

ACAROLOGICAL NOTES

XXVI. New studies on the genus *Laelaps* KOCH, 1836.

(Acari. Laelaptidae)

BY

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In 1935 there was published the result of a first inspection of the Brazilian fauna of acarians belonging to the genus *Laelaps* KOCH, *sensu strictu* (1).

Should we restrict the conception made of the genus since Berlese's time and accepted up to the end of the first quarter of this century, as shown by the work of Ewing in 1925 (2) and of Count Vitzthum in 1926 (3), the importance of the type genus of *Laelaptidae* would be greatly diminished, as a result of the dispersion, through new genera, which have been proposed by specialists, of a whole series of species, which still recently were included in it and of numerous others yet to be described.

Such a view, however, seems to be entirely contradicted by recent researches on the systematic of this group.

The generic conception restricted by Stanley Hirst in 1926 (4), was also reduced by Vitzthum in the same year (3), limited by Ewing, first in 1929 (5), and more precisely, in 1933 (6). The systematic value became still more restrict in 1935, with the description of the genera *Mysolaelaps* FONS., *Ichnolaelaps* FONS. (7) and *Cavilaelaps* FONS. (8). In spite of these continuous modifications, the diagnosis of the genus *Laelaps* remained, however, broad enough to include, in the first study on the Brazilian fauna, the five new species which were proposed in the mentioned paper (1).

After two more years of collecting acarological material, a new and more accurate incursion in the systematic of the group has become necessary. In spite of the simultaneous description, in another article of this publication (9), of five new species, which, till 1929, before Ewing published the afore mentioned paper, would certainly be included in the genus *Laelaps*, six other species were in plain accordance with the restrict diagnosis admitted nowadays.

Such an abundance of material shows the taxonomic and parasitological importance of the genus under investigation, and justifies the opinion of the great acarologist Count Vitzthum, set forth in the description of *Laelaps jettmani* VITZTHUM, 1930 (10), when he stated that the genus *Laelaps* had not yet been as thoroughly studied as the knowledge would have permitted it, at that time.

If his conception expresses the truth about the acarological fauna of regions which are much better explored, it is still more applicable to the Brazilian regions, where nothing had been done about the systematics of this group until 1935. This belief is based on the impossibility of continuing to include the species *L. brasiliensis* EWING, 1925 in the genus *Laelaps*. In so far as we can infer from the very brief description presented by the author of this species (2), this mite should be included in the genus *Cavilaelaps* FONS., 1935.

In accordance with a systematic and bibliographic revision made while writing this paper, there are about thirty species which should be included in the genus *Laelaps*, as it is known at present. Out of these thirty species, more than the third part (11 autochtone and two cosmopolitan species) were found in Brazil, where, however, the fauna of the Amazon district, doubtless very rich, still remains to be explored.

1. *Laelaps berlesei*, sp. n.

(Figs. 1-2)

Large species for the genus, very weakly chitinized, similar to *Laelaps echidninus* BERLESE, from which it is distinguished principally by the width of the genito-ventral plate, which is, also angulous.

Description of the holotype ♀

(Fig. 1)

Idiosoma

The idiosoma measures 1012 μ in length by 735 μ in width at the level of the fourth pair. The shape is very regularly oval, without the sharpening of the anterior extremity, which, as appointed by Vitzthum, is characteristic of *Laelaps echidninus* BERLESE.

Ventral side — Pilous tritosternum. Sternal plate slightly reticulated, almost square, measuring 243 μ in length by 250 μ in width at the anterior mar-

gin (excluding the prolongations) and 281 at the posterior margin. The anterior margin is somewhat projected in the middle; lateral margin straight at the anterior half and curved at the posterior; the posterior margin is slightly concave in the middle. The plate presents conspicuous prolongations between coxae I and II and short ones between II and III. The setae are in a normal position; the posterior are somewhat longer measuring 190 μ ; the median 182 μ and the anterior 168 μ . The pores are represented by very narrow slits and have a median dilated point. The reticulation in front of the sternal makes the existence of a pre-sternal possible, this being, however, almost unnoticeable due to the scarce chitinization of the species.

The metasternalia are short, relatively wide and have a seta of 190 μ , exactly in front of the space between the coxae III and IV.

Genito-ventral plate — The genito-ventral plate, weakly chitinized as all the plates of this species, has a very characteristic shape, reminding that of *Laelaps echidninus*. It is, however, easily distinguished from this species, owing to its genital zone, which is much wider, occupying the whole space between the coxae IV and even touching them. Apart from this, the enlargement of the expanded zone begins much more in front than in *L. echidninus*, and far more pronounced than in the better. The lateral margins are also different; they are angulous and undulated. The posterior margin, however, is exactly like that of *L. echidninus* nearly touching the anterior margin of the anal. The surface of the plate is crossed by 4 or 5 transversal sinuous lines, such as in many other species of the genus. The genital setae which are implanted near the margins are flexible and measure more or less 166 μ . The anterior ventral pair is the farthest from the margin. The median ventral pair is placed just behind the angulous point of the margin, showing a circular pore between them at the edge of the plate. The posterior setae are situated just in front of the posterior angle of the plate. The distance between the posterior margin of the genito-ventral and the anterior of the anal is so short, that the two plates seem to touch in the median line, although the space in this zone does not exceed 2 μ .

Anal plate — Very regularly rounded at the anterior margin and at the angles, measuring 188 μ in length up to the apex of the tubercle of the implantation of the unpaired seta; however, it was not possible to measure it till the *cribrum*, as it follows the curve of the posterior margin of the body. The widest point, at the level of the angles of the plate is practically equal, 186 μ . The anus is 45 μ from the anterior margin and measures 56 μ in length. The paired setae are exactly at the level of the posterior extremity of the anus and measure 102 μ . The unpaired one, which is much stronger, measures 160 μ .

Inguinal plates — Longer than broad, 54 μ in length.

Stigmata at the level of the space between the coxae III and IV. *Peritremata* visible up to the level of the posterior margin of the first pair. *Peritrematalia* elongating posteriorly to the stigmata as it is the rule in this genus.

Dorsal side — Dorsal shield covering the entire idiosoma, weakly chitinized, reticulated, without apparent sculpture, of regular margins, the anterior extremity being narrower, but not as pronounced as in *Laelaps echidninus*.

Apart from these three pairs of anterior setae of the shield, of which the first, projected forwards, is the shortest, measuring 58 μ , and the third the longest, 150 μ , there are 10 other pairs of submedian setae. The hindmost pair is the longest and measures 190 μ . There are two circular spots at the sides of the penultimate pair, which measures 98 μ . Apart from these, there are more or less 60 setae in the shield, almost all smooth, cuts being noticed only in some of them.

Legs

The legs of pair IV are the longest, measuring 1012 μ and the legs of pair II the widest. Coxa I presents a distal spine and a fine proximal seta; coxae II and III with posterior spine and anterior seta curved; coxa IV with small spine-like median seta; the spine of coxa II is somewhat larger and that of coxa III presents a sharper point; the anterior margin of the coxae shows *pecten* with short, setae, more visible in the coxae I and II. Femura of the legs I and II somewhat elongated, with two longer setae. Tarsus I with fine setae and tarsi II, III, IV with some spines, which are stronger and longer in tarsus III.

Gnathosoma

Palps — Measure 220 μ from the first to the fifth joint, the first joint presenting only two ventral setae, the distal of which is long.

Maxillicoxae — With setae of 34 μ .

Rima hypopharingis — With series of 2 or 3 denticles.

Hypostoma — Weakly chitinized, the postero-external setae are the longest, measuring 76 μ .

Corniculi — Weakly chitinized.

Epistoma — Membranous, wide, the anterior margin toothed.

Labrum — Membranous, triangular, pilous at the edges.

Paralabra — Membranous, toothed edges.

Malae internac — Short, longitudinally chamfered.

Styli — In the shape of a stem with curved point.

Mandibulae — Normal, the genual measuring $162\ \mu$ in length by $38\ \mu$ at the widest point, with *pulvillus* bearing more or less 10 broad setae to the back of the *digitus mobilis* and a small seta at the limiting point with the *digitus fixus*. *Digitus mobilis* $70\ \mu$, with 2 more or less equal teeth. *Digitus fixus* with a seta of $58\ \mu$, presenting three teeth, which are smaller than those of *digitus mobilis*, the median being the largest. *Pilus dentilis* of $20\ \mu$, not inflated.

Description of the δ

(Fig. 2)

Idiosoma

Slightly chitinized, measuring $845\ \mu$ in length by $590\ \mu$ in width at the level of the coxa IV, of regular oval shape, without shoulders.

Ventral side — Front margin of the holovenral plate at the level of the anterior margin of coxa II, with distinct reticulation, having a squamous aspect from the sternal region up to the genital. The male organ is projected in the median half at the anterior margin of the sternal region, the anterior setae of the sternal being inserted outside in the same margin. These setae measure $120\ \mu$ and are somewhat smaller and weaker than those of the two posterior pairs, which measure 130 and $152\ \mu$ respectively. The metasternal setae are equal to the posterior sternal and the genital are equal to the anterior. There are four more pairs of setae in the genito-ventral zone, which is very expanded, surpassing laterally the level of the coxae. There is another seta in the left side of the allotype, the corresponding one at the right side being implanted in the uncovered tegument. The paired anal setae are placed at the level of the posterior margin and measure $76\ \mu$. The unpaired seta measures the double of the paired. The setae of the plates are all smooth, without barbs. The uncovered ventral surface of the opisthosoma presents 12 setae at the external margin, the two posterior of which are much longer, all with barbs.

There are traces of a pre-sternal characterized by transversal striation.

Tritosternum with pilous *lascinae* from the base.

Stigmata at the level of the space between the coxae III and IV, the *peritrematalia* prolonging backwards and to the front up to the anterior extremity of the idiosoma.

Dorsal side

Dorsal shield — Covering the whole idiosoma, with distinct reticulation, apparently without sculpture, with the anterior extremity somewhat pointed. It

bears 12 paires of submedian setae and more or less 50 others between these and the lateral margins, all being smooth and relatively long and flexible.

Legs

Legs I and IV are the largest and leg II the shortest and the widest. Coxae I and II with two weak setae coxa III with curved anterior seta and spine-like short posterior seta; coxa IV with a single seta, smaller and finer than those of the other coxae. Femura of the legs I and II with two setae, which are somewhat longer than the others. The pilosity is more developed in the more posterior tarsi.

Type material — A ♀ holotype and a ♂ allotype, mounted on one slide, No. 147 in our collection. Both specimens were captured by the author on a *Gallictis vittata* in Butantan, S. Paulo, on 26.8.1935. The same host was also parasited by a *Liponissus* sp.

Gnathosoma

Epistoma membranous, divided in three *laminae* of rounded apex.

Mandibulae impossible to describe due to its retraction.

Labrum wide, pointed at the apex, slightly pilous and longitudinally striated.

Palps normal.

2. *Laelaps aragonensis*, sp. n.

(Figs. 3-4)

A very characteristic and interesting species, due to the large development of setae, which are usually slender in the other species of this genus, reminding the choetotaxy of the genus *Neolaelaps* HIRST, from which it is distinguished by the existence of four setae in the genito-ventral plate.

Description of the ♀

Idiosoma

Species of median size, the idiosoma measuring 700 μ in length by about 500 μ in width at the level of the fourth pair of legs. The chitinization is median.

Ventral side (Fig. 3).

Tritosternum wide, filamentous from the point of bifurcation of the *lascinae*, which reach the apex of the *corniculi*.

Sternal plate much wider than long, measuring $83\ \mu$ in length at the median line by $167\ \mu$ in width at the level of the anterior prolongations and $228\ \mu$ at the level of the posterior. Its anterior margin is slightly convex, presenting in the external angles the usual prolongations, which are hardly visible between the coxae I and II; the posterior margin is very concave, the median part being placed at the level of the middle of the coxa II and the posterior extremities at the level of the middle of coxa III. The surface of the plate is clearly reticulated, presenting the two pairs of pores in form of slits in the usual position. In the surface three pairs of setae are implanted, which are very characteristic as they are broad at a short distance from the point of implantation, sharpening slowly and progressively up to the apex, which is very pointed and flexible. The anterior and the median pairs are equal, measuring $90\ \mu$ in length and the posterior, somewhat larger, more or less $100\ \mu$.

A slight reticulation of the anterior tegument seems to indicate the existence of a pre-sternal plate.

Metasternal plate elongating from the sternal to the space between the coxae III and IV, with a pair of setae, which is equal to the sternal one.

Genito-ventral plate — Very characteristic, with large posterior expansion elongating near the anal, similar to what is seen in other species of the genus, such as *L. echidninus* BERLESE, *L. lativentralis* FONS., and *L. berlesei*, sp. n. The widest point of this plate measures $235\ \mu$, a little behind the third pair of setae. Its external margin is very convex and the posterior very concave, surrounding the anterior margin of the anal, of which it is separated from the median line by a space of more or less $5\ \mu$. Its surface is crossed by 10 transversal lines, of which the four posterior are of anterior concavity, the fifth more or less straight and the five anterior ones of posterior concavity. The four setae of this plate are just alike the sternal; the three anterior measure $80\ \mu$ and the posterior $95\ \mu$, being implanted at a certain distance from the margins of the plate; the posterior seta at $58\ \mu$ in front of the posterior angle of the plate and at the same distance from the third pair.

Inguinalia $28\ \mu$ in length, ovoid, with large antero-posterior axle.

Anal plate — Triangular, anterior margin convex, adapted to the concavity of the posterior margin of the genito-ventral, reticulated surface, anus at $34\ \mu$ to $18\ \mu$ from the anterior margin. Paired setae with $42\ \mu$, implanted somewhat behind the level of the middle of the anus and at equal distance from this and from the external margin of the plate. Posterior seta with $70\ \mu$. *Cribrum* rising at the edges somewhat beyond the level of the insertion of the posterior seta.

Stigmata at the level of the space between the coxae III and IV. *Peritrema* extending to the dorsal side, at the level of coxa II and visible up to the level of coxa I. *Peritrematalia* distinct with a small pore behind the stigmata, extending to the dorsal plate where they join the dorsal shield.

Uncovered surface of the ventral side almost naked, presenting only 6 setae on each side, the posterior of which are the longest.

Dorsal side (Fig. 4) — Partially covered by the dorsal shield, which, in the median and lateral zone of the idiosoma, leaves a wide stripe uncovered with some setae like those of the shield.

Dorsal shield — Elliptic, margins slightly undulated in the centre, surface reticulated. It bears eleven pairs of submedian setae, the anterior of which pointing forwards measures about 25 μ and the others up to the 9th pair about 60 μ ; the 10th pair is very small, measuring only 12 μ and the 11th is the largest, measuring about 105 μ ; the other setae of the shield, about sixty, all of large proximal extremity and very sharp distal extremity, measure from 52 to 65 μ , excepting, the last marginal pairs, which are larger. The anterior zone of the shield is heavily chitinized and is a result of fusion with the *peritrematalia* in its anterior position.

Legs

The legs of pair IV are longer and slender, those of pair II shorter and wider.

The coxae of pair I present two equal very strong spines; the coxae of pair II show a posterior spine and a curved and strong anterior seta; the coxae of pair III present a posterior spine and an anterior seta, both smaller than those of pair II; in the median part of the coxae of pair IV, there is a single small and very thin seta, contrasting with those of the anterior pairs.

The femura of legs I and II present two setae which are somewhat longer.

Cotypes — Two female specimens, No. 905 in the collection of the Instituto Butantan, caught by R. M. Gilmore on "rat", in Anapolis, State of Goiás, and sent to the author by dr. H. de Beaurepaire Aragão, to whom this species is dedicated.

Gnathosoma

As the greatest part of the pieces of the gnathosoma is hardly visible, it is not possible to present a complete description.

Maxillicoxae — Characterized by the transformation of the setae in very strong spines, identical to those of the coxae; this fact makes it easy to recognize the species, its aspect recalling that of *Neolaelaps magnistigmatus*

(VITZTHUM) (*loc. cit.*). The postero-internal setae of the hypostoma are also typical, that is, very long and broad, contrasting with the postero-external and the anterior of the hypostoma.

3. *Laelaps thori*, sp. n.

(Fig. 5)

Small species, weakly chitinized and with elliptic contour.

Idiosoma

Idiosoma 810 μ in length by 530 μ in width at the level of coxa IV. There are no pronounced shoulders and the pointing of the anterior extremity is not very sharp.

Ventral side

Sternal plate — Reticulated only near the anterior and lateral margins, its central zone is pointed and measures 150 μ in width at the anterior margin, excluding the prolongations between the coxae I and II, and 200 μ at the posterior margin, excluding the prolongations between coxae II and III. Its length, at the median line, is 105 μ . The anterior margin is somewhat protruded in the zone between the paired setae. The lateral and the posterior margins are very concave. The anterior setae are implanted in the anterior margin and 58 μ separated from each other. The median and the posterior are placed far from the lateral and posterior margins. The length and width of the setae increase progressively, the posterior being the largest; they measure respectively 76, 95 and 106 μ .

The metasternal plates are elongated, joining the posterior margin of the sternal plate. Their setae were fractured in the holotype.

The genito-ventral plate measures about 210 μ in length by 170 μ at the widest point at the level of the second pair of setae. It is somewhat expanded and its posterior contour is regularly circular. The ventral zones is crossed by four transversal lines, the two anterior of which are of posterior concavity and the posterior of anterior concavity, the following being almost straight. The pairs of genital and posterior setae measure 95 μ , the others are somewhat smaller. The four pairs are inserted directly in the margins of the plate, pointing backwards.

Anal plate — 80 μ distant from the posterior margin of the genito-ventral plate, of triangular contour, measuring 115 μ in length and at the widest point. The anus measures 38 μ and is 20 μ distant from the anterior margin. The

paired setae, in front of the level of the posterior extremity of the anus, measure 45μ in length, the unpaired one 95μ . The surface of the plate is reticulated at the margins. The angles are rounded and the anterior margin is almost straight.

Inguinal plates elongated, very narrow, about 45μ to 10μ .

Tritosternum with pilous *lascinia*.

Stigmata at the level of the space between the pairs III and IV.

Peritrema comparatively wide, visible up to coxa I.

Peritrematalia prolonging in triangular shape behind the stigmata, visible till the anterior extremity of the idiosoma, fused with the dorsal shield, at the level of the first pair of legs.

Dorsal side

Dorsal shield ending near the posterior extremity of the body, leaving a narrow stripe uncovered, from the height of the second pair up to the posterior extremity. The surface is reticulated and slightly sculptured anteriorly. There are thirteen pairs of submedian setae, including the vertical and excluding the posterior pair, and twelve marginal pairs. The submedian pair, which lies next to the posterior margin, is smaller, measuring 50μ ; the posterior marginal pair is the longest, measuring 98μ . To the outside of the last submedian pair and to the back of and inside of the 10th marginal pair, there are two circular refractive marks.

Legs

The first and the fourth pair are the longest and the second the widest. Coxae without spines. Femura of the first and second pair with two setae somewhat stronger than the others. Tarsus with setae increasing in length and strength from the first to the fourth pair.

Description made from a holotype ♀, No. 1011 in the collection of the Instituto Butantan, without data on either locality or host. The material is certainly Brazilian. This species is dedicated to the great northern acarologist Sig Thor.

Gnathosoma

Normal palps.

The setae of the *maxillicoxae* are comparatively short, measuring only 22μ , whereas the postero-internal of the hypostoma measure 50μ .

Labrum lamellar, comparatively narrow, of toothed margins.

Mandibulae of normal aspect, with crown of setae in the *pulvilli*. *Pilus denticilis* not dilated in the *digitus fixus*. Other structures of the gnathosoma impossible to describe in the holotype.

4. *Laelaps mazzai*, sp. n.

Figs. 6 — 7

Comparatively small, wide and robust species, the ♀ is well chitinized.

Description of the ♀

(Fig. 6)

Idiosoma

It measures 700 μ in length by 550 μ in width at the level of the fourth pair; very pronounced shoulders; anterior extremity sharpened.

Ventral side

Tritosternum wide at the base, with very transparent *lascinae*, which are hardly visible in the holotype.

Sternal plate — Wider than long, with sharp prolongations between the coxae I and II and slight prolongations between coxae II and III. Measures 170 μ in width at the level of the anterior margin, excluding the prolongations, and 195 μ at the level of the posterior, measuring only 98 μ in length at the median line. Its surface presents reticulation which is hardly noticeable. The straight anterior margin is slightly and the posterior strongly thickened and somewhat concave. The anterior setae, measuring 85 μ , are implanted at the level of the anterior margin, and separated from each other by a space of 60 μ ; the median measure 125 μ in length and are about 12 μ distant from the lateral margin; the posterior are placed at the posterior angles and measure 136 μ .

The reticulation of the surface from the anterior margin of the sternal up to the tritosternum indicates the presence of a pre-sternal plate.

Metasternalia elongated, weakly chitinized with setae of about 135 μ .

Genito-ventral plate comparatively short and wide, measuring about 200 μ in length by 160 μ at the widest point. There are four pairs of setae, the genital with 105 μ and the posterior with 72 μ , the other two being fractured in the holotype. The surface of the plate is crossed by four transversal lines, the anterior of which is very concave backwards and the two posterior slightly concave forwards.

Anal-plate — Piriform, 105 μ distant from the posterior margin of the genito-ventral plate, measuring 105 μ in length by 88 μ at the widest point. The anus measures 30 μ and is 15 μ distant from the anterior margin of the plate. The paired setae are placed at the level of the posterior margin of the anus and

fractured just like the unpaired one; the latter, however, according to the mark of implantation, is supposed to be much larger than the paired ones. The lateral angles of the plate are rounded and much more heavily chitinized, as is the case in several other species.

Inguinal plates elliptic, very regular, with large antero-posterior axle, about 30 μ in length.

The uncovered surface of the ventral side bears about 50 setae which increase in length posteriorly, the posterior pair, which is the largest, measuring 115 μ ; all smooth, only the larger presenting slight roughness.

Stigmata at the level of the space between the coxae III and IV.

Peritrema passing on to the lateral margin at the level of the second pair.

Dorsal side

Dorsal shield with undulated margins, corresponding to the widening of the shoulders of the idiosoma, very sharpened at the anterior extremity, with elongated reticulation at the level of the anterior zone of the margins, which is more heavily chitinized. The remaining surface of the shield also shows reticulation always more pronounced behind the setae, where the line has the shape of a *V*, surrounding from the posterior concavity the point of implantation of the seta. The shield leaves a wide edge laterally and posteriorly uncovered, the posterior margin being straight between the setae of the last pair. The setae are more numerous than usually, principally at the anterior third of the shield; there are 16-18 submedian pairs including the vertical one. The longest setae are flexible, like the third submedian pair, which is also the widest.

There are some circular symmetric marks on the surface of the shield, two being marginal posterior pairs. There are also several pairs of slit-like pores. There are more or less twelve marginal setae on each side; the posterior, which are broken in the holotype, seem, by the marks of implantation, to be very long and strong. All the setae of the shield are smooth. There is an anterior aerolated sculpture.

The uncovered dorsal surface has about twenty setae on each side, the posterior pairs being larger.

Legs

Leg II slightly elongated, just like the genual I. Posterior setae of the coxae I, II and III spine-like, wide, that of coxa II being larger. Distal seta of the coxa I implanted almost in the middle of the posterior margin of the joint. Coxa IV with a very weak seta, near the distal margin and approaching the anterior rather than the posterior margin. Femur I has a long seta and the genual I two long setae. Femur II has two long setae and the genual II one. Tarsus III presents the strongest setae and IV the longest.

Gnathosoma

Normal palps.

Epistoma membranous, of foliaceous aspect in the apex.

Mandibulae retracted in the holotype, therefore not described. The *pilus dentilis* not dilated.

Labrum lanceolated, with reduced pilosity.

Corniculi slightly chitinized.

Seta of the *maxillicoxae* and of the hypostoma normal.

Description of the ♂

(Fig. 7)

Our material consists of an unique female, the holotype, and three male specimens, on which the description was based. The fact that these male specimens were caught at the same time as the female and on the same host, which was not parasited by any other species of the same genus or of a similar genus, in itself leads to the supposition that they belong to the same species. In this case, the hypothesis is still strengthened by arguments of morphologic homology, such as the tendency to hypertrichosis in the dorsal shield in both sexes and the resemblance of aspect of certain setae.

Idiosoma

Of elliptic shape, anterior extremity slightly sharpened. The chitinization is median. It measures 552 μ in length by 420 μ in width at the level of the third pair.

Ventral side

The males of this species are very characteristic due to the aspect of the ventral side; instead of presenting the holovertral shield, a result of the fusion of the sternal, genito ventral and anal plates, as is the rule in the *Laelaptidae* and in similar families, they bear a free anal plate which gives them an androgyne appearance. That this is not an unique case, was already shown by Oudemans, in the *Laelaps* Studiën (11), concerning *Laelaps pachypus* KOCH, 1839, a species in which the same anomaly of the plates was observed.

Tritosternum pilous from the point of bifurcation.

Sternal-genito-ventral plate — More chitinized in the sternal zone, characterized by the clearness of the reticulation, the meshes of which are scale-like.

The plate emits prolongations into the interval of the coxae, the anterior being the more pronounced. The ventral zone, of indistinct limits, extends laterally up to about the middle of the coxae, being $35\ \mu$ distant from the anal plate. Apart from the setae, which are normally found in this plate, there are several others, four pairs being in the ventral region and two in the metasternal zone. The supplementary setae are, in the metasternal region, much smaller than the sternal and the metasternal, the anterior pair measuring $50\ \mu$ and the posterior $58\ \mu$, whereas the anterior sternal measures $76\ \mu$, the median $102\ \mu$, the posterior $112\ \mu$, and the metasternal $105\ \mu$. The pair of genital setae measures $95\ \mu$, the posterior of the plate $57\ \mu$ and the supplementary of the ventral region measures about $45\ \mu$.

There are traces of a pre-sternal plate. The male organ projects into the middle of the anterior sternal margin.

Anal plate — Of piriform shape, measures $95\ \mu$ in length by $82\ \mu$ in width, the anus being $18\ \mu$ distant from the anterior margin. The paired setae are behind the middle of the anus, and measure $38\ \mu$. The unpaired seta measures $64\ \mu$. The surface of the plate presents an elongated reticulation near the margins.

In some specimens the intensive dark coloration of the integument in this region raises difficulties in tracing the lateral and posterior limits of this plate. The androgyne aspect is also marked by folds of the integument that is very similar to the scale-like aspect of the ventral plates. Only the examination with high magnification permits to observe the characteristic striation of the integument, that is absent in the plates.

Inguinalia — Elongated, free, about $23\ \mu$.

Stigmata — At the level of the space between the coxae III and IV. *Petritrema* visible up to middle of the coxa II.

Dorsal side

Dorsal shield — Covering almost the whole idiosoma, leaving only a narrow lateral stripe free, anterior extremity sharp. The chitinization is median, being weak at the margins, the limits of which are not very distinct. The surface is all reticulated. The choetotaxy of the shield is very characteristic; normal at the anterior zone, the pilosity becomes more dense backwards from the level of the second pair of legs formed by short setae of about $45\ \mu$, recalling the aspect of the dorsal shield of *Eulalaeps vitzthumi* FONS.. Only the anterior, lateral and posterior are longer; the posterior pair, being the longest, measures $106\ \mu$. There are two circular refractive marks immediately behind the posterior setae and two other equal ones more forwards and outwards.

Legs

The legs are enlarged, especially leg II.

The coxae have comparatively weak setae, excepting the posterior of coxa III, which is comparatively strong. The coxa II presents a strong sting in the anterior margin. The genua I presents one and femur I two long setae. The genua II has two and the femur II one long seta. In tarsus II there are some spines, which are very strong, specially the distal one. In tarsus I there are only weak hairs.

The material under investigation consists of a ♀ and three ♂♂, caught on a wild rat in the Provincia de Salta, Argentine Republic, by Dr. S. Mazza, the specimens being catalogued under No. 604 in the collection of acarians of the Instituto Butantan, S. Paulo.

Gnathosoma

Normal palps.

Epistoma membranous, anterior margin straight, touching only the first joint of the palps.

Labrum lanceolated, cut longitudinally, almost bifid apex, slightly pilous.

Hypostoma with 6-7 lines of denticles, usually with 3 pairs in each line.

Corniculi with very weak chitinization.

Mandibulae difficult to describe, owing to the retraction, in shape of canalculated stems with truncated apex.

5. *Laelaps hirsti*, sp. n.

(Fig. 8)

Large species, weakly chitinized.

Idiosoma

Of elliptic contour, shoulders slightly pronounced, measuring 920 μ in length by 644 μ in width at the level of the fourth pair.

Ventral side

Tritosternum pilous after the bifurcation.

Sternal plate — Well chitinized, of reticulated surface, measuring 200 μ in width at the anterior margin, excluding the anterior prolongation, by 145 μ in

length at the median line. The anterior margin is straight up to the level of the prolongations, the posterior being slightly and the lateral strongly concave. The anterior prolongations such as the posterior are long, projecting between the coxae. The anterior setae are implanted directly at the anterior margin, being $90\ \mu$ distant from each other, and $115\ \mu$ in length. The median are near the lateral margins and measure $124\ \mu$. The posterior measure $220\ \mu$ and as the other they are smooth and with very sharp apex. Apart from the two normal pairs of pores, there seems to be another smaller pair, immediately in front of the posterior setae of the plate.

Metasternalia not very distinct, with setae of $130\ \mu$.

Genito-ventral plate — Well chitinized, wide, measuring about $280\ \mu$ in length by $288\ \mu$ at the widest point. The surface is cut transversally by four not very distinct lines. The genital setae measure $130\ \mu$, the two following $114\ \mu$ and the posterior $122\ \mu$, all being smooth. The margin of this plate is thickened from the level of the second pair of setae.

Inguinalia — Oval, elongated, well chitinized, with $38\ \mu$.

Anal plate — This plate is piriform, with sculptured angles, the anterior margin being $70\ \mu$ distant from the posterior margin of the genito-ventral plate. It measures $130\ \mu$ in length by $114\ \mu$ in width. The anus measures $38\ \mu$ and is $32\ \mu$ distant from the anterior margin. The paired setae in front of the level of the posterior margin of the anus measure $76\ \mu$; the unpaired seta is fractured in the holotype, however, its mark of implantation indicates as almost certain that it is longer than the paired ones, this being a rule in the genus, excepting *L. exceptionalis* FONS.

Stigmata of normal position. *Peritrema* visible up to the anterior margin of coxa II. *Peritrematalia* with triangular posterior prolongation with pore, joining in front to the margin of the dorsal shield, which, therefore, seems thickened.

The uncovered surface of the ventral side shows about twelve pairs of setae in the postero-external region of the opisthosoma, the posterior pair, the longest, measuring $168\ \mu$.

Dorsal side

Shield of the idiosoma regularly elliptic, covering almost the entire surface, of which it leaves only a narrow lateral and posterior stripe free. The surface, all over covered with fine points, is reticulated only near the margins, the lines of the reticulation being fine and hardly noticeable. The surface presents also a sculpture, consisting of lighter areolated spots from the propodosoma up to the hysterosoma. The setae of the shield present a fine and flexible apex, there being thirteen submedian pairs, including the two pairs of the anterior extremity of the shield, the first and the penultimum being shorter and the posterior larger; there are also eleven marginal pairs and fifteen between these and the submedian ones.

There are two pair of circular marks of refractive, identical to those mentioned in other species, at the height of the opisthosoma, characterized by a light central point. Apart from the anterior pair of pores there are also six or seven others, generally slit-shaped. The anterior extremity of the shield is not as sharp as is the rule in the genus. All the setae of the shield as well as the others are smooth, not being indented in the apex as it occurs in other species.

Legs

Legs I and IV are the largest and II the widest.

Coxa I with posterior spine very wide, somewhat larger and wider than the posterior of coxa III, of rounded extremity; distal seta weak at the posterior margin, distant from the extremity.

Coxa II with two setae, both distal, the posterior larger, the anterior margin is toothed and shows a moderate dorsal spine.

Coxa III with posterior spine, somewhat smaller than that of coxa I and anterior seta curved. Coxa IV with weak distal and median seta. Femura I and II each with one longer seta. Genua I with one and genua II with two longer setae. Tarsus I with fine hairs and the rest with spine-like setae, which are longer in tarsus IV.

Description of a female specimen, the holotype, No. 128 in the collection of the Instituto Butantan, caught by the author on a wild rat *Oryzomys eliurus* WAGNER, known by the common name "rato do taquaral", on 3-1-35 at Butantan, São Paulo. On the same host were found *Ischnolaelaps* sp. and *Laelaps butantanensis* FONS..

Gnathosoma

Epistoma membranous, anterior extremity seeming to be truncated, touching the apex of the second joint of the palps.

Mandibulae long, not thickened, with crown of setae at the base of the *digitus mobilis* and small seta at the base of the *digitus fixus*; *pilus dentilis* with the distal half very sharp; the position of the *mandibulae* in the preparation did not permit a description of the teeth.

Labrum very characteristic, shaped like a tongue with anterior extremity wide instead of triangular or lanceolated, as in the majority of the species; surface slightly pilous.

Paralabra wide, pilous.

Styli in the shape of a progressively sharpening stem.

Malae internae in the shape of a truncated stem.

Setae maxillicoxales thin.

Setae hypostomatis internae thin and much longer than the external ones.

Corniculi of median chitinization.

Palps normal, with some comparatively thick setae on the dorsal surface of joints II and III.

6. *Laelaps navasi*, sp. n.

(Fig. 9)

Small species, median chitinization, with the typical morphology of the genus.

Idiosoma

Elliptic, anterior extremity slightly sharpened, shoulders somewhat pronounced, measuring 736 μ in length by 530 μ in width at the level of the fourth pair. In the holotype, the posterior extremity presents a slight protuberance, corresponding to the zone of the *cribrum* of the anal plate.

Ventral side

Tritosternum — Visible only at the base of the apex of the *lascinae* which are pilous, the median part at the *rima hypopharyngis* up to the height of the posterior setae of the hypostoma.

Sternal plate — Well chitinized, lateral margins slightly thickened, reticulation hardly noticeable. The anterior angles form long projections between the coxae I and II, there existing smaller projections between the coxae II and III. The length of the plate at the median line is 110 μ and the width at the anterior margin, excluding the projections, 160 μ . The anterior margin is slightly convex and somewhat thickened between the anterior setae, the lateral and the posterior being concave, the latter more strongly. The anterior setae are implanted directly at the anterior margin, being 64 μ distant one from the other, and measure 83 μ in length. The median are much more external, but still very far from the lateral margins. The length is the same as that of the posterior, i.e., 118 μ . The posterior are of somewhat more external position than the median, yet not touching the lateral or the posterior margins. All the setae are wide at the base and sharpen regularly up to apex, which is very thin. The *pori repugnatori* have the usual position and shape, its slits being, however, much wider than usual.

Pre-sternal plate — Recognizable by the distinct reticulation from the anterior margin of the sternal up to the *tritosternum*.

Metasternalia weakly chitinized, with setae of equal length and aspect as the posterior ones of the sternal plate.

Genito-ventral plate — Chitinization somewhat more weak than that of the sternal plate, of normal expansion in the ventral zone, measuring about $260\ \mu$ in length by $182\ \mu$ at the widest point. The surface of the plate presents four transversal lines, which are usually found in species of the genus, apart from longitudinal lines in the most anterior zone of the ventral plate. The genital setae are submarginal and measure $95\ \mu$; the two median pairs are marginal and measure $76\ \mu$ in length and the posterior $84\ \mu$.

Inguinal plates — Much longer than wide and thinner at the back. At the sides of the first pair of setae of the ventral zone of the plate, there are, in the tegument, two small elongated plates, as they often appear in species of the genus *Liponissus* KOLENATI. Between this pair and the genital seta there is another smaller pair; still another punctiform pair being placed back and outwards of the small elongated plate first mentioned.

Anal plate — Cordiform, characterized by the convexity of the anterior margin, measuring about $110\ \mu$ in length by $102\ \mu$ at the widest point. The anal orifice measures $38\ \mu$, the anterior extremity being $23\ \mu$ distant from the anterior margin of the plate. Paired setae with $52\ \mu$, at the level of the posterior margin of the anus; unpaired seta much stronger, $100\ \mu$ in length. The surface of the plate presents longitudinal lines near the anterior and lateral margin and sculpture in the external angles. The *cribrum* goes even beyond the implantation of the posterior seta.

Stigmata with the usual position.

Peritrema visible up to the middle of coxa II.

Peritrematalia with short and narrow posterior prolongation and one pore at the extremity.

The uncovered zone of the ventral plate presents on each side about 30 setae, which are smooth and short, excepting, however, the posterior, which is long with $120\ \mu$, and of toothed apex.

Dorsal side

Dorsal shield — It does not cover the whole surface of the idiosoma, leaving free, from the level of the second pair of legs, a margin which increases progressively. The anterior extremity is slightly pointed, presenting a slight undulation at the edges, which, at the level of the space between the coxae I and II, assumes proportions of real reentrance. The reticulation is more pronounced near the margins, finishing in the centre. The anterior half of the median zone is

sculptured by lighter halos. Paired circular or marks also exist slit-shaped; of the latter there is a pair directly in front of the posterior setae and another marginal in front of the penultimum pair of setae. The shield presents numerous short setae, about 50 μ , excepting the first median pair and the posterior ones, which are long, the last measuring 110 μ . There are about 18 median pairs, including the anterior group. The penultimum pair of median setae, directly in front of the posterior pair, which generally is very reduced, is in this species of the same size as the majority of the other setae. The zone of the margin in the space between the posterior setae is straight.

Legs

Robust legs, the third pair seeming to be somewhat shorter.

Coxa I with spine-like posterior seta, which is weaker than the posterior of coxa I, and a curved anterior seta; there is, apart from this, a short and strong spine of sharp apex at the anterior margin. Coxa III with spine-like posterior seta, which is weaker than that of coxa II and somewhat stronger than the anterior of coxa I, and a curved anterior seta. Coxa IV with fine seta, nearer the distal edge and the anterior margin. Genua I with a long seta and genua II with two on the dorsal side. Femura I and II with a longer seta each. Tarsus I with fine hairs, others with spine-like setae longer in tarsus IV.

Description of a ♀ holotype, No. 1098, caught by the employee of the Instituto Butantan, José Navas, in Butantan, State of S. Paulo, on the 7-5-1937, on a wild rat, known by the common name "rato do taquaral", which lives in "Bamboo-trees" (probably *Oryzomys eliurus* WAGNER or *O. flavescens* THOMAS). We dedicate the specific name to this employee in appreciation of his great help in collecting material.

Gnathosoma

Epistoma membranous, wide, of trilobed apex.

Mandibulae of normal aspect, with crown of setae in the apex of the genua, corresponding to the side of the *digitus mobilis*. Owing to the position of the *mandibulae* it was not possible to verify the existence of the setae, which usually exist at this extremity of the side of the *digitus fixus*. For the same reasons, it was not possible to draw the mandible, which seems to present three teeth in the *digitus fixus* and two in the *digitus mobilis*, such as a not dilated *pilus dentilis*.

Labrum pilous of triangular rounded apex.

Paralabra foliaceous, wide, with thin prolongations.

Malae internae forming pilous *lascinae*.

Setae maxillicoxales equal in length to the of *hypostomatis internae*, only somewhat wider.

Corniculi weakly chitinized.

Palps normal.

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