

Recharacterization of Gymnodamaeidea and erection of
Plateremaeidea (Acari, Oribatei), with key to families and genera.

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ABSTRACT

The present paper deals with the recharacterization of the Gymnodamaeidea and the erection of Plateremaeidea n. grad. (Acari, Oribatei). Gymnodamaeidae Grandjean, Aleurodamaeidae Paschoal & Johnston, and Idiodamaeidae Paschoal are recognised under the Gymnodamaeidea. Plateremaeidae Tragardh, Pheroliodidae Paschoal, Nooliodidae Paschoal, Hammeriellidae Paschoal, Lyrifissellidae Paschoal, Pedrocortesellidae Paschoal, Licnodamaeidae Grandjean and Licnobelbidae Grandjean are included in Plateremaeidea. A key to the families and genera of Gymnodamaeidea and Plateremaeidea is also provided.

Gymnodamaeidea was proposed by Grandjean for the families Gymnodamaeidae Grandjean, Licnobelbidae Grandjean, Licnodamaeidae Grandjean and Plateremaeidae Tragardh, all having in common the absence of trachea I and its stigma (tracheal system sub-normal, with only tracheae III and sejugal), and the reduction in number of the notogastral setae, the centro-dorsals always absent. Close families as Liodidae, Hermanniellidae and Plasmobatidae have abnormal tracheal system.

A new dimension to the Gymnodamaeidea was given by Balogh (1972), who placed it in the group Polytricha (with more than six pairs of genital setae), together with Liodoidea, Hermannielloidea, Hermannioidea and Nanhermannioidea, according to him, could be distinguished by the following characteristics: notogastral setae reduced in number, being restricted to the posteromarginal pairs (three to six pairs on adults); notogaster flat or excavated, occasionally with exuviae or cerotegument; **ro**, **le** originated one close to the other; legs very long and filiform or on sockets; anal setae varying from three to six pairs. He admitted as Gymnodamaeidea the same families pointed out by Grandjean (1965).

In the present paper a completely new statement is given to the Gymnodamaeidea with the erection of Plateremaeidea. The conclusions were drawn from two basic dissertation works presented by Paschoal (1975, 1979). split into several published papers (See the References).

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Superfamily Gymnodamaeioidea Grandjean

Gymnodamaeioidea Grandjean, 1954; Grandjean, 1965; Balogh, 1972; Paschoal, 1979.

Characteristics – Eupherederms, i. e., nymphs retain exuviae of previous instars; adults with or without exuviae. Tracheal system sub-normal, i. e., trachea I missing; only tracheae III and sejugal present. Pycnonotics, i. e., without areae porosae on notogaster. Body and legs covered by cerotegument with or without microtubercles. Cuticle smooth, with no foveae nor reticula. Prodorsal apodemata generally present. **le** dorsal to dorso-lateral, anterior or posterior to **ro**; **ro** ventral; **ex** lateral, short; **in** minute, anterior to or between bothridia; bothridium dorsal; **ss** clavate or flagellate, with distal spinules generally. Notogastral dorsocentral setae absent on adults; with six pairs of posterolateral notogastral setae (**ps1**, **ps2**, **ps3**, **h1**, **r2**, **r3**), or five pairs (**r3** absent), or four pairs (**r3**, **r2** absent), or three pairs (**r3**, **r2**, **ps3** absent). With three pairs of dorsal lyrifissures (**ia**, **im**, **ip**) and two pairs of lateral lyrifissures (**ips**, **ih**). **Notogaster** ovate or circular, flat to slightly convex. Notogastral tectum present between **bng** and **lambda** lines. **Apo** I complete; all other epimeral apodemata incomplete, with or without transversal apodematic bonds. Epimeral chaetotaxy 3 : 1 : 3 : 3 (normal), or 2 : 2 : 3 : 3 (**la** on **ep** II), or 2 : 2 : 4 : 2 (**la** on **ep** II, **4a** on **ep** IV); epimeral setae of equal size. Genital aperture square to almost circular; anal aperture pyriform; genital and anal apertures contiguous, joint or not joint. Genitoanal chaetotaxy 7 (or 6) – 1 – 3 (or 2) – 3 (or 2); genital setae on a sole longitudinal row generally; **ag** lateral or posterior to genitalia. Pedotecta I, II present, auriculiform; pedotectal tooth **p** absent; lateral carenae present; acetabula I, II integument and cotyloid forming a pointed structure. Leg articulations not on proximal sockets or on sockets only at the adult stage; **Tr** and **Fe** – **Tr** articulations of legs I, II inside acetabula; femora proximal portion after trochantera articulation sinuous; femoral and trochanteral tracheae absent; with three small claws, the medial one the strongest; tarsi fusiform with no true pedicels; famulus enclosed in **Ts** I; **p** **Ts** I tactile; **omega** 1 **Ts** I paraxial, larger than **omega** 2, close to it, not on distal apophysis; **Tb** I apophysis short, with two solenidia and a tactile seta; **fi1** **Tb** I long, antiaxial, associated with a tactile seta; **fi2** **Tb** I paraxial, short; femora bulbous; **Ts** II with two equally developed solenidia, or with just one long solenidium; **ft'** **Ts** III, IV present or absent; (**it**) **Ts** IV absent; **pl'** **Ts** II, IV absent. Leg chaetotaxy: **Ts**. 19(2) – 16(2) or 16(1) – 16 or 15 – 13 or 12; **Tb**. 5 (2) – 5 (1) – 4 (1) – 4 (1); **Ge**. 4 (1) or 3 (1) – 4 (1) – 3 (1) – 3; **Fe**. 5 – 5 – 3 – 2 or 3; **Tr**. 1 – 1 – 2 – 1.

Recognised families: Gymnodamaeidae Grandjean, (Paschoal, 1975, 1982a – c, 1983a – b, 1984a – f; Paschoal & Johnston, 1982a, b); Aleurodamaeidae Paschoal & Johnston, (Paschoal, 1975; Paschoal & Johnston, 1984); and Idiodamaeidae Paschoal, (Paschoal, 1979; Paschoal, 1984f, 1987d).

Superfamily Plateremaeoidea Tragardh n. grad.

Characteristics — Eupheredermes — i. e., nymphs retain exuviae or preceding instars; adults with or without exuviae. Tracheal system sub-normal, i. e., trachea I missing, only the tracheae III and sejugal present. Pycnonotics, i. e., without — areae porosae on notogaster. Body and legs covered by cerotegument with or without microtubercles. Cuticle smooth, foveate or reticulate. Prodorsal apodemata generally present. **le** dorsal, dorso-lateral or lateral, anterior or almost at **ro** level; **ro** ventral; **in** reduced, between bothridia; bothridium dorsal to dorso-lateral, leaned or not against notogaster; **ss** flagellate, rodlike, fusiform, club-shaped or leaf-shaped, with distal spinules. Notogaster centro-dorsal setae absent; with six pairs of postero-lateral notogastral setae (**ps1**, **ps2**, **ps3**, **h1**, **r2**, **r3**), or five (**r3** absent), or four pairs (**r3**, **h1** absent). Three pairs of dorsal lyrifissures (**ia**, **im**, **ip**) and two pairs of lateral lyrifissures (**ips**, **ih**). Notogaster ovate or circular, flat (convex in **Licnobelba**). Notogastral tectum between **bng** and **lambda** lines (except **Licnobelba**). **Apo** I complete; all other apodemata incomplete, with or without transversal apodematic bonds. Epimeral chaetotaxy 3 : 1 : 3 : 3 or with epimeral neotrichy; epimeral setae of equal size, or with the epimere I first row setae larger than the others when neotrichy is present. Genital aperture square to almost circular; anal aperture pyriform, cylindrical or circular; genital and anal apertures contiguous joint or not joint. Genitoanal chaetotaxy 8 or 7 (or 6) — 1 — 2 to 8 — 3; genital setae on a sole longitudinal row or on more than one row, or yet set on arc; **ag** lateral to posterior to genitalia. Pedotecta I, II absent; pedotectal tooth **p** present; lateral carenae present; acetabula I, II integument and cotyloid forming a bunt structure. Leg articulations on proximal — sockets, i. e., sockets on proximal ends of tarsi, tibiae and genua; Tr and Fe — Tr articulations of legs I, II outside acetabula; femofemora proximal portion after trochantera articulation almost, straight; femoral and trochanteral tracheae present; with tree small, median or large claws, the middle claw generally larger than the laterals tarsi pedicels present, narrow; Ts I famulus enclosed or free; **p** Ts I an euphatidium; **omega** 1 Ts 1 paraxial, larger than **omega** 2, both set on a distal apophysis; tibial apophysis I short, median or large, bearing two solenidia; **fil** Tb I long, antixial; **fi2** short, paraxial, femora not bulbous; Ts II with two close solenidia; **pl'** Ts III absent or present; **pl'** Ts IV absent; (**it**) Ts IV absent or present. Leg chaetotaxy: Ts. 19(2) — 17(2) — 16 (or 15) — 15 (or 12); Tb. 4 (2) — 5(1) — 4(1) — 4 (1); Ge. 4 (1) — 4 (1) or 3 (1) — 3 (1) or 2 (1) — 3 or 2; Fe. 8 — 8 — 5 — 5 or 5 — 5 — 3 — 2; Tr. 1 — 1 — 4 — 3 or 1 — 1 — 2 — 1.

Recognised families — Plateremaeidae Tragardh, (PASCHOAL 1979, 1987a); Pherolioididae Paschoal, (PASCHOAL 1987b); Nooliodidae Paschoal, (PASCHOAL, 1989d); Hammeriellidae Paschoal, (PASCHOAL, 1989a); Lyrifissellidae Paschoal, (PASCHOAL, 1989e); Pedrocortesellidae Paschoal, (PASCHOAL, 1987c); Licnobelbidae Grandjean, (PASCHOAL, 1987d).

Key to superfamilies, families and genera

- 1 – Pedotecta I, II auriculiform; pedotectal tooth **p** absent; acetabula I, II integument and cotyloid forming a pointed structure; leg articulations not on proximal sockets or with sockets only at the adult stage; Tr and Fe – Tr articulation of legs I, II inside acetabula; tarsi fusiform, pedicels absent; Ts II with sixteen tactile setae; **fil** Ts I associated with a tactile seta; without femoral tracheae GYMNODAMAEOIDEA 2
 - Pedotecta I, II absent; pedotectal tooth **p** present; acetabula I, II integument and cotyloid forming a blunt structure; leg articulations on proximal sockets; Tr and Fe – Tr articulations of legs I, II outside acetabula; tarsi not fusiform with pedicels; Ts II with seventeen tactile setae; **fil** Ts I not associated with a tactile seta; femoral tracheae present PLATEREMAEOIDEA 13
- 2 – Adults with no exuviae; body and legs covered by a thin cerotegument layer with microtubercles; **ss** with spinules; notogaster flat; **ag** lateral or postero-lateral to genitalia leg setae not on tubercles; **fi2** Tb I short 3
 - Adults with exuviae; body and legs covered by a thick cerotegument layer without microtubercles; **ss** flagellate, with out spinules; notogaster convex; **ag** posterior to genitalia; leg setae on tubercles; **fi2** Tb I median Aleurodamaeidae Paschoal & Johnston Aleurodamaeus Grandjean
- 3 – **le** dorsal, posterior to **ro**; **ss** filiform, long; with three pairs of anal setae; Ts II with just one solenidium **omega**, of large size; notogaster convex anteriorly; **ft'** Ts III, IV present Idiodamaeidae Paschoal Idiodamaeus Paschoal
 - **le** anterior or at **ro** level; **ss** clavate; two pairs of anal setae; Ts II with two equally developed **omega** solenidia; notogaster flat; **ft'** Ts III, IV absent Gymnodamaeidae Grandjean 4
- 4 – Body larger than 500 μ ; **apo in** present; **in** on strong tubercle set on **apo in**, anterior to bothridia 5
 - Body smaller than 500 μ ; **apo in** absent; **in** on small tubercle, between bothridia or a little anterior to it 10
- 5 – Cerotegument piled on dorsum body; one sole pairs of genital setae close to genitalia inner margin; acetabula I, II integument and cotyloid not sharp pointed; **pv'** Ts I posterior to **pv''**; d Ge I, II close to distal margin; **d** Tb II on distal half; **d** Ge IV medial Plesiodamaeus Grandjean
 - Cerotegument not piled; all genital setae close to inner margin; acetabula I, II integument and cotyloid sharp pointed; **pv'** Ts I anterior to or at the level of **pv''**; **d** Ge I, II proximal or medial; **d** Tb II proximal; **d** Ge IV close to the proximal or distal boundaries 6
- 6 – Ts – Tb, Tb – Ge, Ge – Fe articulations not on sockets 7
 - Ts – Tb, Tb – Ge, Ge – Fe articulations on sockets 9

- 7 – Two setae on Fe IV; notogaster with anterior tubercles; **h1**, **ps1**, **ps2** setae bases on prominent folds of distal body margin **Pleodamaeus** Paschoal
- Three setae on Fe IV; notogaster with no anterior tubercles; **h1**, **ps1**, **ps2** setae bases not on folds 8
- 8 – Genitalia inner margins dentate; genital and anal apertures contiguous, the openings not joint; 3c on lateral tubercles; epimeral furrow boundaries tuberculate **Odontodamaeus** Paschoal
- Genitalia inner margins smooth; genital and anal apertures contiguous, the openings completely joint; 3c not on tubercles; epimeral furrow boundaries smooth **Gymnodamaeus** Kulczynski
- 9 – **le** dorso-lateral, anterior to **ro**, close to it; central notogaster with no ornaments; **h1** subterminal; **1a** on epimere I; genital and anal apertures very close together; acetabulum IV near acetabulum III; pedotectal apophysis absent **Adrodamaeus** Paschoal
- **le** lateral, almost at **ro** level; central notogaster ornamented; **h1** terminal; **1a** on epimere II; genital and anal apertures contiguous, the contours no longer seen at the contact area (ano-genital bridge present); acetabulum IV not too close to acetabulum III; pedotectal apophysis present. **Arthrodamaeus** Grandjean
- 10 – Six pairs of genital setae; microtubercles large; **ip** very long **Joshuella** Wallwork
- Seven pairs of genital setae; microtubercles small; **ip** not too long 11
- 11 – Three setae on Fe IV; **apo bo** present; **in** anterior to bothridia; **la** on epimere I; two pairs of adanal setae; **v'** Ge II anterior to the lateral setae **Johnstonella** Paschoal
- Two setae on Fe IV; **apo bo** absent; **in** between bothridia; **la** on epimere I or II; two or three pairs of adanal setae; **v'** Ge II at the level or posterior to the lateral setae 12
- 12 – **la** on epimere I; two pairs of adanal setae; **apo ro** an incomplete bar; **le** dorso-lateral, projecting slightly beyond rostrum tip; **ss** with large head; **ip** long; **r2** present; **h1** tubercles not coalescent; **fi** Tb III, IV close to **d** **Nortonella** Paschoal
- **la** on epimere II; three pairs of adanal setae; **apo ro** a complete bar; **le** lateral, well projected beyond rostrum – tip; **ss** with small head; **ip** short; **r2** absent; **h1** tubercles coalescent; **fi** Tb III, IV away from **d** **Jacotella** Banks
- 13 – Body covered by a thick layer of cerotegument without microtubercles; **ss** flagellate, rodlike or clavate; **le** almost at **ro** level; **apo** I with a long bar turned backward; with epimeral neotrichy; epimere I setae larger than the others; genital and anal apertures almost circular; seven pairs of genital setae on more than one longitudinal row; tarsi pedicels long; anal plate with four to eight pairs of setae; Fe. chaetotaxy 8 – 8 – 5 – 5; Tr. chaetotaxy 1 – 1 – 4 – 3 **Plateremaeidae** Tragardh 14

- Body covered by a thin layer of cerotegument with or without microtubercles; **ss** fusiform, clavate or leaf-shaped; **le** anterior to **ro**; **apo** I long bar absent; without epimeral neotrichy; epimeral setae of equal size; genitalia square, anal aperture pyriform generally; seven, six or five pairs of genital setae on a sole longitudinal row, or with eight pairs on more than one row; tarsi pedicels short; anal plate with three or two pairs of setae; Fe. 5 – 5 – 3 – 2; Tr. 1 – 1 – 2 – 1 18
- 14 – Cuticle smooth; **ss** flagellate, long; notogaster circular; **r3** dorsal, close to the margin; seven pairs of anal setae; pedotectal tooth **a** present; Ts I famulus free; **pl**” Ts III, IV absent **Plateremaeus** Berlese
- Cuticle foveate or smooth; **ss** flagellate, rodlike, or clavate; notogaster ovate or circular; **r3** away from the margin; six, five or four pairs of anal setae; pedotectal tooth **a** absent; Ts I famulus generally enclosed; **pl**” Ts III, IV present or absent 15
- 15 – **ss** flagellate or rodlike; four or six pairs of anal setae; leg segments with crests 16
- **ss** clavate; five or six pairs of anal setae; leg segments without crests 17
- 16 – **ss** rodlike, long, straight; notogaster circular; **hl** away from the homologous seta; anal and genital apertures apart one from the other; four pairs of anal setae; femoral crests well developed **Lopheremaeus** Paschoal
- **ss** flagellate, curved, notogaster ovate; **hl** close to the homologous seta; anal and genital apertures contiguous; six pairs of anal setae; crests small **Paralopheremaeus** Paschoal
- 17 – Cuticle smooth; **ss** club well developed; **hl**, **r2** at notogastral margin; anal and genital apertures partially joint, with on ornaments; six pairs of anal setae **Allodamaeus** Banks
- Cuticle foveate, **ss** club small; **hl**, **r2** subterminal; apertures no too close, with ornaments; five pairs of anal setae **Calipteremaeus** Paschoal
- 18 – Three pairs of anal setae; five pairs of notogastral setae; without a median transversal furrow on prodorsum 19
- Two pairs of anal setae; six, five or four pairs of notogastral setae; with or without a median transversal furrow on prodorsum 26
- 19 – Cuticle foveate or reticulate; **ss** clavate the club globose, black; seven pairs of genital setae; tarsi pedicels extremely short, with three strong claws; **pl**” Ts II, III present; **(it)** Ts IV present Hammeriellidae Paschoal 20
- Cuticle foveate, reticulate or smooth; **ss** fusiform, clavate or leaf-shaped; eight, seven or six pairs of genital setae; tarsi pedicels short, with three median to small claws; **pl**” Ts II, III absent; **(it)** Ts IV absent 22
- 20 – **le** lateral; bothridium away from notogaster; **ss** totally enclosed in bothridium; **ps2**, **ps3** anterior to **r2**; **ip** small; tibial I apophysis long; leg

- segments very long **Novazelandiella** Paschoal
 – **le** dorsal to dorso-lateral; bothridium close to notogaster; **ss** free distally; **ps2**, **ps3** posterior to **r2**; **ip** long; tibial I apophysis short; leg segments normal 21
- 21 – Adults with exuviae; **le** dorsal; **ss** distally globose; **r2** dorsal; notogaster circular; without femoral crests; (**it**), (**tc**) on strong apophyses; **pl'** Ts IV absent **Hammeriella** Paschoal
 – Adults without exuviae; **le** dorso-lateral; **ss** slightly clavate; **r2** lateral; notogaster ovate; with femoral crests; (**it**), (**tc**) not on apophyses; **pl'** Ts IV present **Andesperuviella** Paschoal
- 22 – Cuticle smooth; **ss** fusiform; notogaster rounded; anal aperture rectangular; eight pairs of genital setae; three median size claws, the laterals quite slender **Nooliodidae** Paschoal
 **Nooliodes** Paschoal
 – Cuticle foveate or reticulate; **ss** leaf-shaped or clavate; notogaster ovate; anal aperture pyriform; seven or six pairs of genital setae; three small claws, the medial the strongest **Pherolioididae** Paschoal 23
- 23 – Prodorsal apodemata absent or reduced; **ss** leaf-shaped; **hl** away from the homologous seta; six pairs of genital setae, on arc; with femoral crests **Licnoliodes** Grandjean
 – Prodorsal apodemata present, well developed; **ss** clavate; **hl** close to the homologous seta; seven pairs of genital setae, on a sole longitudinal row; with or without femoral crests 24
- 24 – **ps2**, **ps3** close together away from **ps1**; **ps3** anterior to **r2**; **hl** not too close to the homologous seta; **r2** at notogastral margin (**it**), (**tc**), (**u**) on apophyses; Ts I famulus free **Octoliodes** Paschoal
 – **ps2**, **ps3** close to **ps1**; **ps3** posterior to **r2** generally; **hl** close to its homologous seta; **r2** dorsal, not at notogastral margin; (**it**), (**tc**), (**u**) not on apophyses; Ts I famulus enclosed 25
- 25 – Adults with exuviae; **le** lateral; bothridium not coiled; notogaster without a posterior deep furrow; three small claws; without femoral crests; (**it**) Ts IV absent **Pheroliodes** Grandjean
 – Adults without exuviae; **le** dorsal; bothridium coiled; notogaster with a posterior deep furrow; three median size claws; with femoral crests; (**it**) Ts IV present **Lopholiodes** Paschoal
- 26 – With a median transversal furrow on prodorsum; **le** close to **ro**; **ss** clavate; six or five pairs of notogastral setae; **ps2**, **ps3** dorso-lateral to dorsal; seven pairs of genital setae, on a sole longitudinal row or on a semicircle; with true tarsi pedicels; notogaster flat; with notogastral tectum 27
 – Without a median transversal furrow on prodorsum; **le** away from **ro**; **ss** flat, leaf-shaped; five or four pairs of notogastral setae; **ps2**, **ps3** ventral, posterior to **r2**; six or five pairs of genital setae, on arc; without true tarsi pedicels; notogaster convex or flat; without notogastral tectum 29

- 27 – Five pairs of notogastral setae; notogaster distal margin salient; **hl** close to the homologous seta; notogaster rounded; genital and anal apertures completely joint; **ag** posterior to genitalia; three strong claws; **pl**' Ts II present; **ft**' Ts IV present Lyrifissellidae Paschoal
 **Lyrifissella** Paschoal
 – Six or five pairs of notogastral setae; notogastral distal margin invaginated; **hl** away from the homologous seta; notogaster ovate; genital and anal apertures partially joint; **ag** lateral to genitalia; three small claws, the laterals quite slender; **pl**' Ts II absent; **ft**' Ts IV absent Pedrocortesellidae Paschoal 28
- 28 – **le** dorsal; **r3** absent; **r2** close to **ip**; **h1**, **ps2**, **ps3** away from notogastral margin; genital setae on semicircle; (**tc**), (**it**) not on apophyses
 **Pedrocortesella** Hammer
 – **le** lateral; **r3** present; **r2** away from **ip**; **h1**, **ps2**, **ps3** well at the margin; genital setae on a sole longitudinal row; (**tc**), (**it**) on apophyses
 **Hexachaetoniella** Paschoal
- 29 – Adults without exuviae; cuticle reticulate or smooth; bothridium with two sharp saliences; five pairs of notogastral setae; **hl** away from the homologous seta; lyrifissures large; warts absent; five pairs of genital setae; famulus free on Ts I Licnodamaeidae Grandjean
 **Licnodamaeus** Grandjean
 – Adults with exuviae; cuticle smooth, shiny; bothridium with just one sharp salience; five or four pairs of notogastral setae; **hl** very close to the homologous seta; lyrifissures small; warts present; six pairs of genital setae; famulus enclosed on Ts I Licnobelbidae Grandjean **Licnobelba** Grandjean

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