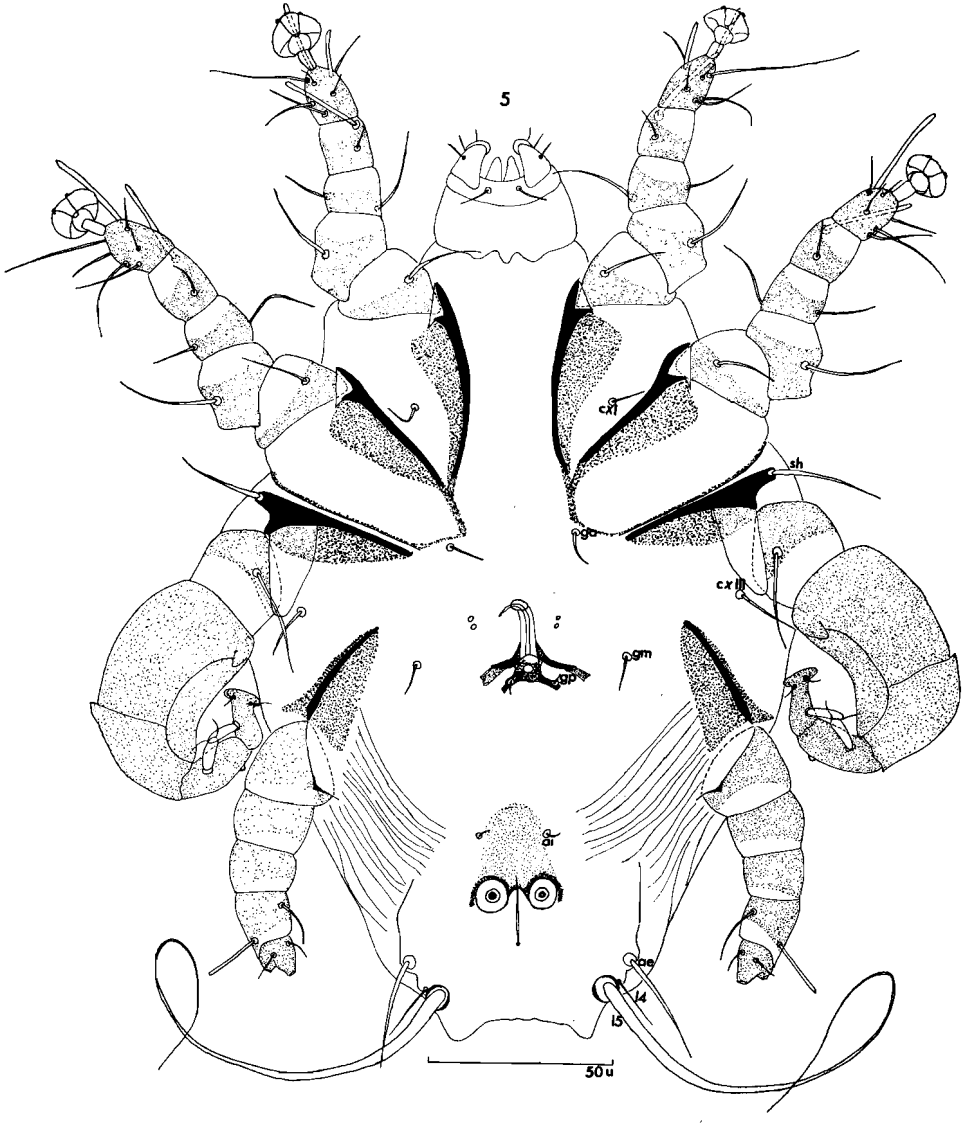

Fig. 5. — *Gliricoptes muscardinus* spec. nov., allotype male venter.

Penis 18 μ (19 μ in a paratype). Finely punctated shield between adanal suckers and anals internal, covering anterior part of anus by duplication of epidermis. Adanal lobes widely separated and small. Adanal suckers 9 μ wide. Measurements in table II.

Tritonymph : Length 218-276 μ, witdh 138-188 μ. It differs from females mainly by lacking of bursa copulatrix and vulva. Chaetotaxy and solenidiotaxy like in females, but setae shorter.

Protonymph : Length 126-170 μ, width 103-122 μ. It differs from tritonymph mainly by the absence of the trochanter setae and the anterior and posterior genital setae. Tarsus I with only one solenidion. The legs IV are well developed contrary to species of the *Myocoptes* CLAPARÈDE.

Eggs : Length 168-195 μ, width 62-76 μ.

Host and locality : *Muscardinus avellanarius* (LINNAEUS, 1758), München 18.V.1969, 8.VII.1969 ; Purkersdorf (Austria) 26.IX.1964 (host preserved in alcohol, Naturhistorisches Museum Wien (Nr. 10.826).

The mites prefer the outside regions of femora of hind legs and posterior dorsal region of hosts.

Types : Holotype and allotype in Zoologische Sammlung des Bayerischen Staates München (n° P490/1-3) ; paratypes (14 ♀♀, 2 ♂♂ TrN, 19 PrN) : Rijksmuseum van Natuurlijke Historie, Leiden (n° P1192-93) ; Naturhistorisches Museum, Wien ; British Museum (Natural History), London (n° 1971-19), Prins Leopold Instituut voor Tropische Geneeskunde, Antwerpen ; U.S. National Museum, Washington ; Zoölogisch Laboratorium, Nijmegen.

Gliricoptes nitedulus spec. nov.

This species presents the characteristics of the genus *Gliricoptes*. It differs from *G. glirinus* by the small length of the setae *g a, g p, a e, a 3* and *a i ;* from other species by longer *sc e.*

Female (holotype) (fig. 6-8) : Length 290 μ, in 10 paratypes measured ∅ 303 μ 290-313), width 142 μ, in paratypes ∅ 141 μ (133-155).

Venter (fig. 6) : Epimerae I separated, connected to epimerae II and III with small sclerotized bands. Epimerae IV connected with genital apodemes. Vulva inverted Y-shaped, posterior vulva lobe more strongly sclerotized. Epigynium sickle-shaped. Setation as figured, measurements in table I. Anus ventral subterminal, opening of bursa copulatrix posterior to anus. Soft parts regularly weakly striated without scales.

Dorsum (fig. 7) : Propodosomatal and hysterosomatal shields very finely

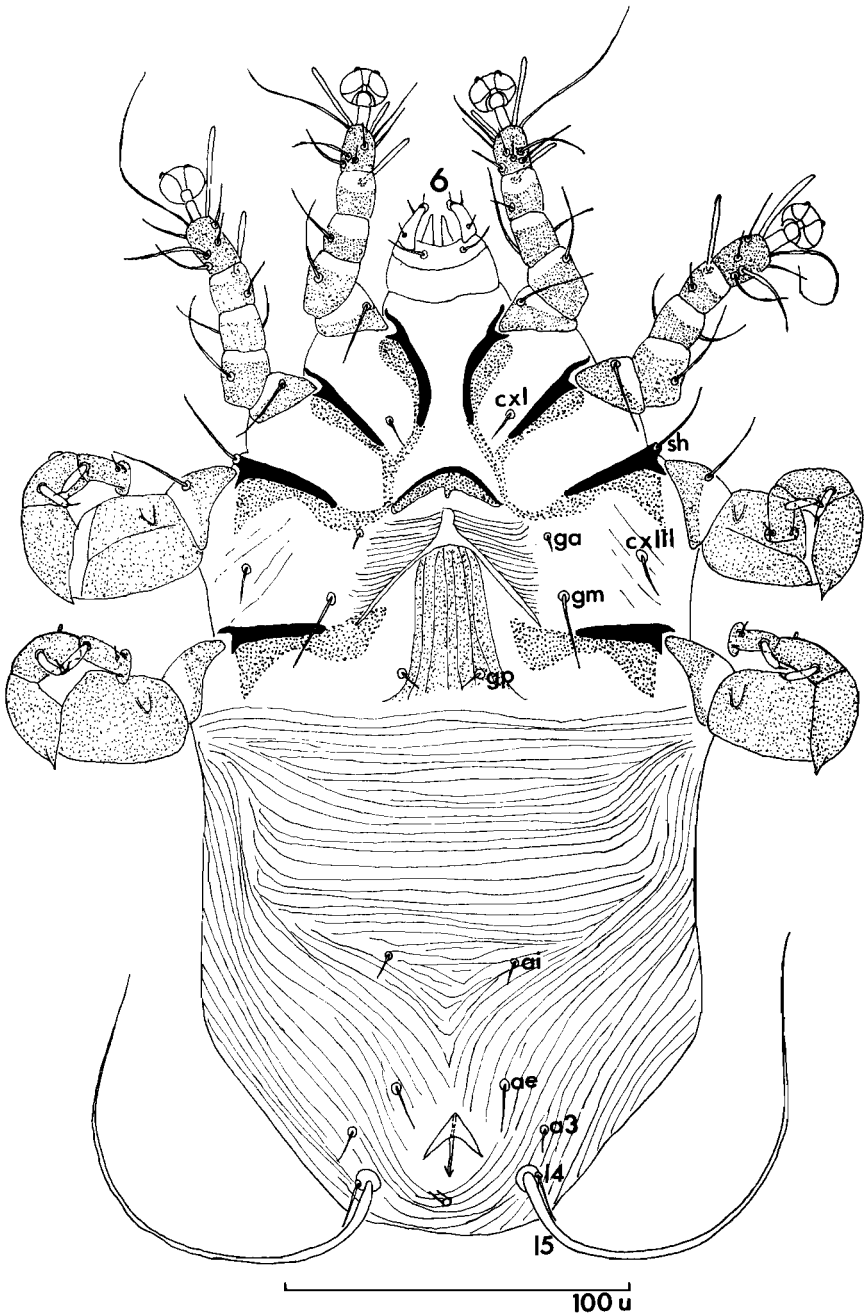

Fig. 6. — *Gliricoptes nitedulus* spec. nov., holotype female venter.

punctated, weakly sclerotized. Spermatheca with long duct, mouth of duct with strongly sclerotized ring with two excavated appendages (fig. 8).

Male (allotype) (fig. 9, 10) : Length 235 μ, in 10 paratypes measured ∅ 220 μ (209-235), width 133 μ, in paratypes ∅ 124 μ (105-133).

Venter : (fig. 10) : Epimerae I separated, connected with epimerae II and epimerites II, being distinctly separated from epimerae III. Coxal fields IV with large scute. Large finely punctated shield between adanal suckers and genital posterior, covering anterior part of anus by duplication of epidermis. Penis of 45 μ. Posterior lobes surrounded by soft membranes.

Dorsum (fig. 9) : Weakly sclerotized hysterosomatal shield larger than in females, running up posterior lobes. Setation as figured. Measurements are given in table II.

Tritonymph : 10 specimens measured : length 195-256 μ, width 115-147 μ. Chaetotaxy and solenidiotaxy like female, but setae shorter.

Protonymph : Length 172 μ, width 128 μ. Chaetotaxy and solenidiotaxy like in *G. muscardinus*.

Eggs : Length 163-176 μ, width 53-72 μ. Eggs lice-like fixed to middle of hairs, never found near base of hair.

Host and locality : *Dryomys nitedula* PALLAS, 1779, Bialowieza. Collection number 20 316, 2-IX-1958 ; 17 134, 11-VIII-1956 ; Mammals Research Institute of Polish Academy of Science.

The mites prefer dorsal posterior regions and femora of hind legs.

Types : Holotype (n° 53/71) and allotype (n° 54/71) in the Institute of Zoology, Polish Academy of Sciences, Warsaw. Paratypes (44 ♀♀, 18 ♂♂, 22 TrN, 3 PrN) ; Mammals Research Institute, Bialowieza (n° 97640 - 2/20316) ; Rijksmuseum van Natuurlijke Historie, Leiden (n° P1184-85) ; British Museum (Natural History), London (n° 1971-17-18), U.S. National Collection, Washington ; Prins Leopold Instituut voor Tropische Geneeskunde, Antwerpen ; Zoologische Sammlung des Bayerischen Staates, München (n° P493/1-3) ; Naturhistorisches Museum, Wien ; Zoölogisch Laboratorium, Nijmegen.

Gliricoptes eliomys spec. nov.

This species differs markedly from other Myocoptidae by lack of subhumeral setae in both sexes and developmental stages. All other characteristics of the genus *Gliricoptes* LAWRENCE are present.

Female (holotype) (fig. 11-13) : Length 320 μ, in 10 paratypes measured ∅ 323 μ (306-356), width 138 μ, in paratypes ∅ 147 μ (133-162).

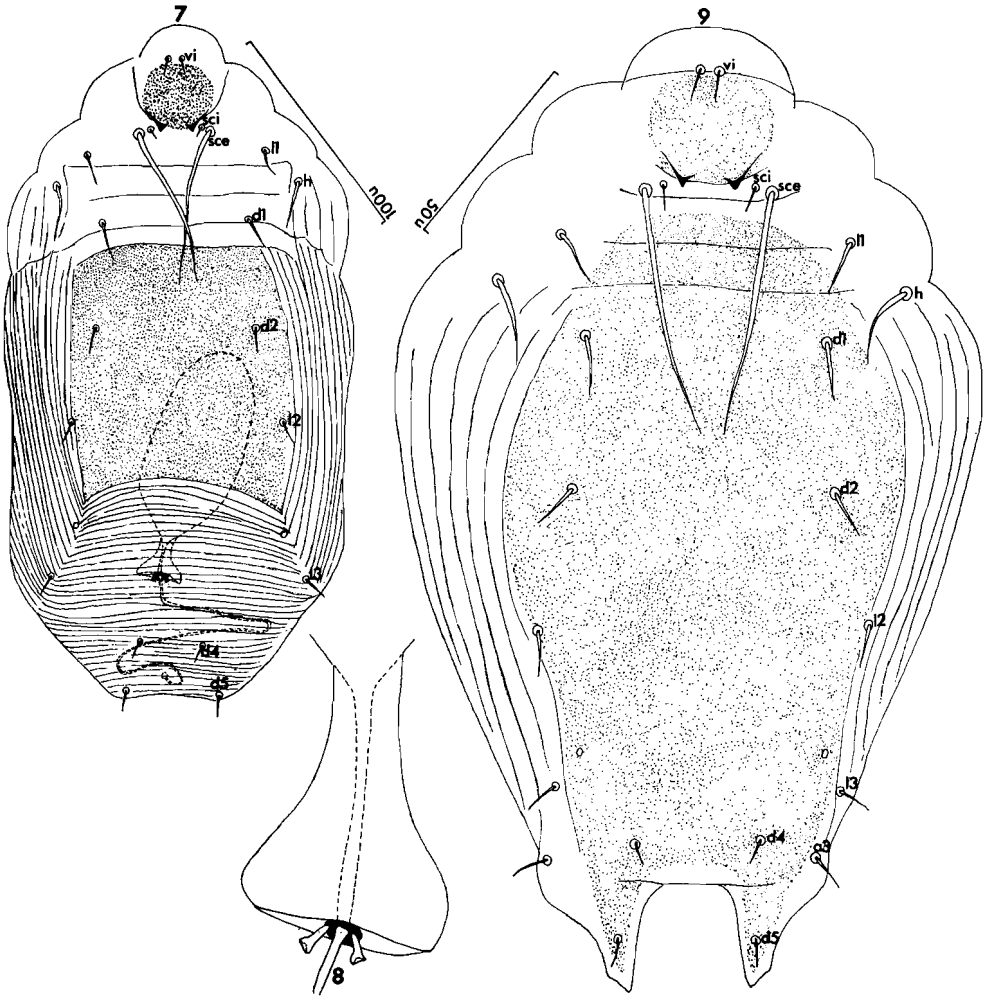

Fig. 7-9. — *Gliricoptes nitedulus* spec. nov., 7) holotype female dorsum, 8) mouth of spermatheca, 9) allotype male dorsum.

Venter (fig. 11) : Epimerae widely separated, connected with epimerae II and III by small bands. Epimerae IV connected with genital apodemes. Vulva inverted Y-shaped. Epigynium strongly sclerotized. Setae anales internal close to anales external, widely separated from genital posterior (largest distance of all species known of the genus *Gliricoptes).* Very short lateral 4. Chaetotaxy as figured, measurements in table I.

Fig. 10. — *Gliricoptes nitedulus* spec. nov., allotype male venter.

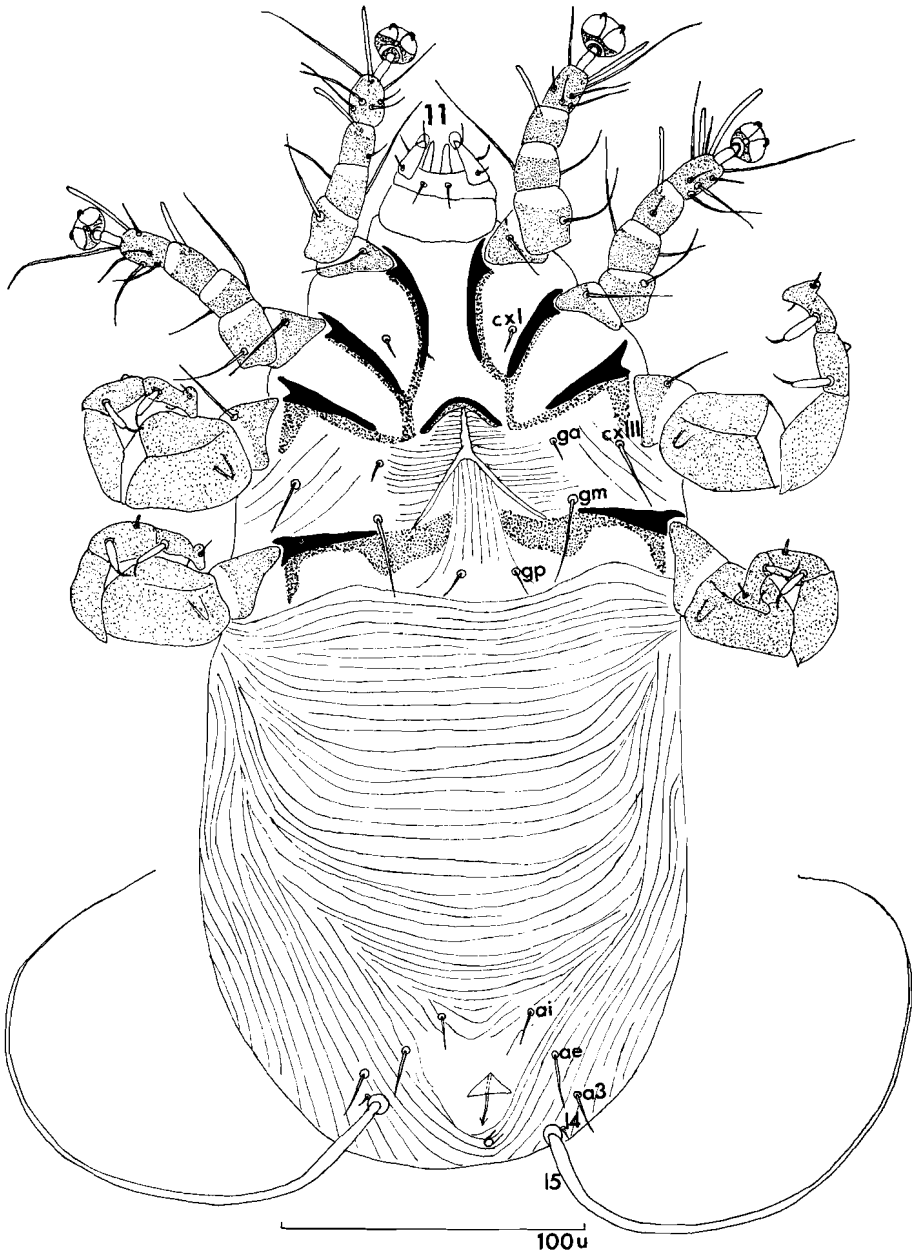

Fig. 11. — *Gliricoptes eliomys* spec. nov., holotype female venter.

Dorsum (fig. 12): Propodosomatal shield punctated with two scutes at posterior border, hysterosomatal shield almost rectangular. Spermatheca smaller than in other *Gliricoptes* species : length 60 μ, width 18 μ. Mouth of tube (fig. 13) as in other species.

Male (allotype) (fig. 14, 15) : Length 184 μ, in 8 paratypes $\varnothing$ 183 μ (170-196), width 106 μ, in paratypes $\varnothing$ 105 μ (92-119).

Venter (fig. 15) : Epimerae I separated, connected to epimerae II, but not distinctly connected to epimerites II. Coxal fields IV with large scutes. Genital region covered by a projection, running up to *g a*. Fine punctated, weakly

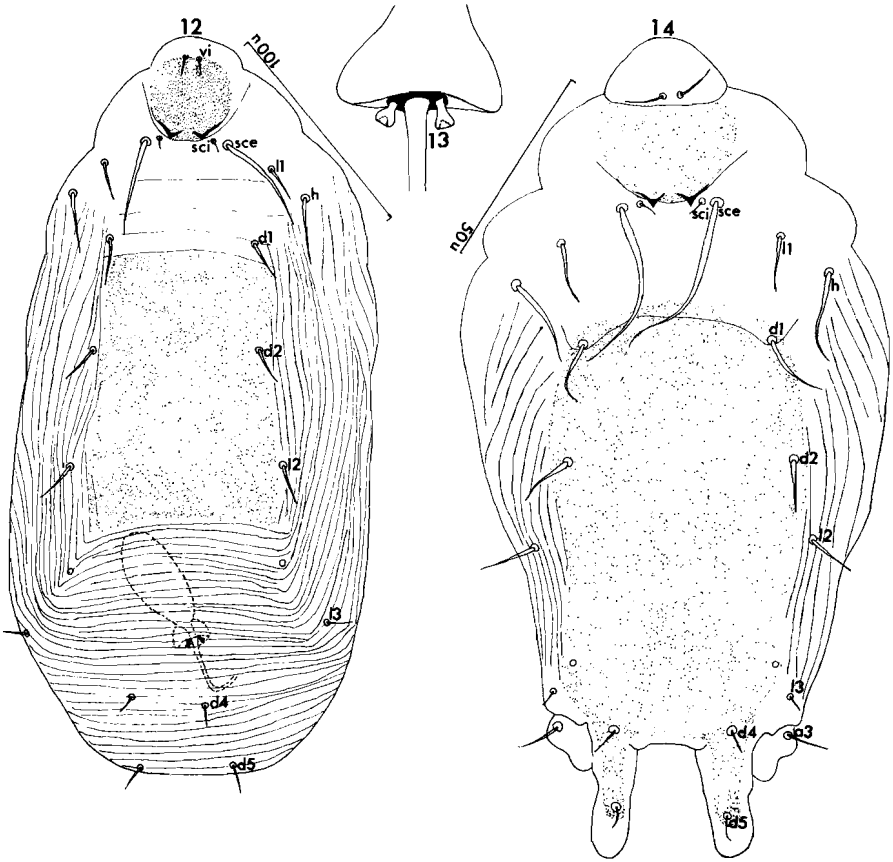

Fig. 12-14. — *Gliricoptes eliomys* spec. nov., 12) holotype female dorsum, 13) mouth of spermatheca, 14) allotype male dorsum.

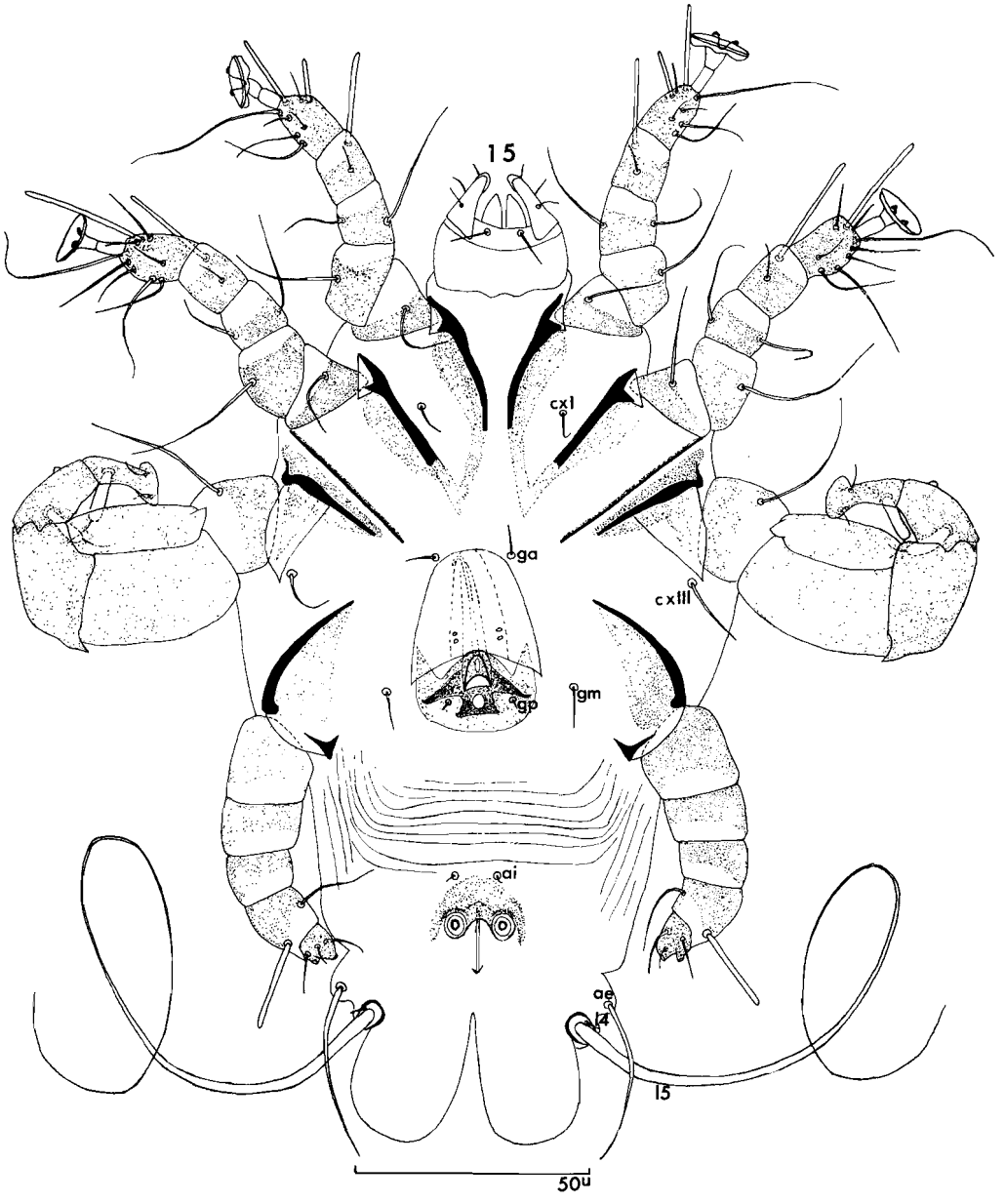

Fig.15. — *Gliricoptes eliomys* spec. nov., allotype male venter

sclerotized shield between anales internal and adanal suckers, covering anterior part of anus. Large posterior lobes with soft membranes. Setae *l 4* minute.

Dorsum (fig. 15) : Hysterosomatal shield much larger than in female, extending to posterior lobes. Chaetotaxy as figured, measurements in table II.

Tritonymph : 4 specimens measured : length 230-257 μ, width 120-147 μ. Chaetotaxy as in female, but somewhat shorter. Vulva and bursa copulatrix absent.

Protonymph : Length 195-207 μ, width 115-126 μ. Chaetotaxy like protonymph, only setae *g a*, *g p*, solenidion ω 3 and trochanter setae lacking. Legs IV in shape of legs III.

Eggs : Length 60 μ, width 18 μ.

Host and locality : *Eliomys quercinus* (LINNAEUS, 1758).

Series of types : Gafsa, Tunis, 1914 (alcohol preserved host at Naturhistorisches Museum, Wien).

Im Fang, Switzerland, 21-IX-1969.

Valkenburg, The Netherlands, 23-III-1967, only nymphs.

The species is found on dorsal posterior parts and on femoral regions of hind legs.

Types : Holotype and allotype : Naturhistorisches Museum, Wien. Paratypes (19 ♀♀, 8 ♂♂, 4 TrN, 2 PrN) : Rijksmuseum van Natuurlijke Historie, Leiden (n° P1186), Zoologische Sammlung des Bayerischen Staates, München (n° P492/1-2) ; British Museum (Natural History), London (n° 1971, 22-23) ; U.S. National Collection, Washington ; Prins Leopold Instituut voor Tropische Geneeskunde, Antwerpen ; Zoölogisch Laboratorium, Nijmegen.

Gliricoptes betulinus spec. nov.

The species differs strikingly from other species by broad ductus of bursa copulatrix in female and very long penis in male specimens.

Female (holotype) (fig. 16-18) : Same characteristics as the genus *Gliricoptes* LAWRENCE. Length 329 μ, in 10 paratypes measured ∅ 317 μ (294-331), width 152 μ, in paratypes ∅ 137 μ (115-152).

Venter (fig. 16) : Epimerae I separated, connected to epimerae II and III by small bands. Epimerae IV connected with broad genital apodemes. Vulva inverted Y-shape. Anus ventral, anterior part covered by a fold of the cuticula. Soft parts of opisthosoma regularly striated without scutes. Opening of bursa copulatrix posterior to anus. Setae anales internal and external widely separated. Lateral 4 relatively long.

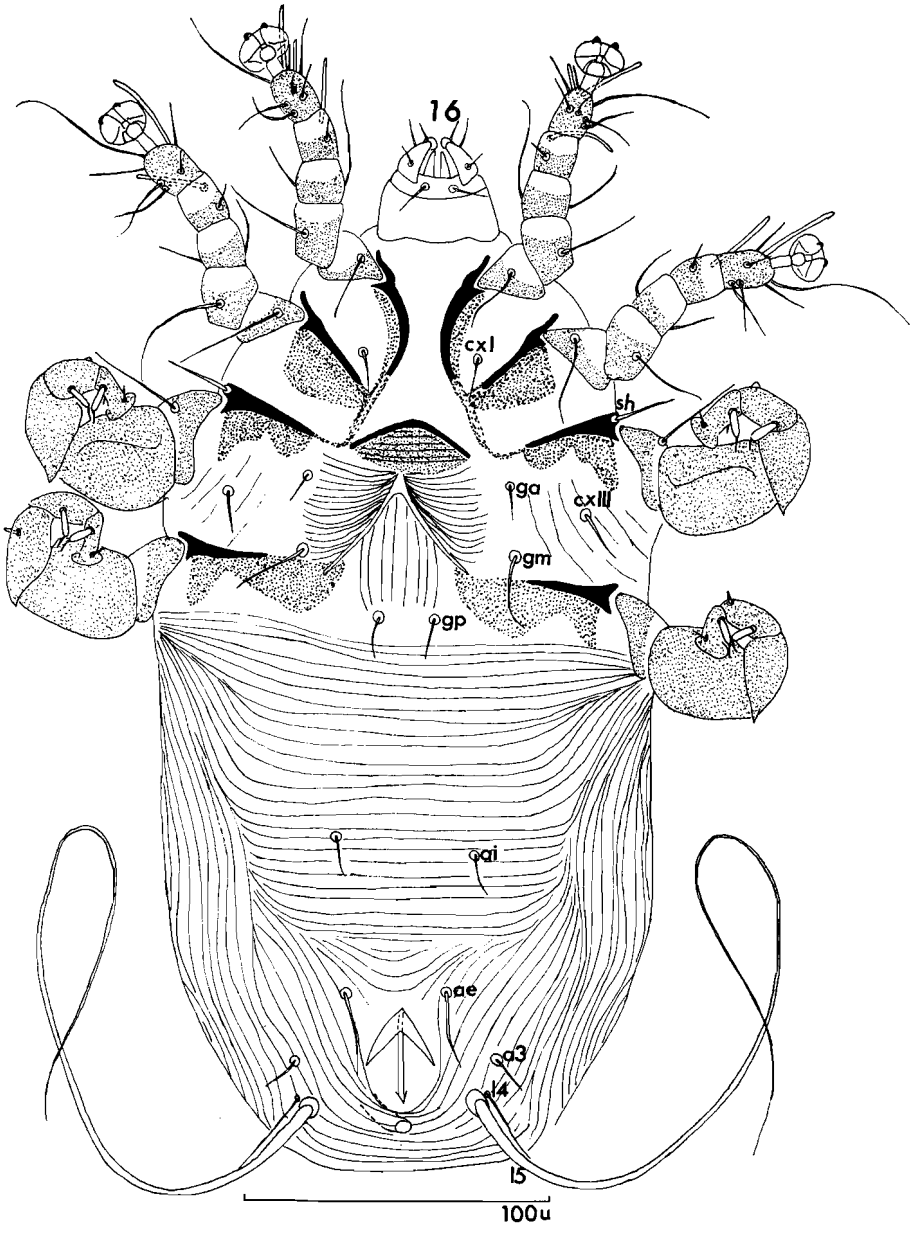

Fig. 16. — *Gliricoptes betulinus* spec. nov., holotype female venter.

Dorsum (fig. 17) : Propodosomatal shield with two scutes at posterior border, hysterosomatal shield almost rectangular. Setae dorsal 4 far posterior like *G. glirinus*. Ductus of bursa copulatrix very wide. Mouth of ductus into spermatheca (fig. 18) with club-like excavated setae.

Male (allotype) (fig. 19, 21) : Length 221 μ, in 3 paratypes 219-225, width 133 μ, in paratypes 117-133 μ.

Venter : Epimerae I separated, connected to epimerae II and epimerites II by small bands. Epimerae III and IV free. Penis unusually long and wide, curved

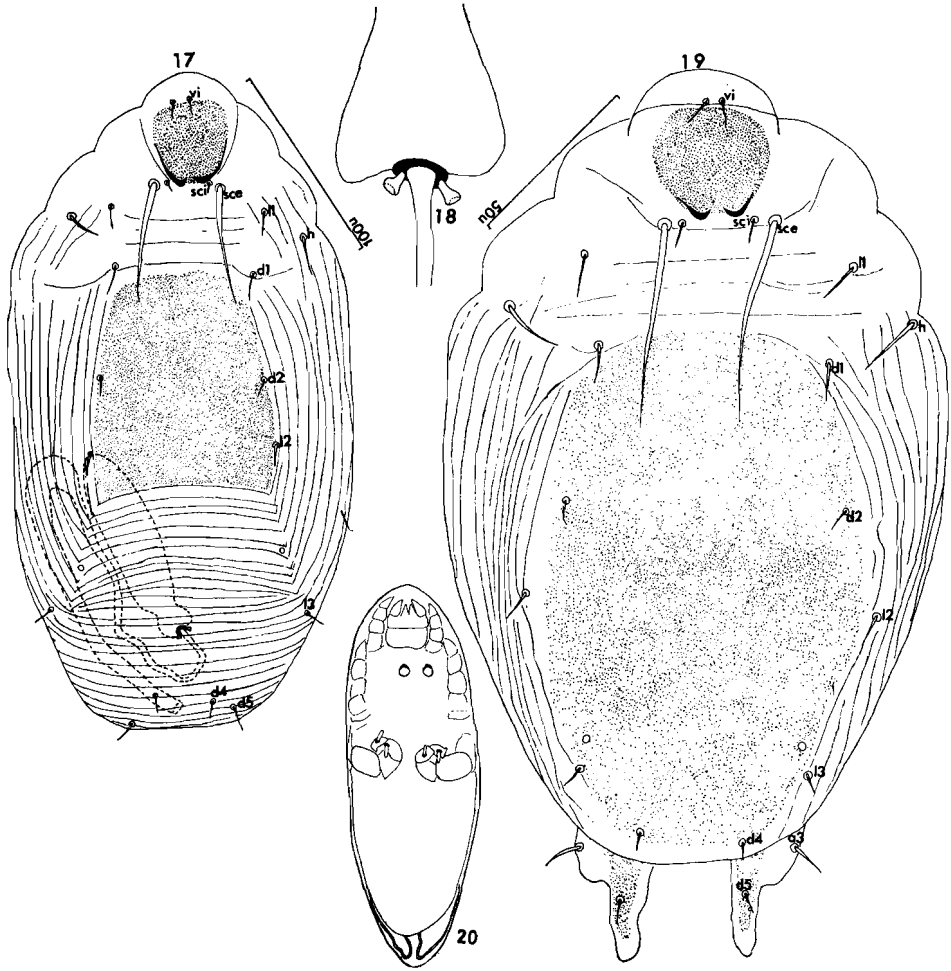

Fig. 17-20. — *Gliricoptes betulinus* spec. nov., 17) holotype female dorsum, 18) mouth of spermatheca, 19) allotype male dorsum, 20) egg.

Fig. 21. — *Gliricoptes betulinus* spec. nov., allotype male venter.

TABLE I : CHARACTERISTICS OF GLIRICOPTES FEMALES. DATA IN μ

(The female of *G. graphiuri* is unknown)

	glirinus CANESTRINI	*vulcano-rum* FAIN	*muscar-dinus* spec.nov.	*nitedulus* spec.nov.	*eliomys* spec.nov.	*betulinus* spec.nov.
Length	264-288	257	333-397	290-313	306-356	294-331
Width	135-150	120	140-202	133-155	133-162	115-152
Shield length	93	90	102-126	96-108	108-126	96-101
Shield width	80	62	60-88	69-75	66-80	69-87
g a	15	10	8-11	5-9	6-7	9-12
g m	33	24	20-25	23-29	21-24	22-29
g p	21	13	13-14	9-12	11-14	12-15
a i	36	16	8-10	11-14	12-14	13-16
a e	24	15	19-23	18-21	19-22	18-25
a 3	17	15	16-20	11-16	13-17	13-16
g p - a i	90	82	96-140	66-76	126-168	63-82
a i - a e	48	36	23-28	39-48	12-14	44-55
d 1	25	18	23-25	16-18	20-23	15-16
d 4	12	9	14-16	12-14	11-12	9-10
d 5	12	9	13-16	10-12	12-14	9-11
l 1	24	18	23-24	16-18	16-20	16-17
l 4			9-13	14-18	3-4	35-45
l 5	225	180	122-148	172-200	196-220	172-195
sc e	72	55	62-69	64-81	50-58	56-67
h	36	25	32-35	23-25	30-36	18-22
d 4 - d 5	13	10	32-39	23-30	24-35	16-21
Spermatheca length			74	82	60	78-91
Spermatheca width			23	25	18	19-21

TABLE II: CHARACTERISTICS OF GLIRICOPTES MALES. DATA in μ.
(The male of *G. vulcanorum* is unknown)

	glirinus CANESTRINI	*graphiuri* FAIN	*muscardinus* spec. nov.	*nitedulus* spec. nov.	*eliomys* spec. nov.	*betulinus* spec. nov.
Length	195-204	210	230-241	209-235	170-196	219-225
Width	108-120	126	150	105-133	92-119	117-133
Lobe length	10	22	9	20-28	27-34	29-36
g a	9	9	8-9	5-9	5-7	14-15
g m	9	15	9-10	12-14	9-11	12-14
g p	3		4-5	4-5	3-4	4-5
a e	45	48	25-31	3-38	39-50	40-45
a 3	12	15	13-14	10-13	10-13	10-13
d 1	16	18	16	16-17	14-16	14
d 4	7	6	9	6-8	4-5	5
d 5	10	6	4	5-7	4-6	9
l 1	16	16	21	15-17	14-16	14
l 4	45	12	14-16	20-28	2-3	37-40
l 5	195	165	138-161	170-195	184-207	195-200
Penis	33	90	18	34-37	19-22	234-268
Adanal sucker	5-6	6	9	5-7	4-6	9

backwards. Large genital apodemes almost reaching coxal fields IV. A large projection covers curved part of penis, reaching up to the ends of epimerae I, much larger than in *Sciurocoptes sciurinus*. Coxal fields IV without scutes. Finely punctated, weakly sclerotized shield in front of anus, not reaching setae *a i*. Large posterior lobes with soft membranes.

Dorsum (fig. 19) : Finely punctated hysterosomatal shield much larger than in female, running up to lobes. Chaetotaxy as figured, measurements in table II.

Tritonymph : 10 specimens measured : length 224-265 μ, width 112-142 μ. Chaetotaxy like the female, but shorter setae.

Protonymph : 10 specimens measured : length 166-198 μ, width 96-112 μ. Legs IV and chaetotaxy as in related species.

Larva : Length 174-200 μ, width 104-112 μ.

Eggs (fig. 20) : Length 204 μ, width 64 μ, with two chitinous cup-like structures as in eggs of the family Epidermoptidae TROUESSART.

Host and locality : *Sicista betulina* PALLAS, 1779, Bialowieza, Poland : collection number 8976, 20-VII-1949 ; 10 648, 10-IX-1949 ; 10 600, 4-IX-1949 ; 10 609, 7-IX-1949 ; 10 730, 19-IX-1949.

Mites were found on back of hosts, between shoulders and on the outside of femora of hind legs ; eggs and larvae mainly between shoulders.

Types : Holotype (n° 51/71) and allotype (n° P52/71) in the Institute of Zoology, Polish Academy of Sciences, Warsaw. Paratypes (8 ♀♀, 8 ♂♂, 22 TrN, 40 PrN, 6 L) : Rijksmuseum van Natuurlijke Historie, Leiden (n° P1182-83) ; Zoologische Sammlung des Bayerischen Staates, München (n° P491/1-2) ; British Museum (Natural History), London (n° 1971, 20-21) ; U.S. National Collection, Washington ; Naturhistorisches Museum, Wien ; Prins Leopold Instituut voor Tropische Geneeskunde, Antwerpen ; Zoölogisch Laboratorium, Nijmegen.

SUMMARY

Four new *Gliricoptes* species, found on the European hosts *Muscardinus avellanarius, Dryomys nitedula, Eliomys quercinus* and *Sicista betulina*, are described and represented. Tables give the differences with the species of the same genus described up till now.

SAMENVATTING

Een viertal nieuwe *Gliricoptes*-soorten, afkomstig van de Europese gastheren *Muscardinus avellanarius, Dryomys nitedula, Eliomys quercinus* en *Sicista betulina,* wordt beschreven en afgebeeld. In de tabellen zijn de verschillen met de tot dusver beschreven soorten van hetzelfde geslacht aangegeven.

RESUME

Dans la présente note nous donnons une description et des figures de quatre espèces nouvelles de *Gliricoptes,* provenant des hôtes européens *Muscardinus avellanarius, Dryomys nitedula, Eliomys quercinus* et *Sicista betulina.* Dans les tables les différences par rapport aux espèces connues du même genre ont été indiquées.

ZUSAMMENFASSUNG

Vier neue *Gliricoptes*-Arten der europäischen Wirte *Muscardinus avellanarius, Dryomys nitedula, Eliomys quercinus* und *Sicista betulina* werden beschrieben und abgebildet. Die Unterschiede zu den bislang beschriebenen Species der Gattung werden in Tabellen dargestellt.

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