



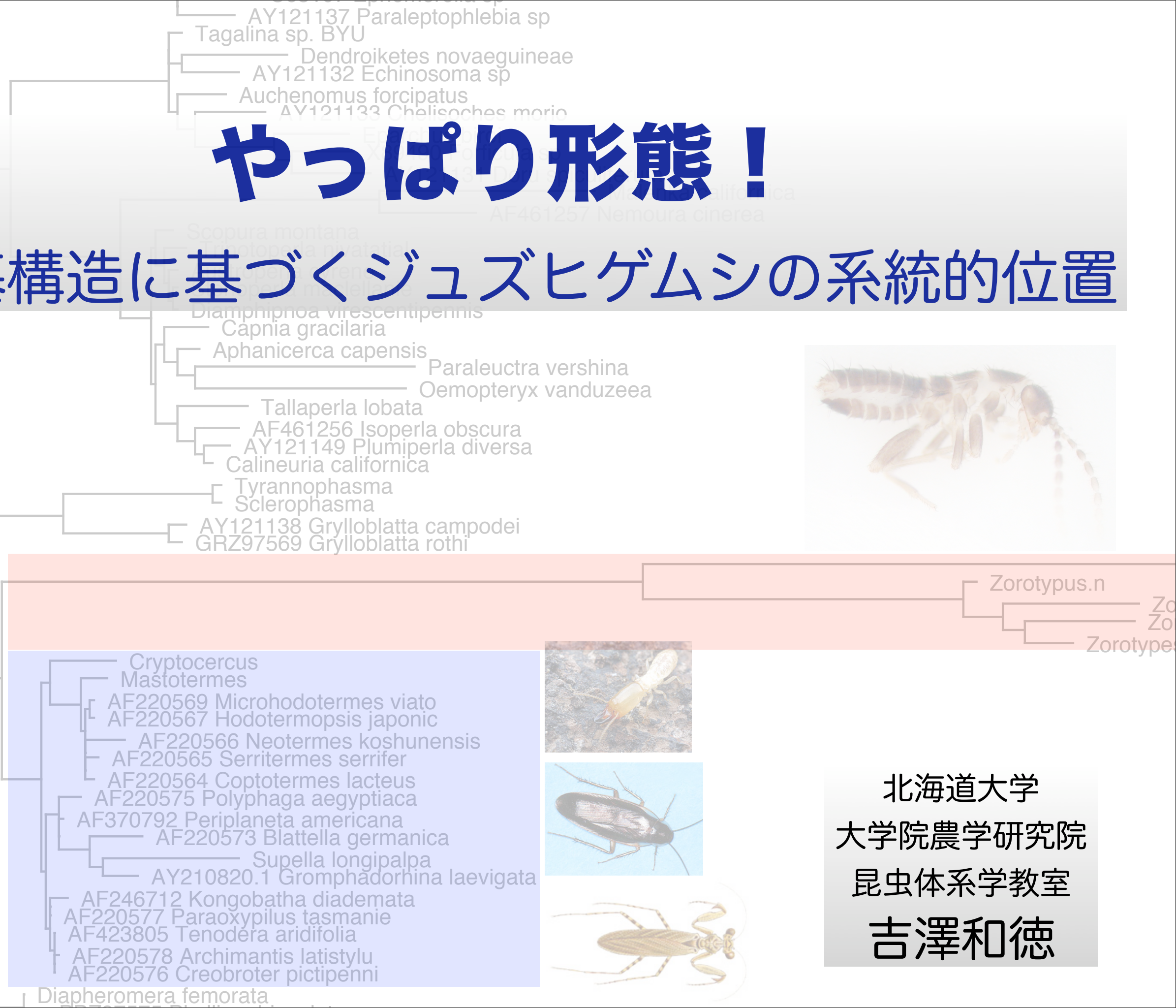
# HOKKAIDO UNIVERSITY

|                  |                                                                                   |
|------------------|-----------------------------------------------------------------------------------|
| Title            | やっぱり形態！：翅基構造に基づくジュズヒゲムシの系統的位置                                                     |
| Author(s)        | 吉澤, 和徳                                                                            |
| Relation         | 日本昆虫学会第66回大会. 平成18年9月16日～平成18年9月18日. 鹿児島市                                         |
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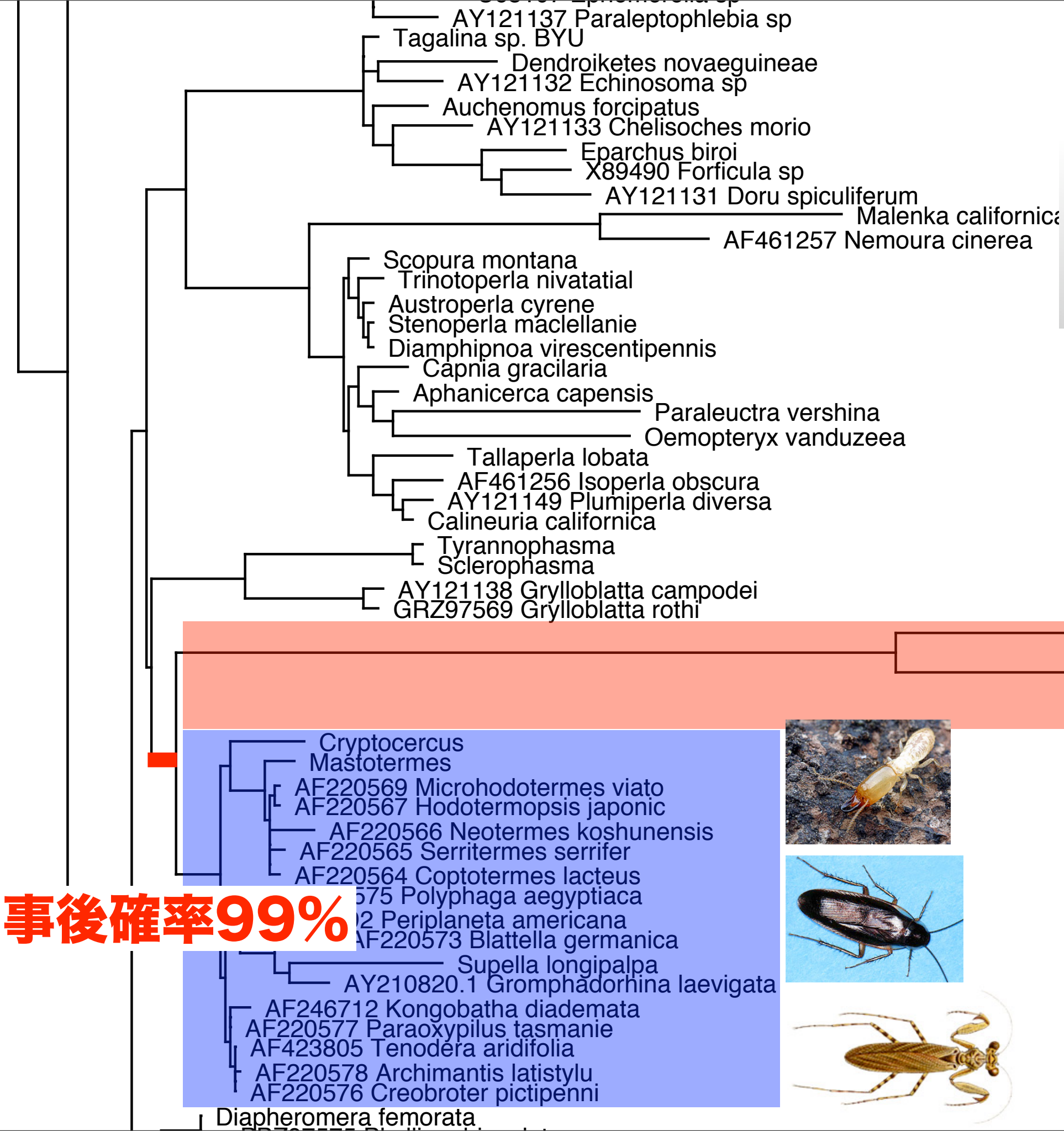


# やっぱり形態！

# 翅基構造に基づくジュズヒゲムシの系統的位置



北海道大学  
大学院農学研究院  
昆虫体系学教室  
吉澤和徳

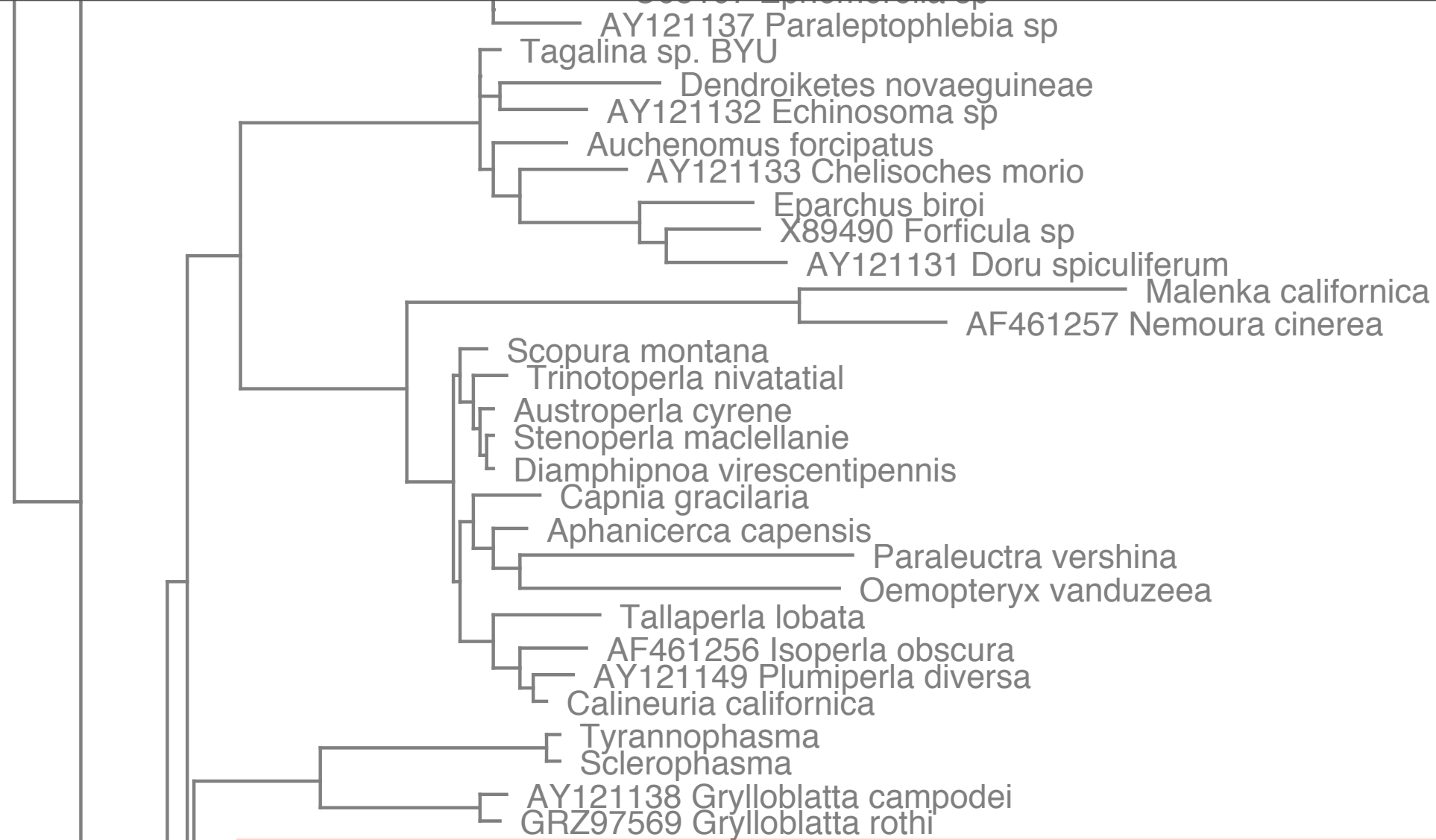


# @岡山大会 若手懇シンポ



18S rDNA

事後確率99%



**v e r r y a n c o n g**  
 Zorotypus  
 Zorotypus  
 Zorotypus

Very short  
 basal node

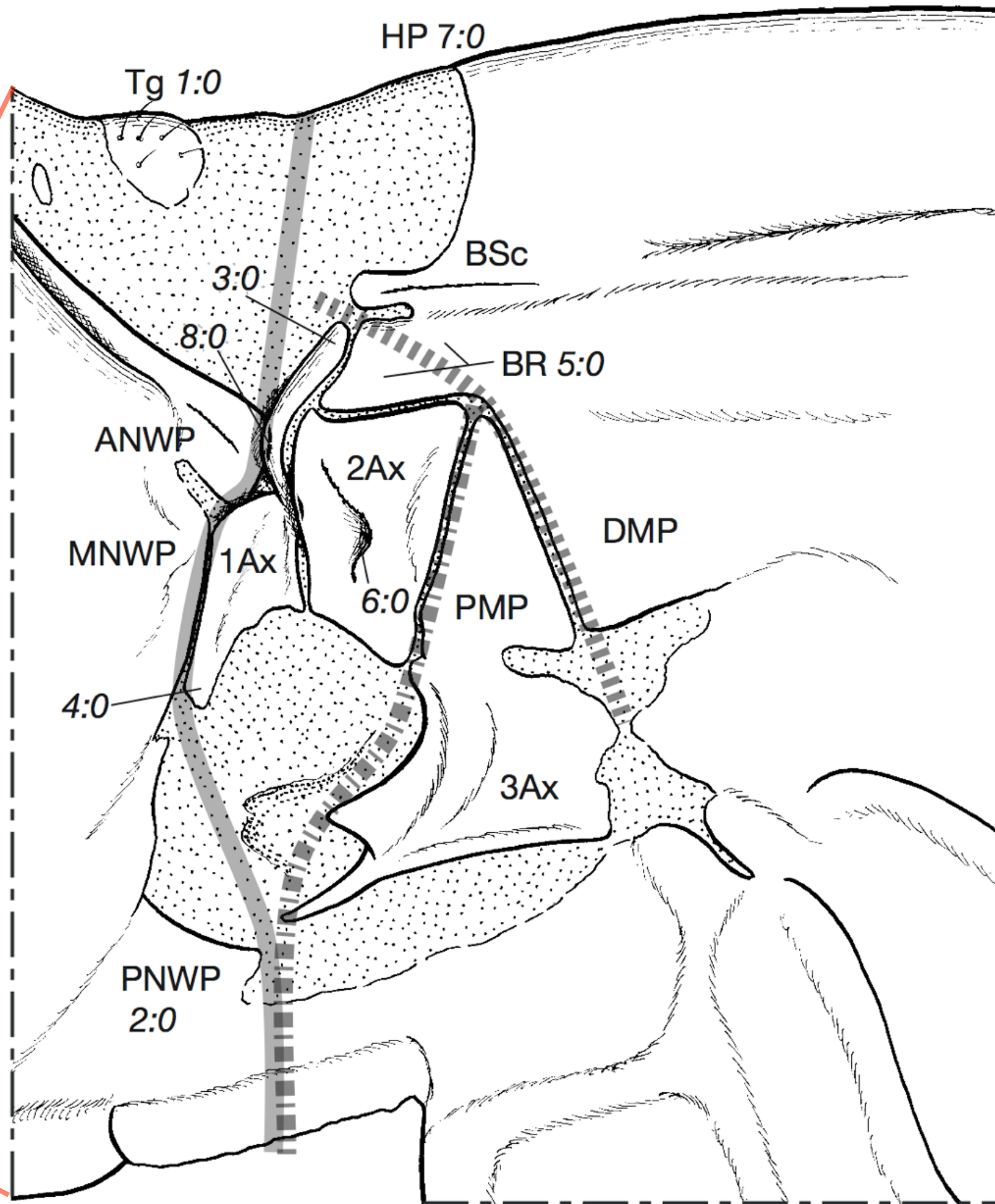
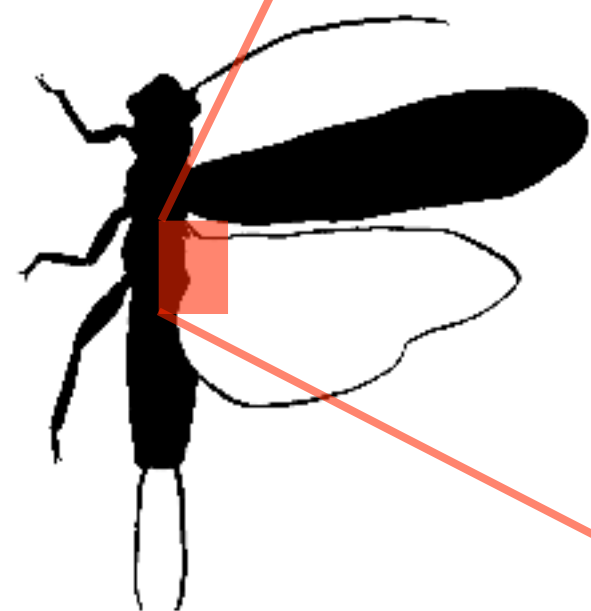
- Cryptocercus
- Mastotermes
- AF220569 Microhodotermes viato
- AF220567 Hodotermopsis japonic
- AF220566 Neotermes koshunensis
- AF220565 Serritermes serrifer
- AF220564 Coptotermes lacteus
- AF220575 Polyphaga aegyptiaca
- AF370792 Periplaneta americana
- AF220573 Blattella germanica
- Supella longipalpa
- AY210820.1 Gromphadorhina laevigata
- AF246712 Kongobatha diademata
- AF220577 Paraoxypilus tasmanie
- AF423805 Tenodera aridifolia
- AF220578 Archimantis latistylu
- AF220576 Creobroter pictipenni
- Diapheromera femorata

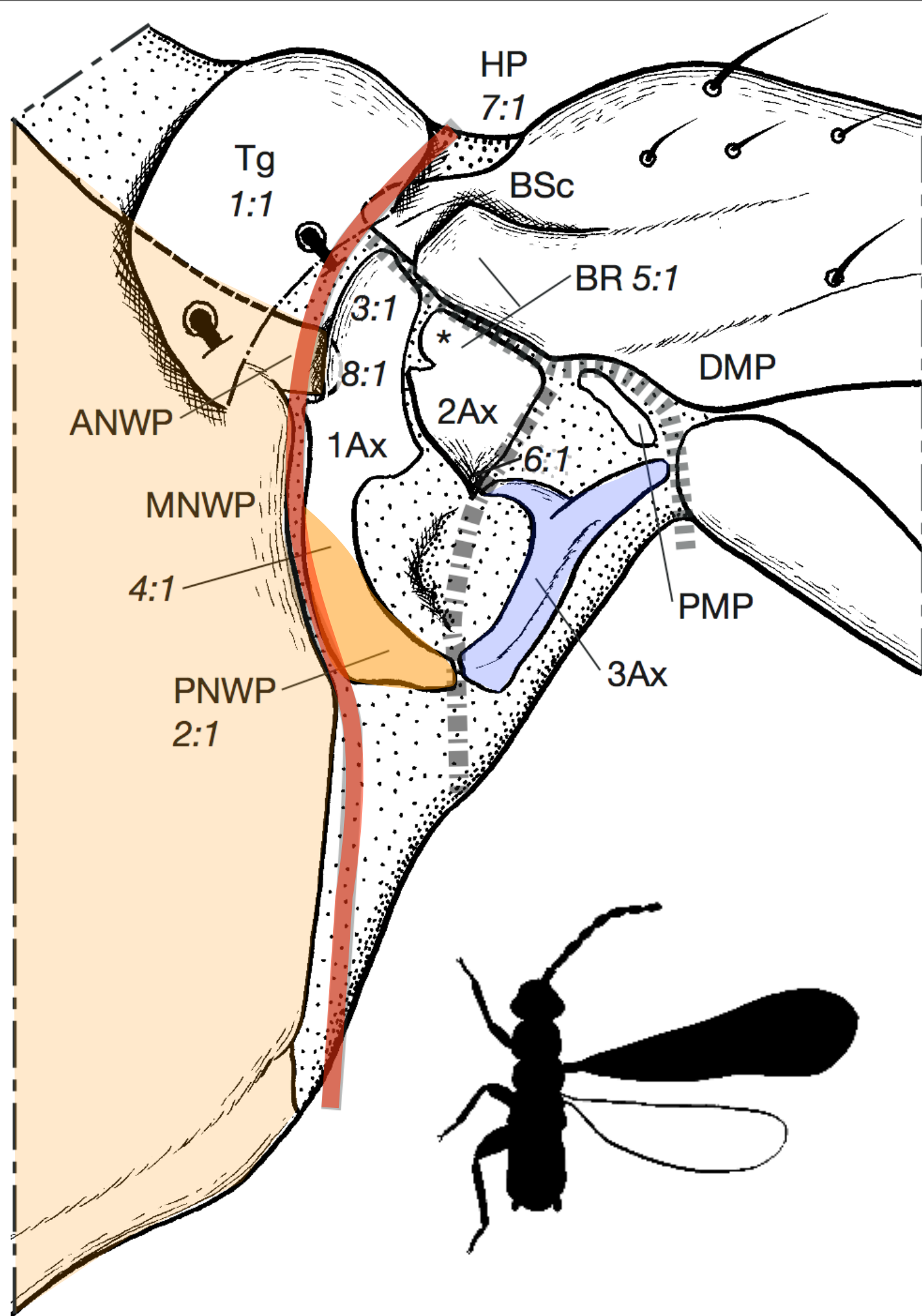
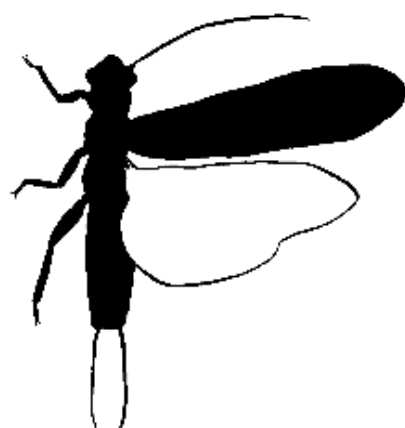
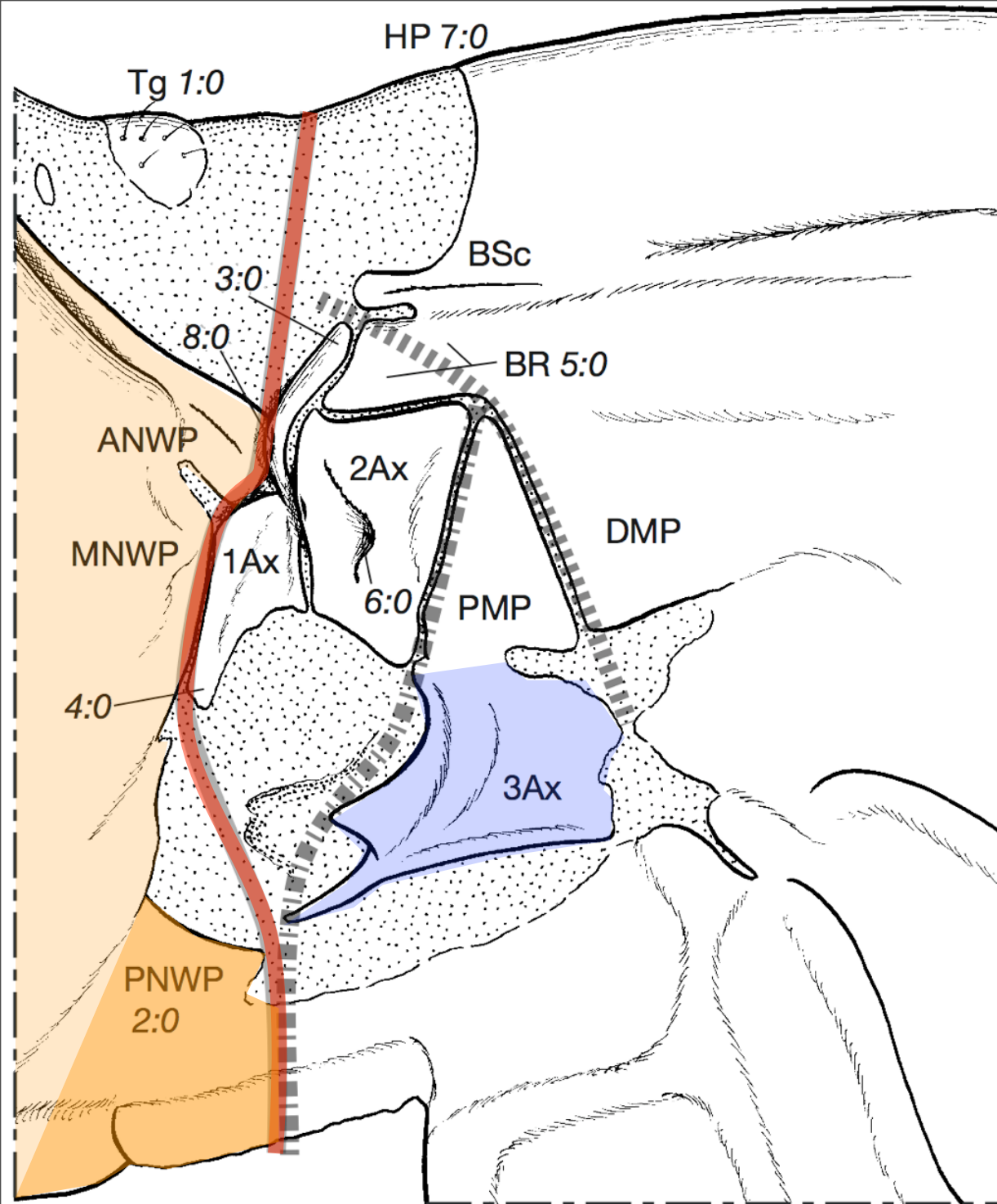


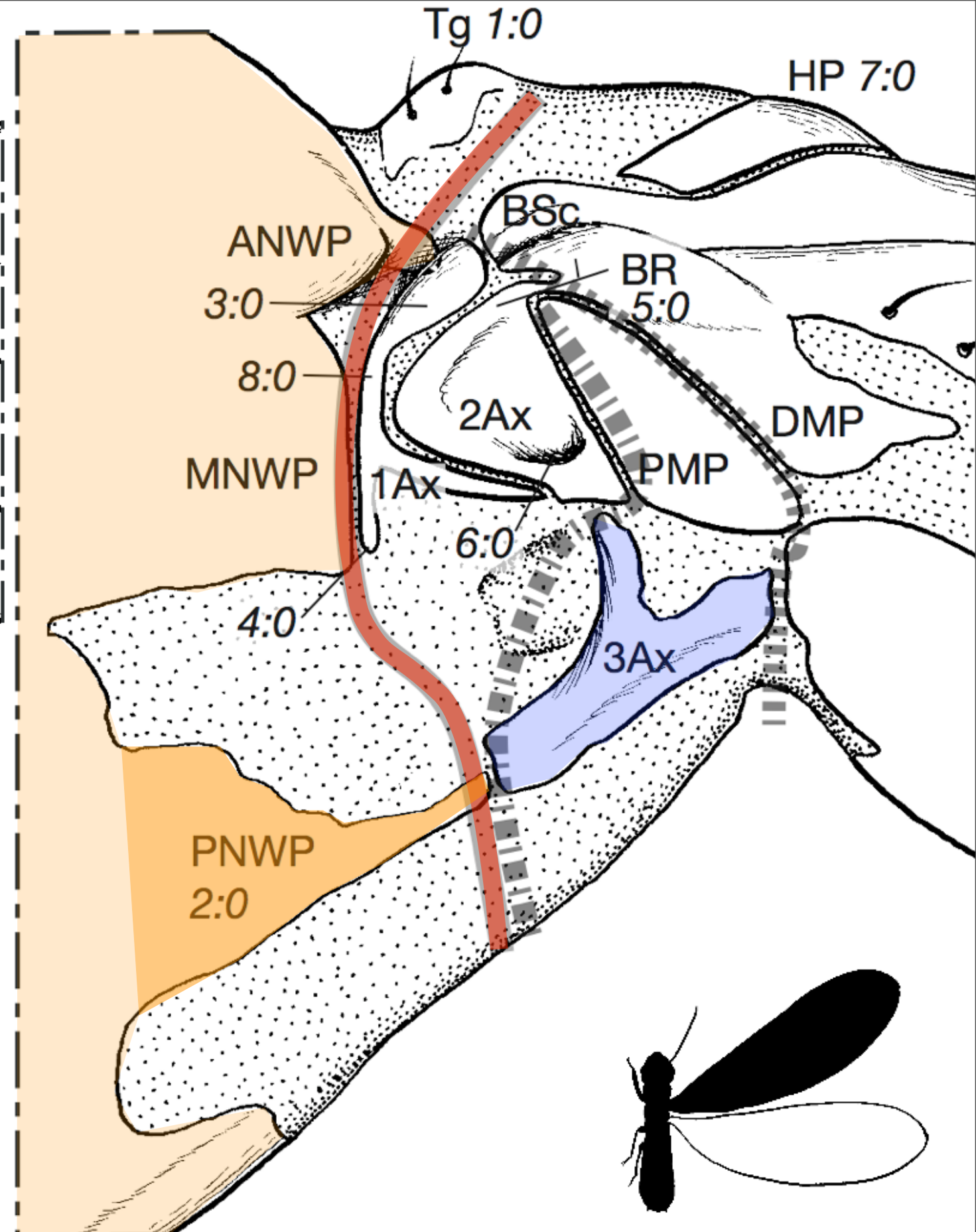
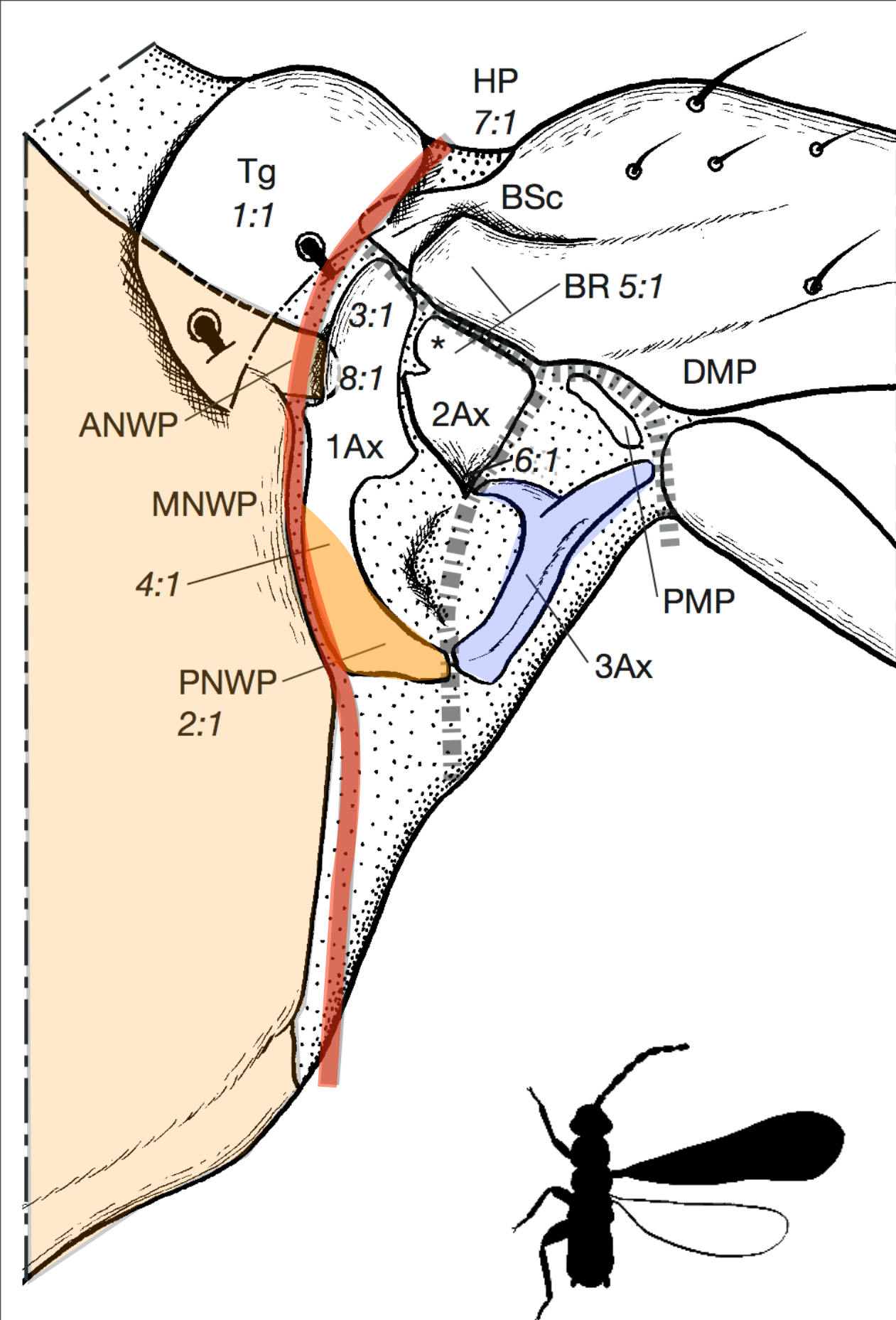
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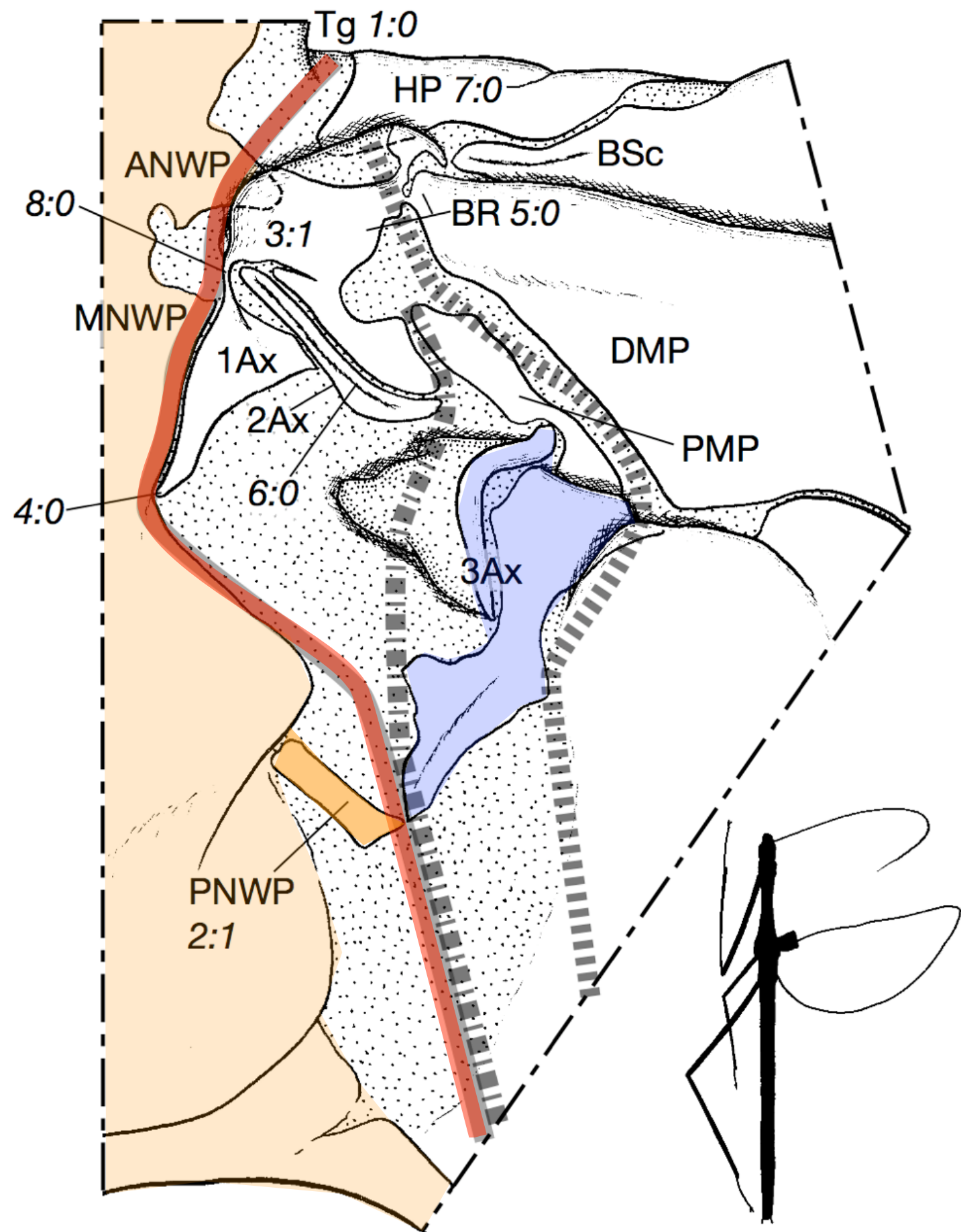
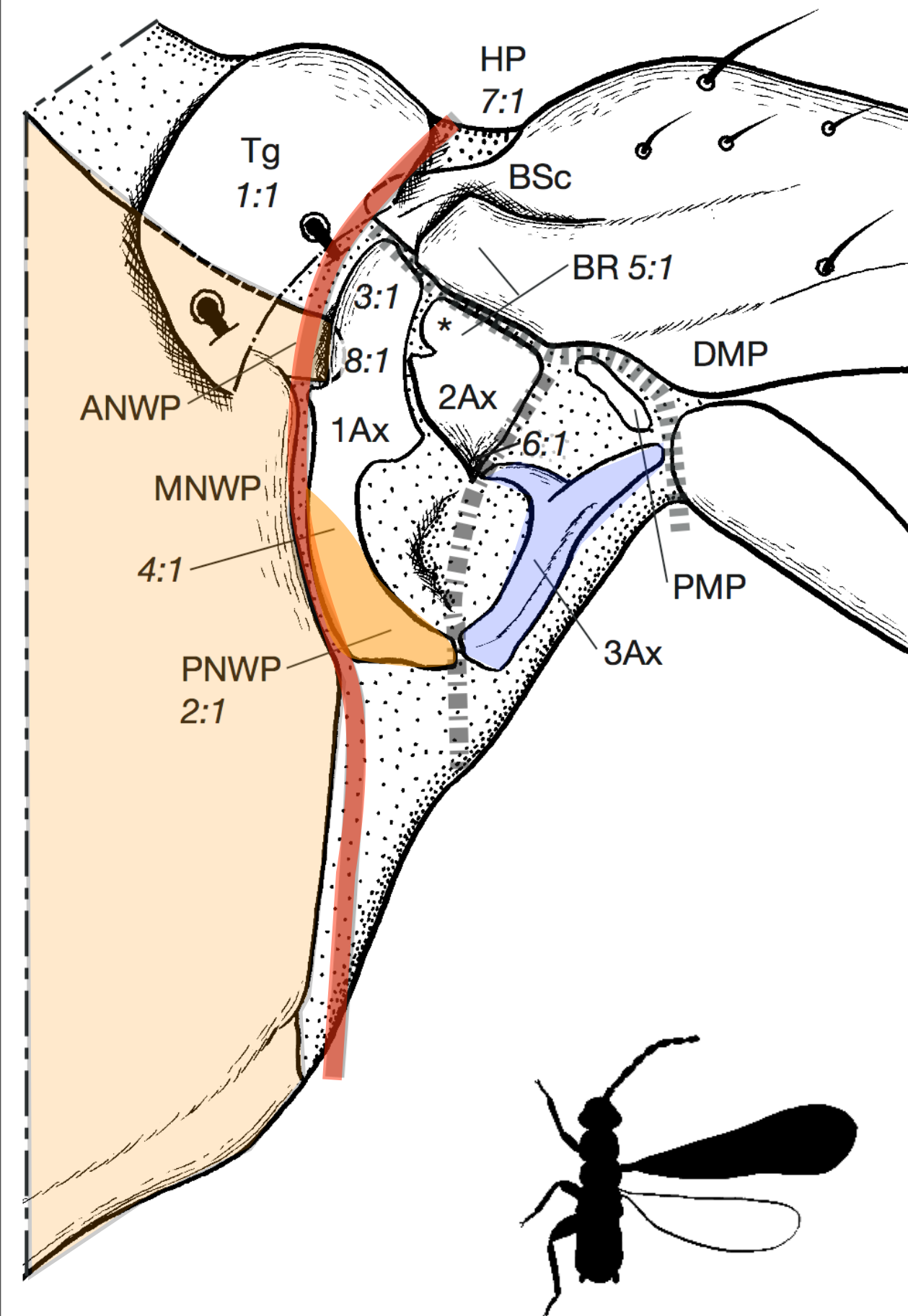
分子系統の結果は  
まちがいでした

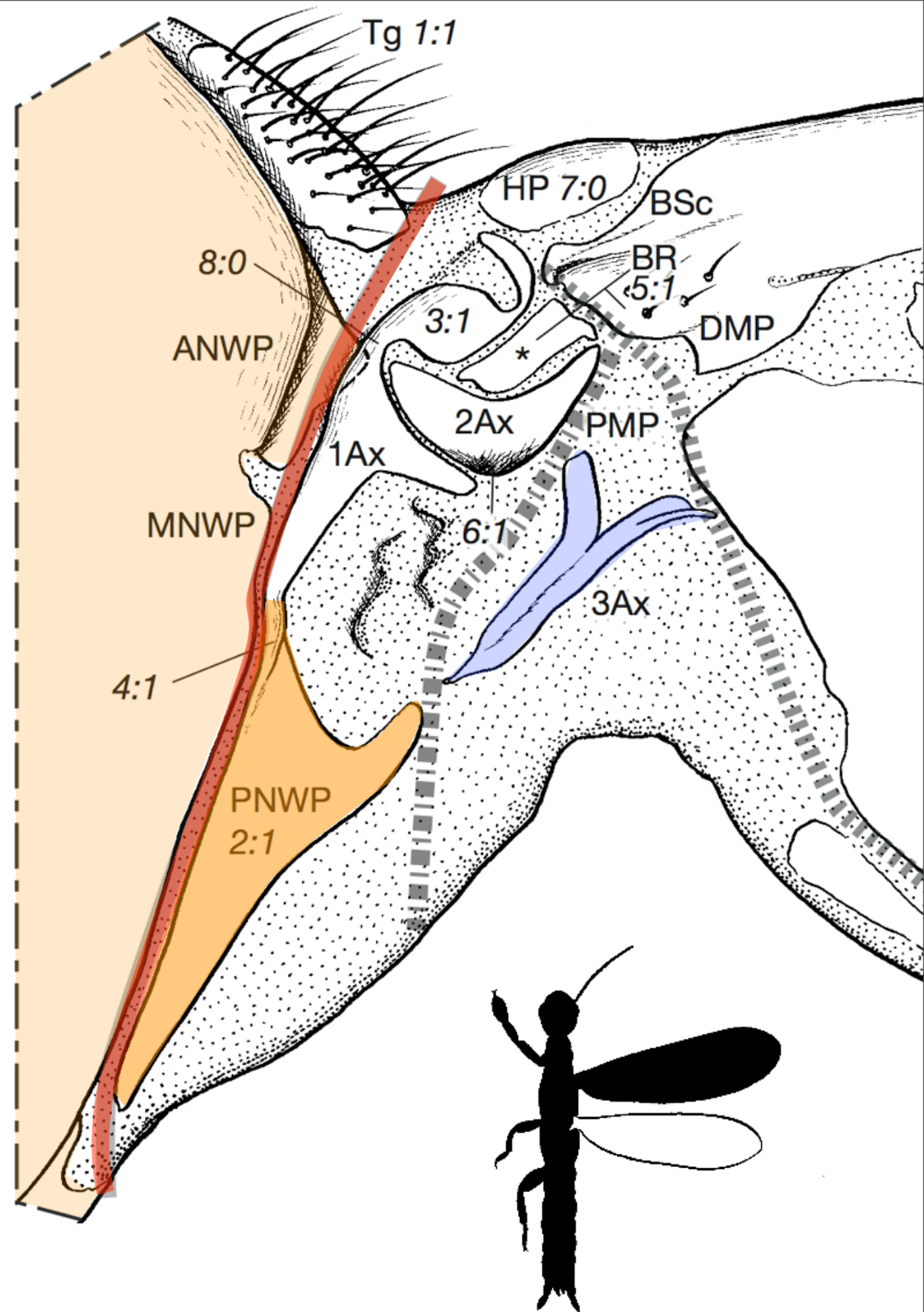
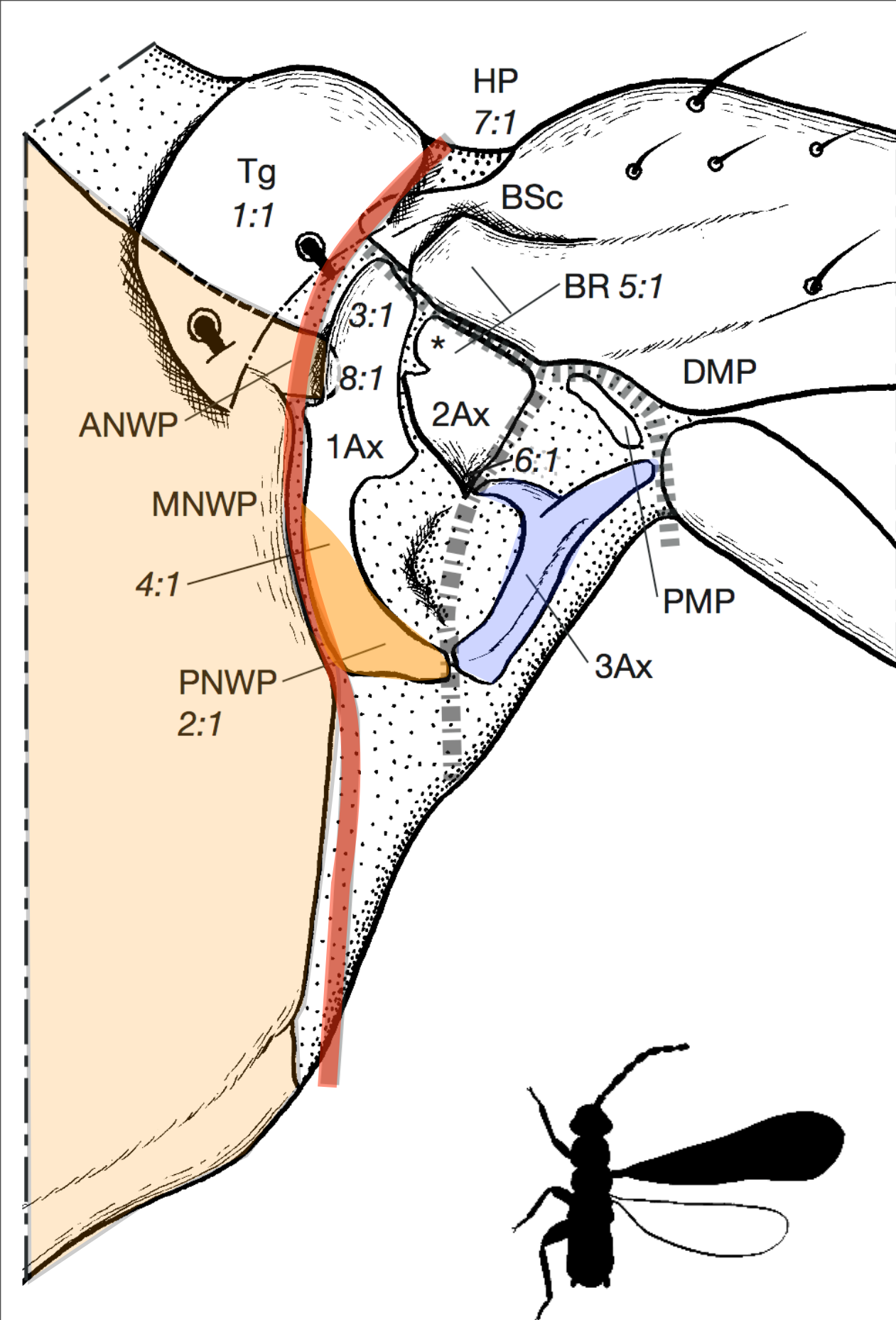






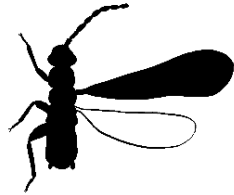






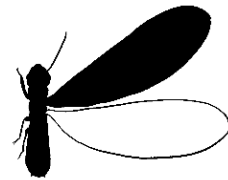
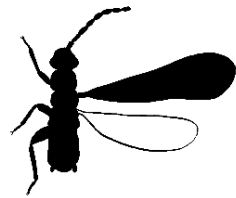
形態では

((ジュズヒゲ, シロアリモドキ) ナナフシ)

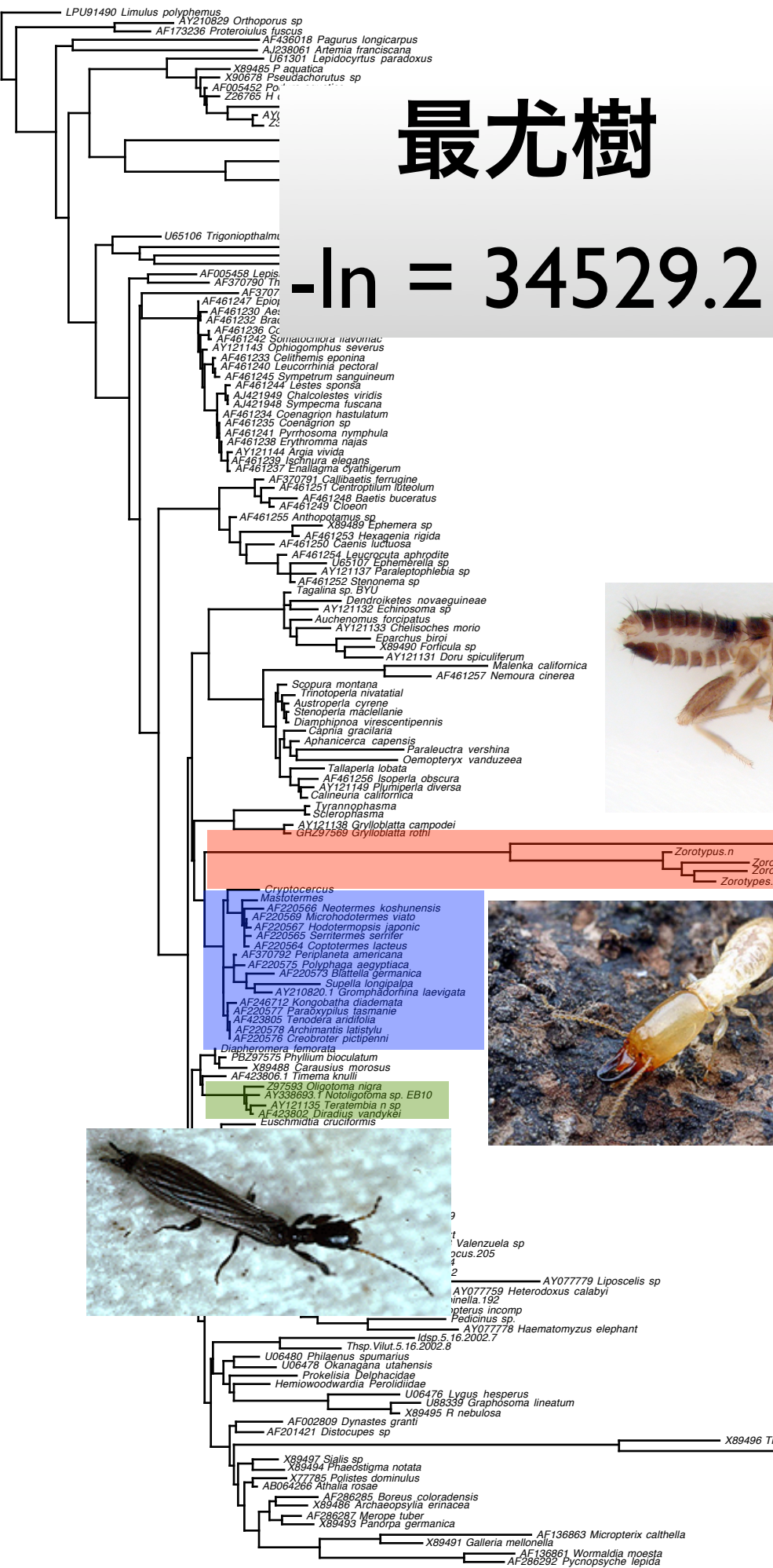


分子では

(ジュズヒゲ, 網翅類)



**本当は,どっち?**



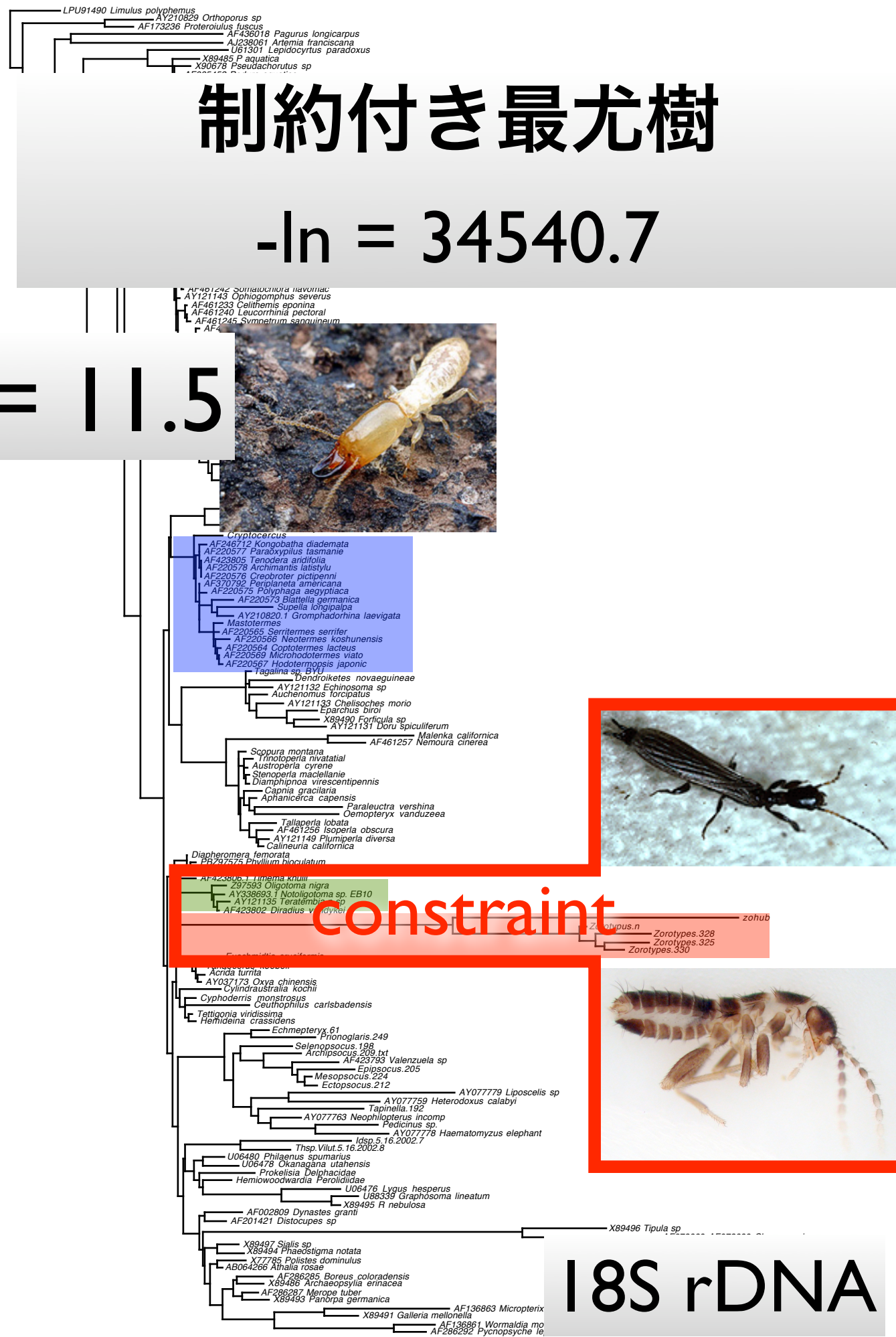
最尤樹

-ln = 34529.2



AF005456 Catajapx sp  
idae sp 2  
ampodea tilyardi  
Lepidocampa weberi  
Hainanajapx jianfengensis  
AY037168 Parajapx emeryanus  
Parajapx emeryanus

$\Delta -ln = 11.5$



制約付き最尤樹

-ln = 34540.7

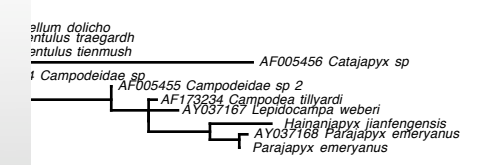
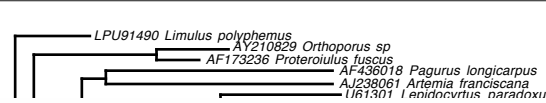
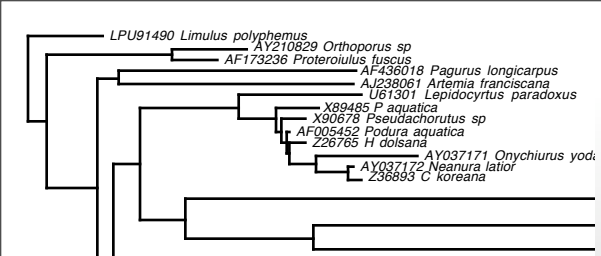


Cryptocercus  
AF246712 Kongobatha diademata  
AF220577 Paraxypilus tasmania  
AF423805 Tenodera aridifolia  
AF220578 Archimantis latistylus  
AF220579 Creobroter pictipennis  
AF370792 Periplaneta americana  
AF220575 Polyphaga aegyptiaca  
AF220573 Blattella germanica  
Supella longipalpa  
AY210820.1 Gromphadorhina laevigata  
Mastotermes  
AF220566 Neotermes koshunensis  
AF220567 Microhodotermes viator  
AF220568 Hodotermopsis japonica  
AF220565 Seritermes seriter  
AF220564 Coptotermes lacteus  
AF220569 Microhodotermes viator  
AF220567 Hodotermopsis japonica  
Tagalina sp. BYU  
Dendroiketes novaeguineae  
AY121132 Echinotoma sp  
Auchenomus forcipatus  
AY121133 Chelisoches morio  
Eparchus biroi  
X89490 Forficula sp  
AY121131 Doru spiculiferum  
Malenka californica  
AF461257 Nemoura cinerea

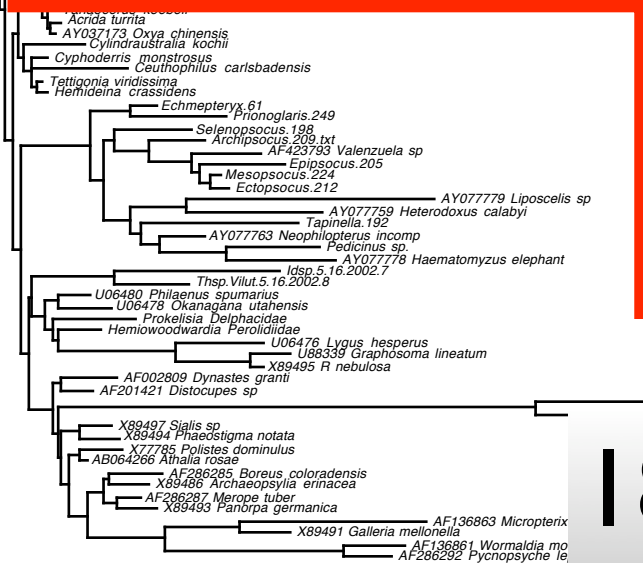
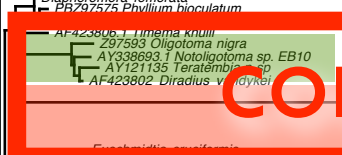
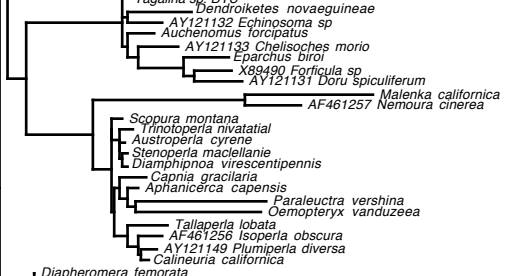
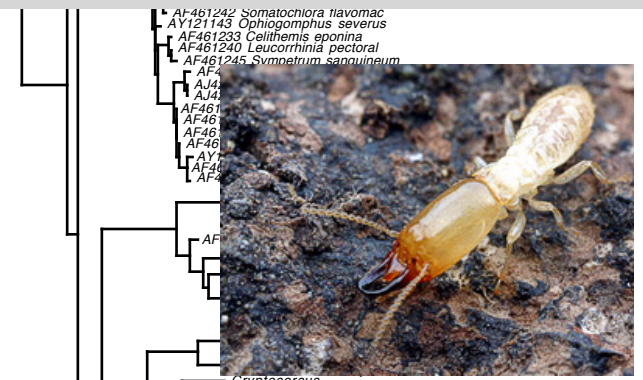
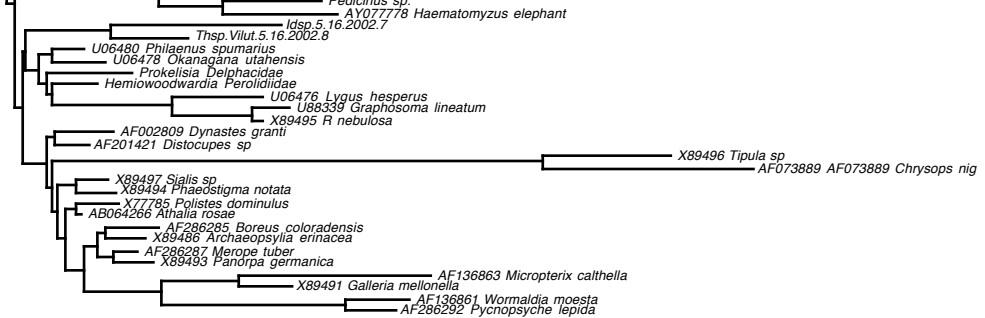
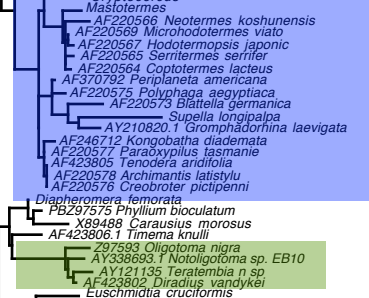
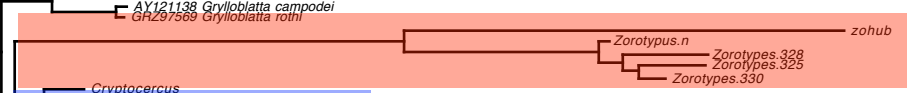
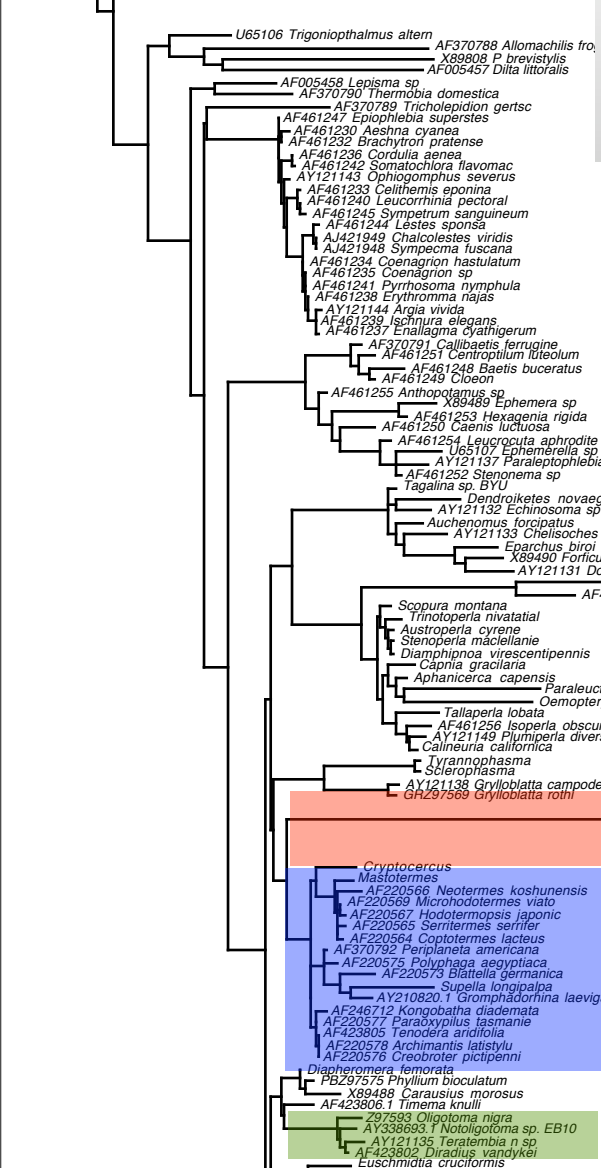
constraint

Zorotypus.n  
Zorotypus.328  
Zorotypus.325  
Zorotypus.330

I8S rDNA



$\Delta -\ln = 11.5$   
 $P = 0.159 \text{ (KH)}, 0.422 \text{ (SH)}$



constraint

18S rDNA

0.01 substitutions/site

0.01 substitutions/site

- GRZ97569 *Grylloblatta rothi*
- Cryptocercus*
- AF246712 *Kongobatha diademata*
- AF220577 *Paraöxyphilus tasmanie*
- AF423805 *Tenodera aridifolia*
- AF220578 *Archimantis latistylu*
- AF220576 *Creobroter pictipenni*
- AF370792 *Periplaneta americana*
- AF220575 *Polyphaga aegyptiaca*
- AF220573 *Blattella germanica*
- Supella longipalpa*
- AY210820.1 *Gromphadorhina laevigata*
- Mastotermes*
- AF220565 *Serritermes serrifer*
- AF220566 *Neotermes koshunensis*
- AF220564 *Coptotermes lacteus*
- AF220569 *Microhodotermes viato*
- AF220567 *Hodotermopsis japonic*



- Tagalina* sp. BYU
- Dendroiketes novaeguineae*
- AY121132 *Echinosoma* sp
- Auchenomus forcipatus*
- AY121133 *Chelisoche morio*
- Enarchus biroi*
- 90 *Forficula* sp
- 121131 *Doru spiculiferum*
- Malenka californi*
- AF461257 *Nemoura cinerea*



- Diapheromera femorata*
- PBZ97575 *Phyllium bioculatum*
- X89488 *Carausius morosus*
- AF423806.1 *Timema knulli*
- Z97593 *Oligotoma nigra*
- AY338693.1 *Notoligotoma* sp. EB10
- AY121135 *Teratembia* n sp
- AF423802 *Diradius vandykei*

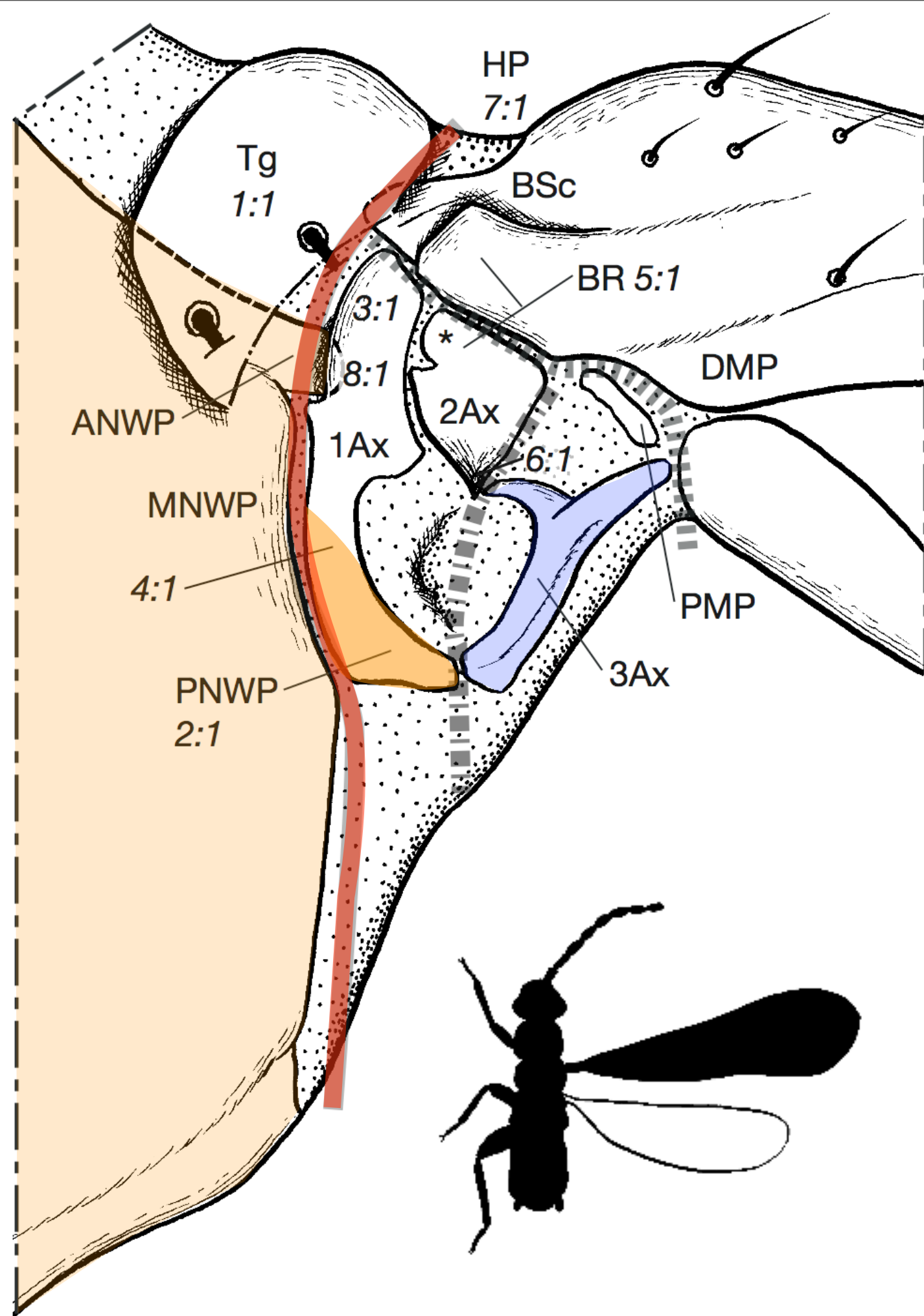
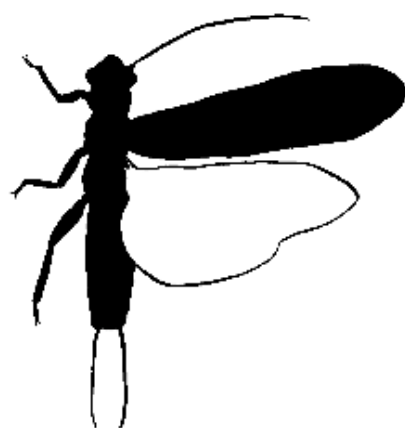
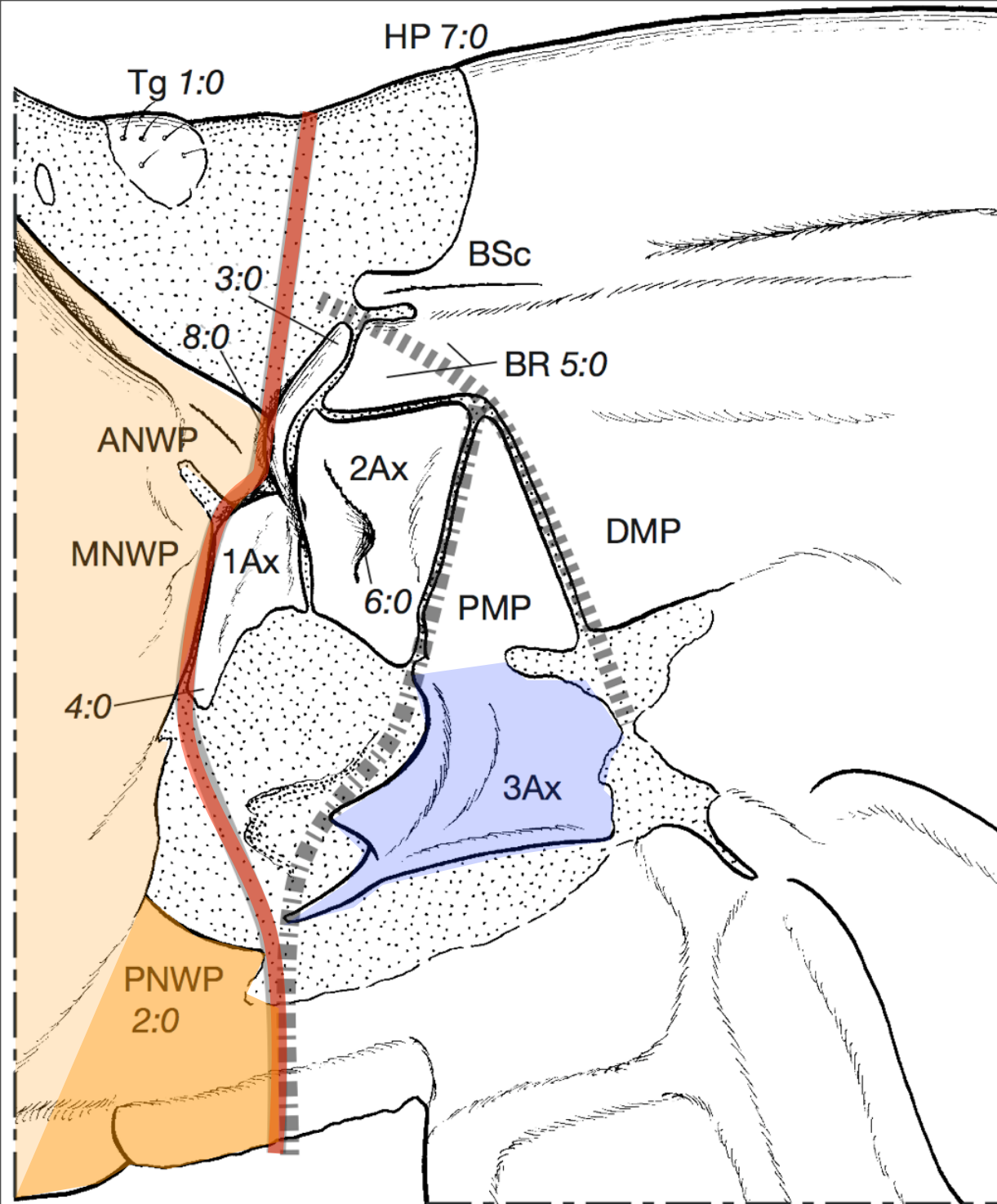


18S的には  
これもアリ

- zohub*
- Zorotypus.n*
- Zorotypes.328*
- Zorotypes.325*
- Zorotypes.330*

- Euschmidtia cruciformis*
- Tanaocerus koebeli*
- Acrida turrata*
- AY037173 *Oxya chinensis*
- Cylindraustralia kochii*
- Cyphoderris monstrosus*
- Ceuthophilus carlsbadensis*
- Tettigonia viridissima*
- Hemideina crassidens*
- Echmepteryx.61*
- Prionoglaris.249*
- Selenopsocus.198*
- Archipsocus.209.txt*
- AF423793 *Valenzuela* sp





# 結論

- 分子系統でのジュズヒゲムシの位置づけは誤差の範囲
- Wing base の共有派生形質は顕著
  - basal hinge の状態は旧翅類から新翅類の全てで一致
- 他の形態形質もジュズヒゲ＋シロアリモドキ
- **ジュズヒゲ＋シロアリモドキがベスト**

# 問題点

- シロアリモドキ+ナナフシは下唇の特異な筋肉相で支持
- ジュズヒゲムシでは未確認 (Beutel & Weide, 2005)

# 感謝感激

- ・ 矢田 脩（九大・比文）

科研A「熱帯アジア産昆虫類のインベントリー作成と  
国際ネットワークの構築」

- ・ 小島弘昭（九大・博）

野村周平（科博）

高橋直樹（九大・生防研）

Idris A.B. (UKM)

サンプリングのサポート