

1. Serangga air - Pendahuluan:

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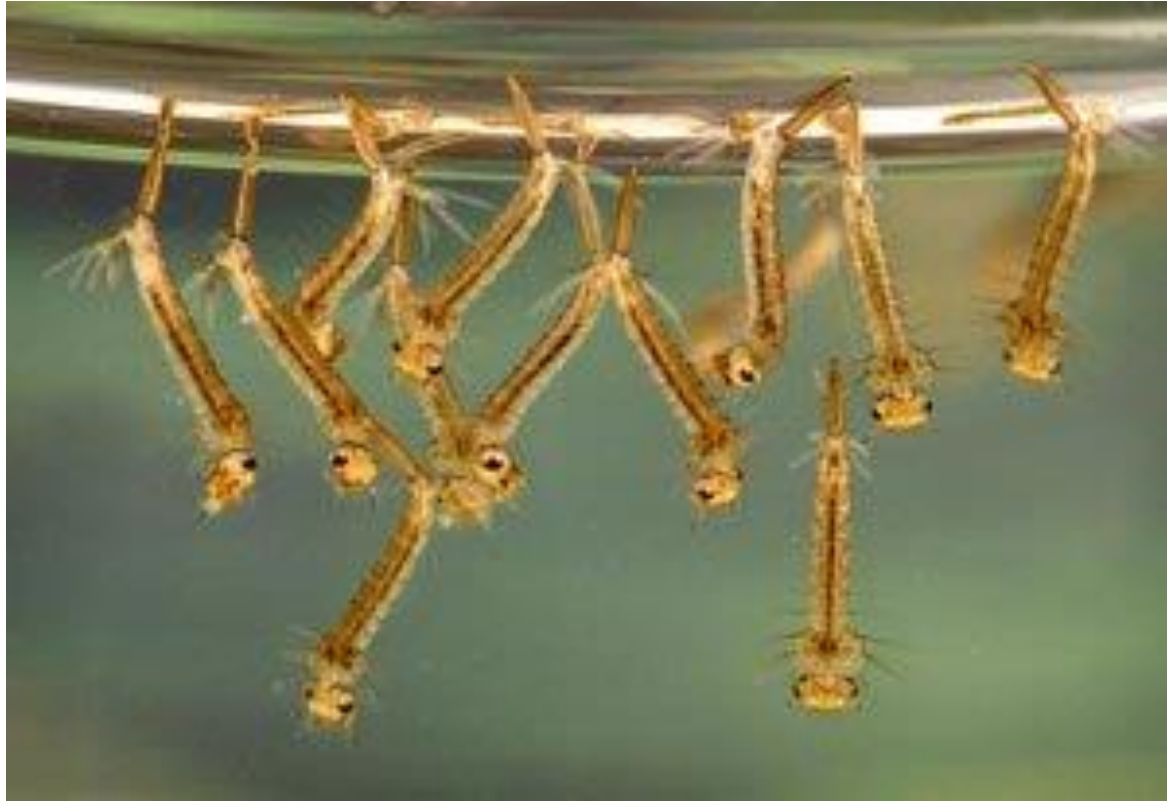
Avertebrata Akuatik (SKS: 3)



Serangga air ?????











Mayflies
Ephemeroptera



Stoneflies
Plecoptera



Caddisflies
Trichoptera



Dragons & damsels
Odonata



Beetles
Coleoptera



True bugs
Hemiptera



True flies
Diptera

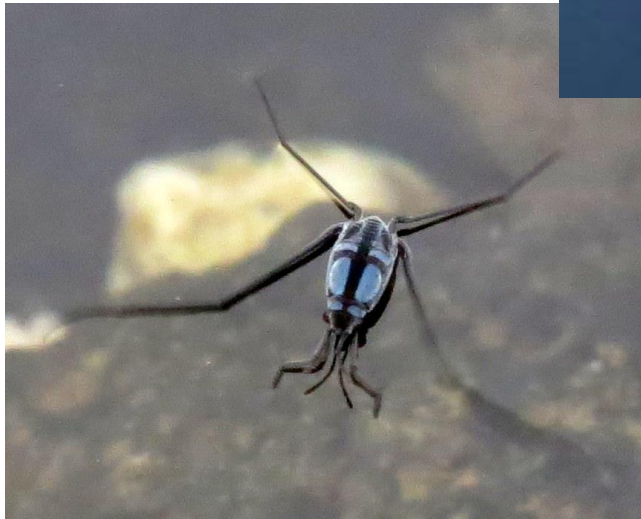


The "minor orders"
Megaloptera, Neuroptera, Lepidoptera

Habitat: lentik dan lotik sistem







Ephemeroptera

>3000 species



Plecoptera

~4000 species



Mesocapnia arizonensis, Santa Rita Mountains, AZ

Trichoptera

>14,000 species



Neophylax rickeri, Point Reyes NS, California



Odonata

>6000 species

Paltothermis lineatipes
Dragoon Mountains, AZ



Coleoptera

>19,000 species



Thermonectus marmoratus
Ventana Canyon, AZ

Hemiptera

>5000 species



Abedus herberti, Cave Creek, AZ

Diptera

>20,000 species

Prosimulium sp.
Willow Creek, AZ





Photo: www.troutnut.com

Lepidoptera

~1000 species



Photo: D. Rubinoff

Megaloptera

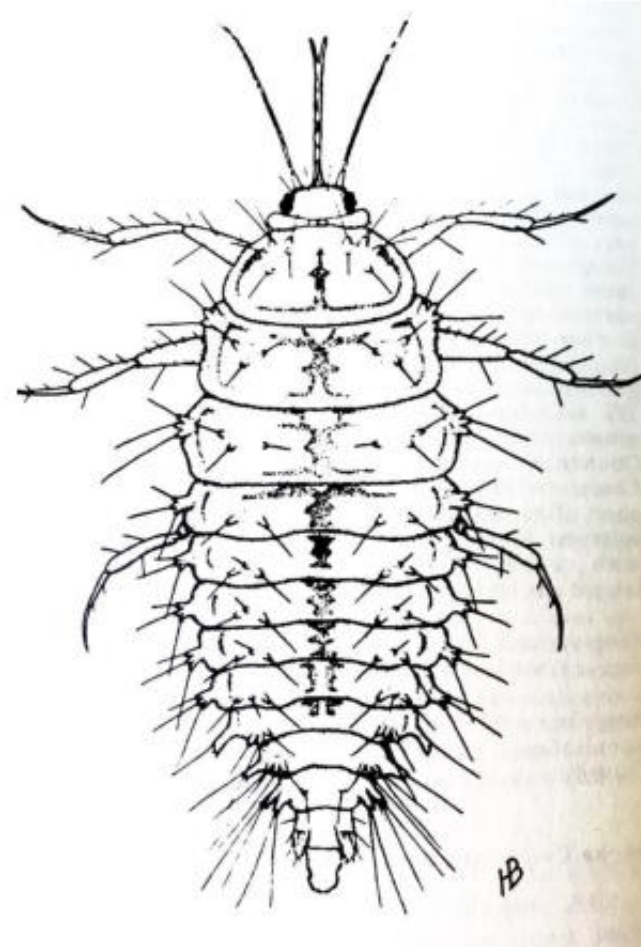
~400 species



Corydalus texanus
Bear Canyon, AZ

Neuroptera

>100 species



Sierra El Aguaje, Sonora

Did insects colonize aquatic habitats once or multiple times?

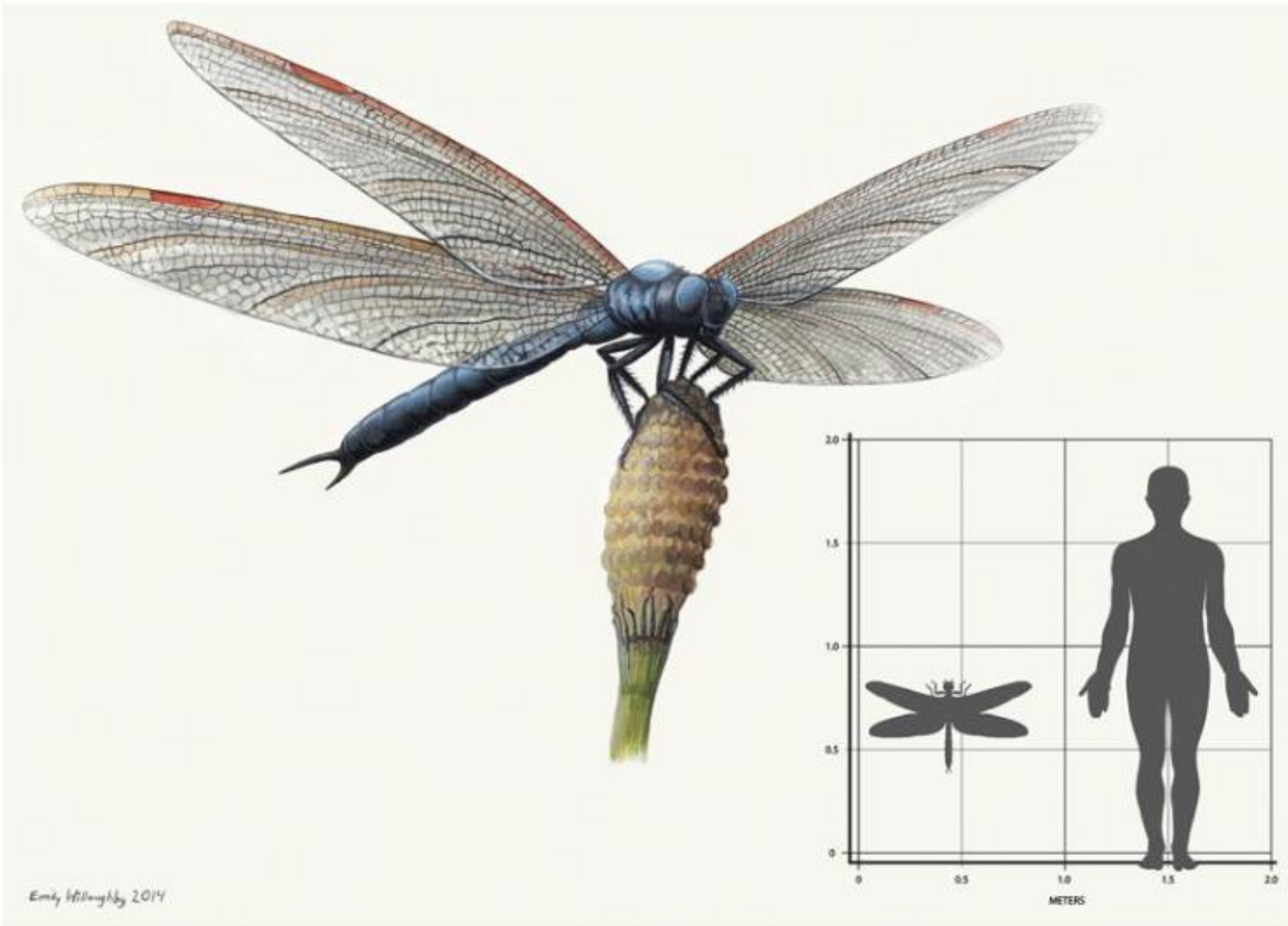


Some orders fully aquatic, others have mix of terrestrial and aquatic species

Sudah berapa lama serangga air hidup di bumi????



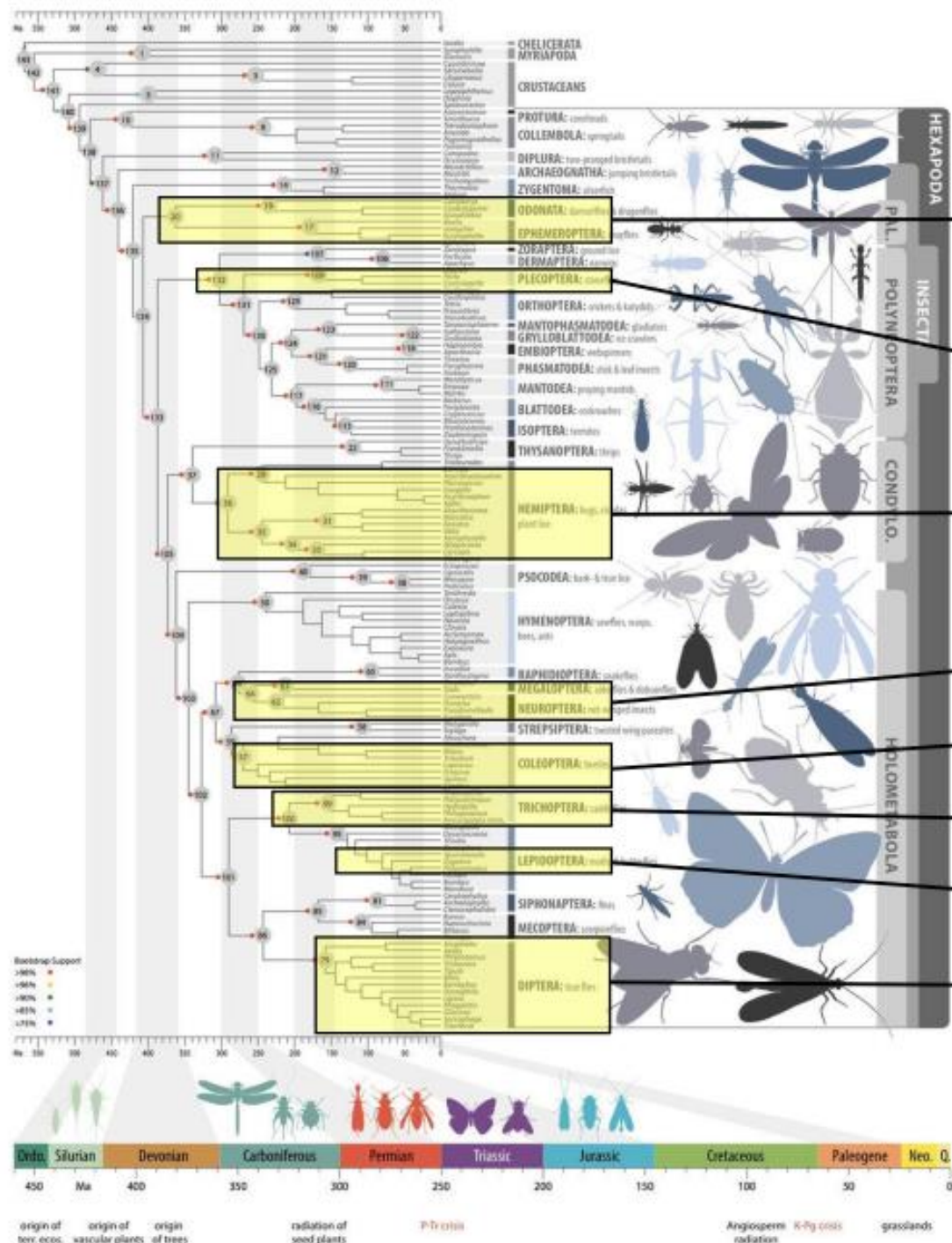
Meganeura Jurassic Period



The wingspan is 68cm



Mayfly, Cretaceous period, Brazil



Dragonflies
Mayflies

Stoneflies

True bugs

Dobsonflies, lacewings

Beetles

Caddisflies

Aquatic moths

True flies

419.2 (+/- 3.2) million years ago - 358.9 (+/- 0.4) million years ago

Era Devonian

