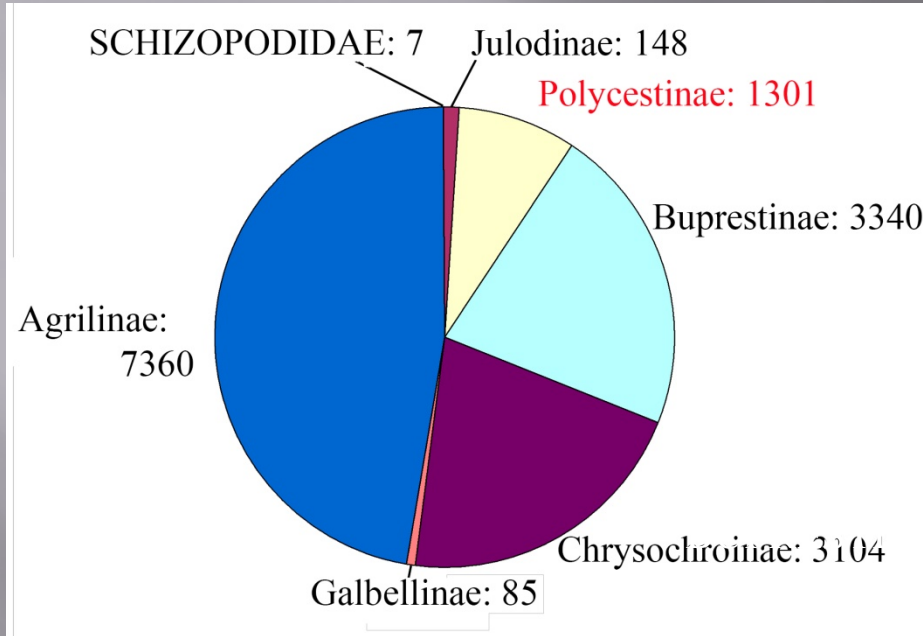


LARVAL MORPHOLOGY OF THE
JEWEL BEETLES OF THE
SUBFAMILY POLYCESTINAE
AND ITS SIGNIFICANCE FOR
THE TAXONOMY AND
PHYLOGENY (COLEOPTERA:
BUPRESTIDAE)

Mark G. VOLKOVITSH

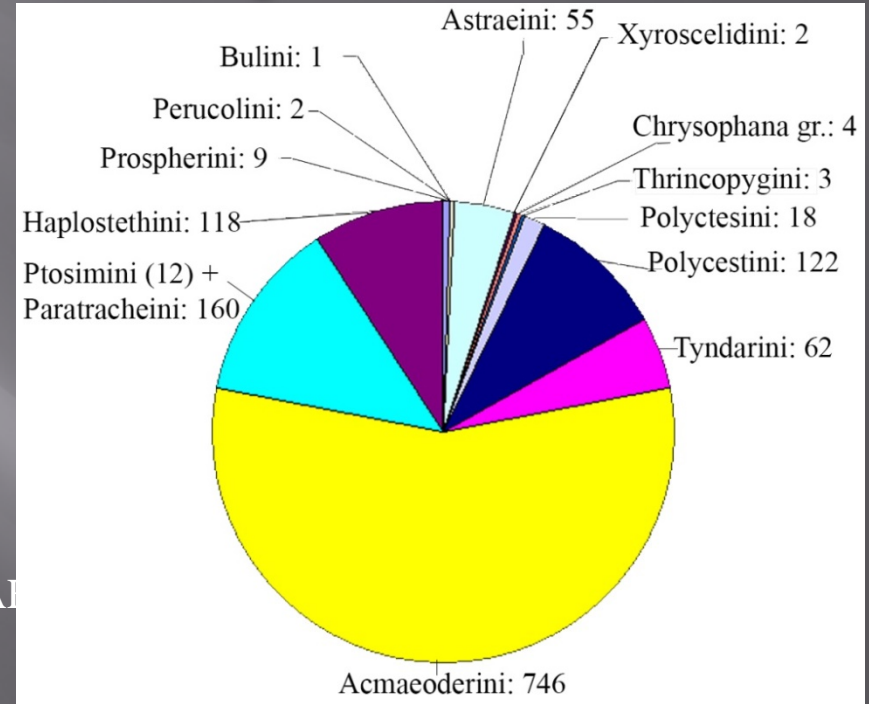
Zoological Institute RAS
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Buprestoidea and Polycestinae: Taxonomic compositions and species numbers



BUPRESTOIDEA

~15 300 spp., 500 genn., 50 trbs.
after Bellamy (2008), updated



POLYCESTINAE

1301 spp., 82 genn., 13 trbs.
35 genn. – monotypic, 23 – 2–5 spp.,
11 – >20 spp., 3 – >100 spp.
after Bellamy (2008), updated

Current state of knowledge of polycestine larvae

BUPRESTOIDEA

~ 380 species world wide (~2.3–2.5 %) (Bílý, 1996, updated)

POLYCESTINAE

~ 100 species (8 %) from 24 genera (~ 30 %) and 11 tribes (~ 85 %)

Acmaeoderini (Acmaeoderina) are best studied,

Perucolini and **Bulini** are still unknown

Key to the larvae of supraspecific taxa including **Polycestinae**:

Cobos (1986)

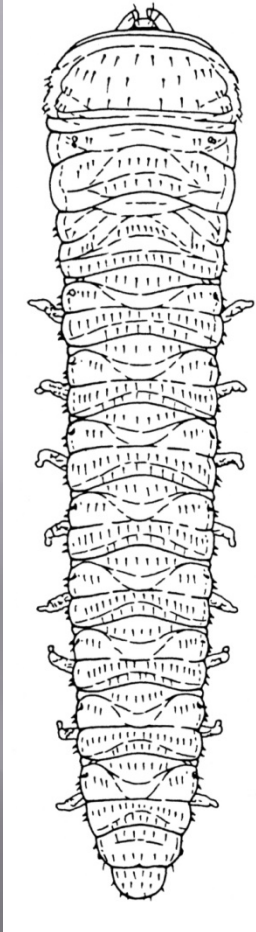
Analysis of larval characters of **Polycestinae**:

Volkovitsh & Hawkeswood (1999), Volkovitsh & Bílý (2015)

Host plants of known polycestine larvae

Taxa / no. of studied species	Host plants
Prospherini: <i>Prospheres</i> (1), <i>Blepharum</i> (1)	<i>Araucaria</i> (Araucariaceae), <i>Pinus</i> (Pinaceae) (intr.), <i>Dacrydium</i> (Podocarpaceae)
Astraeini: <i>Astraeus</i> (3)	<i>Eucalyptus</i> (Myrtaceae), <i>Banksia</i> (Proteaceae), <i>Bursaria</i> (Pittosporaceae)
Xyrosclidini: <i>Xyrosclis</i> (2)	<i>Macrozamia</i> (Zamiaceae, Cycadophyta)
Thrincopygini: <i>Thrincopyge</i> (2)	<i>Dasyilirion</i> , <i>Nolina</i> (Nolinaceae)
Polyctesini: <i>Chrysophana</i> (2); <i>Polyctesis</i> (2), <i>Bellamyina</i> (1)	<i>Pinus</i> (Pinaceae) (also <i>Cedrus</i> , <i>Taxodium</i>); <i>Rhus</i> , <i>Cotinus</i> (Anacardiaceae)
Polycestini: <i>Strigoptera</i> (1), <i>Strigopteroides</i> (1), <i>Polycesta</i> (4), <i>Thurntaxisia</i> (1)	<i>Ceriops</i> (Rhizophoraceae), <i>Quercus</i> (Fagaceae), <i>Platanus</i> (Platanaceae), <i>Bursera</i> (Burseraceae), lumber, wooden constructions
Tyndarini: <i>Neocypetes</i> (1), <i>Ocypetes</i> (1), <i>Paratyndaris</i> (2), <i>Tyndaris</i> (1)	“locust-like” wood, <i>Prosopis</i> (Fabaceae), <i>Trevoa</i> (Rhamnaceae)
Acmaeoderini: <i>Acmaeodera</i> (~30), <i>Acmaeoderopsis</i> (1), <i>Acmaeoderella</i> (~ 30), <i>Xantheremia</i> (3)	Totally, 158 genn. from 50 famm. of gymnosperms and angiosperms, particularly Rosidae (51 %)
Ptosimini: <i>Ptosima</i> (2); Paratracheini: <i>Sponsor</i> (1), <i>Paratrachys</i> (1)	<i>Cercis</i> (Fabaceae), <i>Prunus</i> (Rosaceae); <i>Acacia</i> (Fabaceae); <i>Ficus</i> (Moraceae)
Haplostethini: <i>Mastogenius</i> (2)	<i>Quercus</i> (Fagaceae), <i>Rhizophora</i> (Rhizophoraceae)

Morpho-ecological types of buprestid larvae



Schizopoid
Schizopus

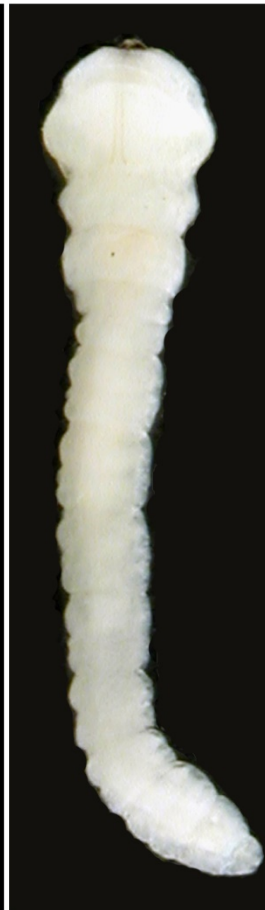
Julodoid
Julodis

Buprestoid
Belionota

Agriloid
Agrilus (EAB)

Trachyoid
Trachys

Morpho-ecological types of polycestine larvae



BUPRESTOID

Astraeus *Paratyndaris* *Mastogenius*

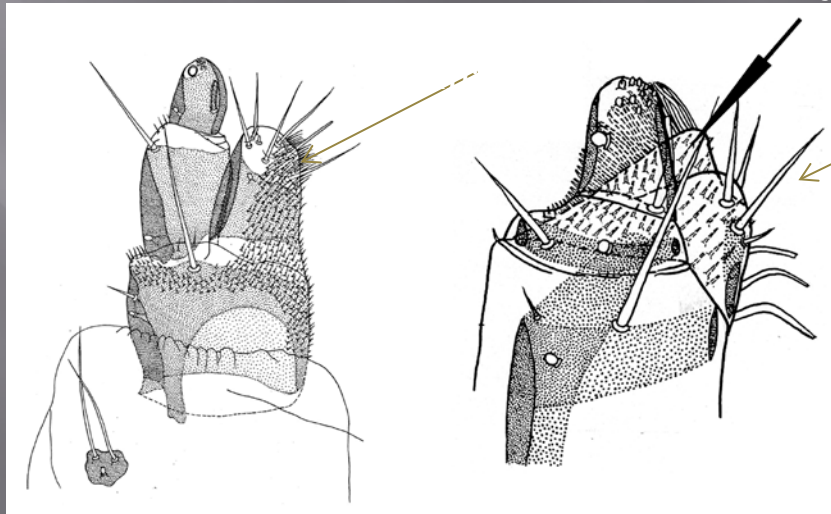
TRACHYOID

Paratrachys

Diagnostic characters of Polycestinae larvae



Single pronotal groove additional lobe



mala

Prospheres

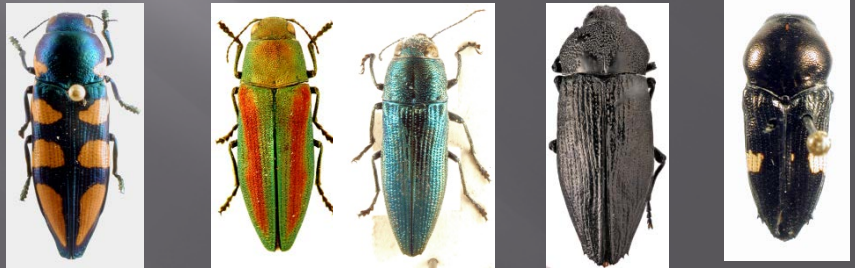
Acmaeoderella

Phyletic lineages of Polycestinae (after Volkovitsh, 2001, 2008)

1. **Prospherioid:** Prospherini, Perucolini, Bulini, Astraeini, Xyroscelidini



2. **Polycestioid:** Thrincopygini, Polyctesini (incl. *Chrysophana*-gr.), Polycestini, Tyndarini



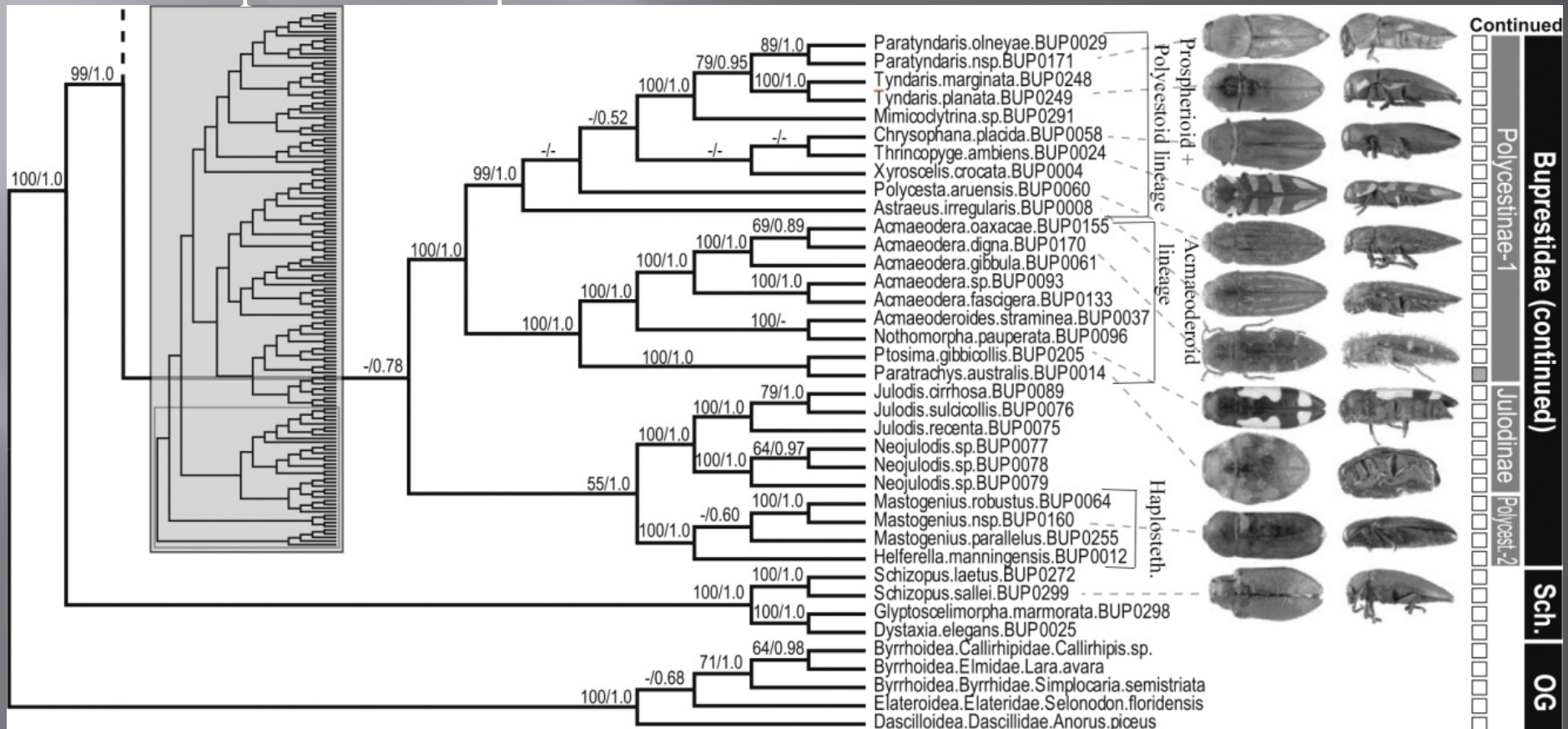
3. **Acmaeoderioid:** Acmaeoderini, Ptosimini (incl. Paratracheini), Haplostethini



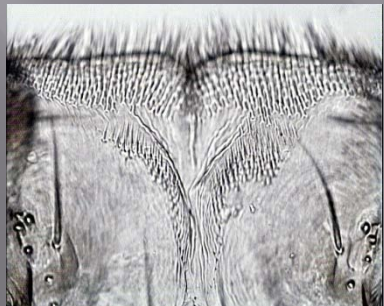
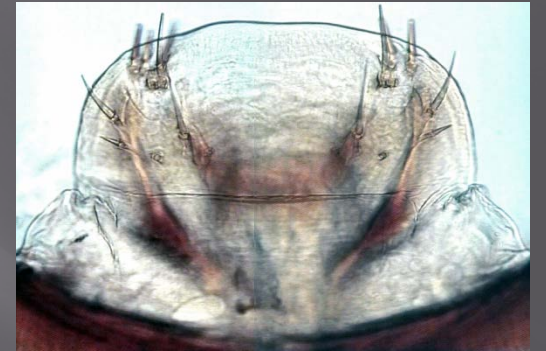
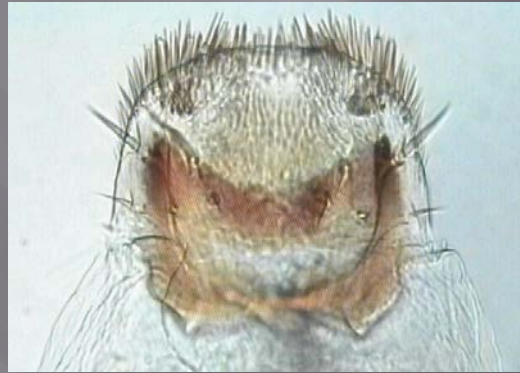
Fragment of phylogenetic tree for Polycestinae, Julodinae, Schizopodidae, outgroups based on molecular phylogenetic study (after Evans et al., 2015)

Agrilinae

Chalcophorinae + Buprestinae + Galbellinae



Prospheeroid lineage



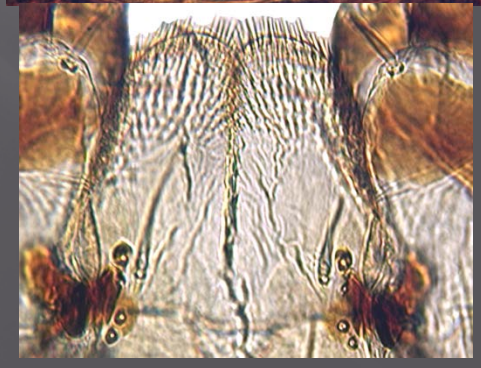
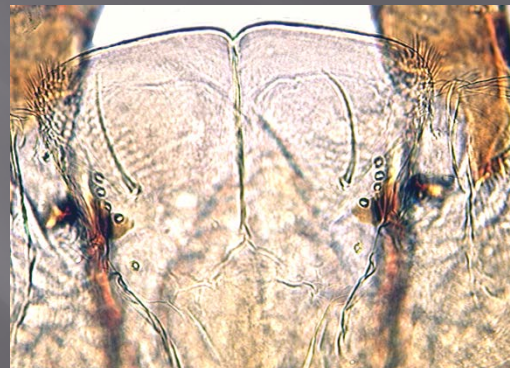
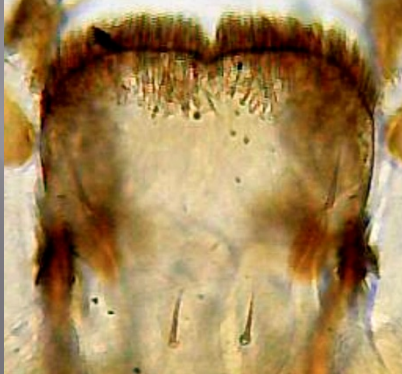
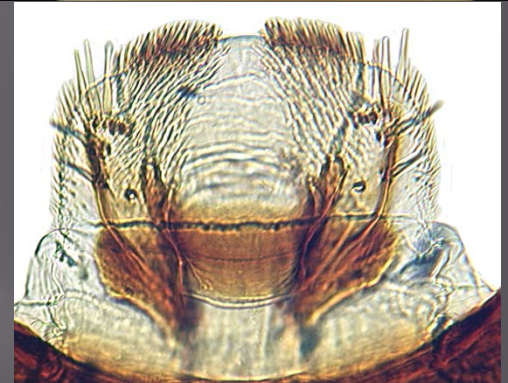
Prospherini

Xyrosclidini

Astraeni

Polycestioid lineage:

Thryncopigini, *Chrysophana*-gr., Polycetesini

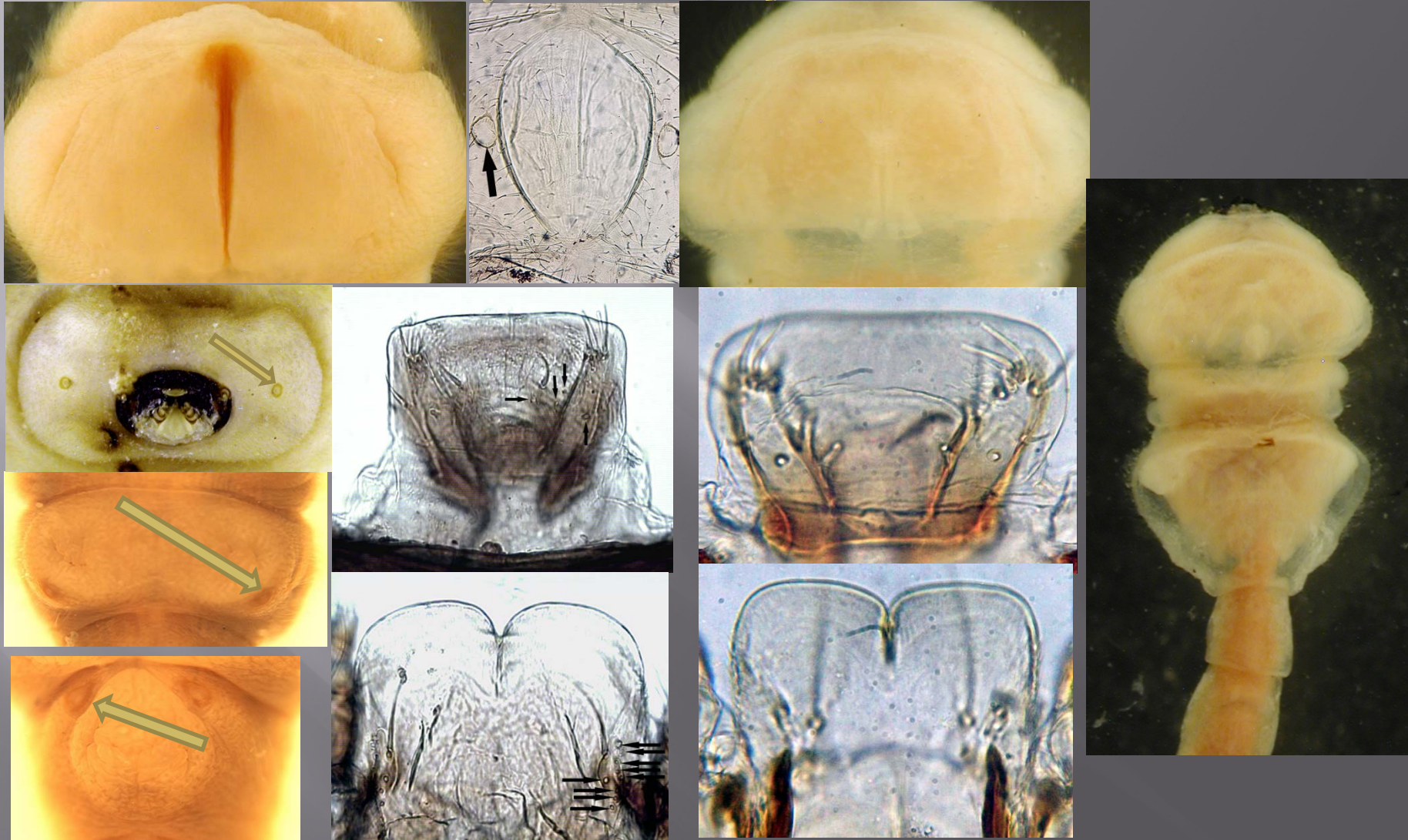


Thrincopyge

Chrysophana

Polycetes

Polycestioid lineage: Polycestini, Tyndarini



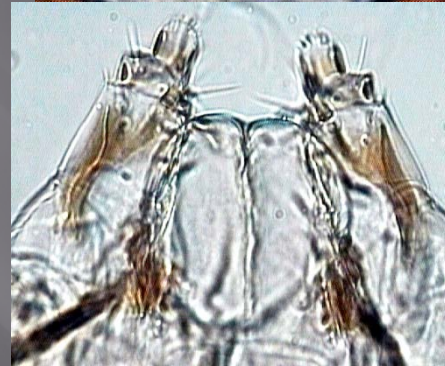
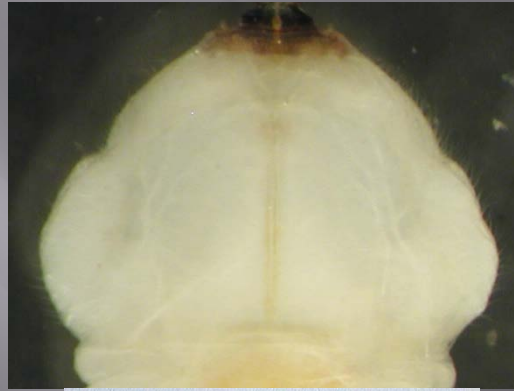
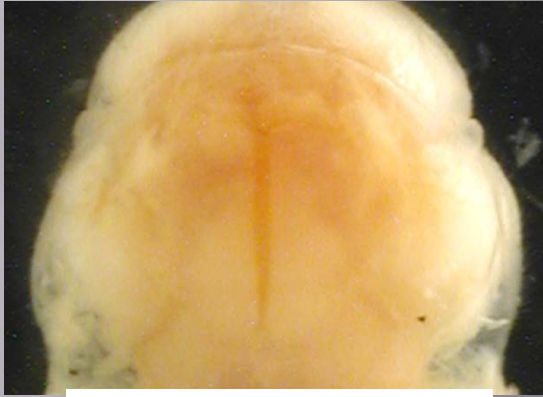
Polycestini

Polycesta, Thurntaxisia, Strigoptera

Tyndarini

Paratyndaris

Acmaeoderioid lineage: Ptosimini, Paratracheini

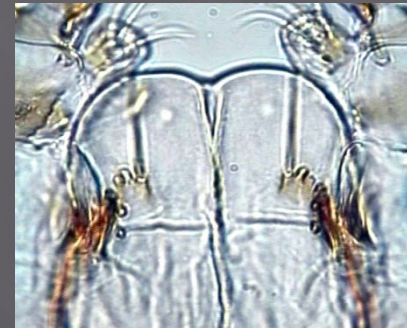
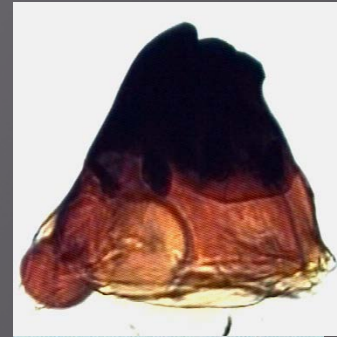


Ptosima

Sponsor

Paratrachys

Acmaeoderioid lineage: Acmaeoderini, Haplostethini



Acmaeoderini: *Acmaeodera*

Haplostethini: *Mastogenius*

Conclusions

1. Larval morphology supports the separation of primitive Gondwanian prospherioid lineage from the taxa of polycestioid lineage.
2. Larval characters also support the possible relations of Thrincopygini to Polyctesini but disagree with the placement of *Chrysophana* within Polyctesini.
3. Larval characters and feeding habits conflict with a placement of *Sponsor* in Paratracheini, in the same time they support close relationship of leaf-mining *Paratrachys* with wood-boring Ptosimini.
4. Larval morphology supports the placement of Haplostethini within Polycestinae contrary to their position as a sister group to Julodinae according to molecular study by Evans et al., 2015.

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