Småkrypenes sexualliv

Gunnar Hasle



NATIONAL GEOGRAPHIC

Photograph by Hasan Ba□lar | National Geographic Photo Contest 2014
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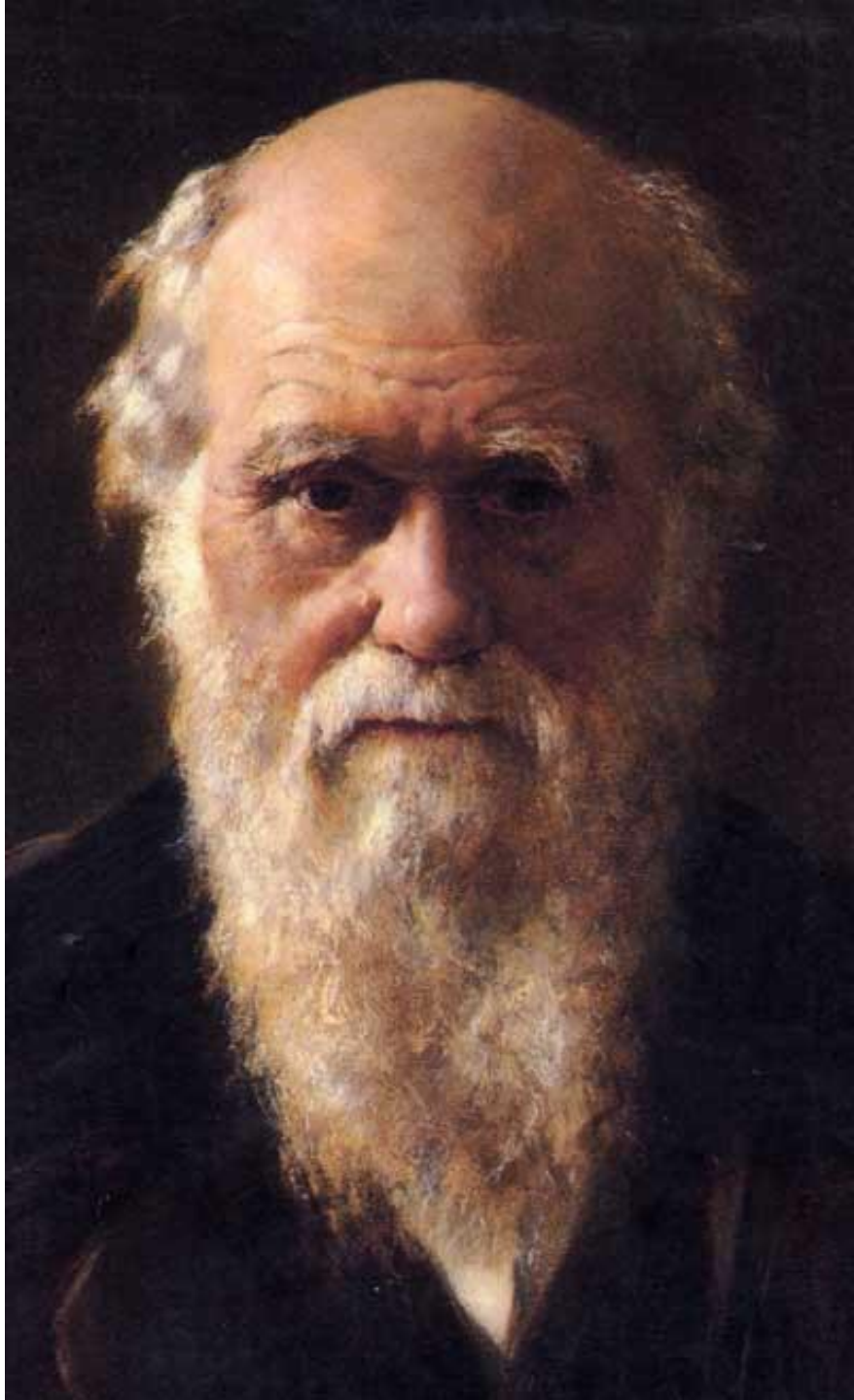
https://en.wikipedia.org/wiki/Silverfish

Darwins evolusjonslære (1871):

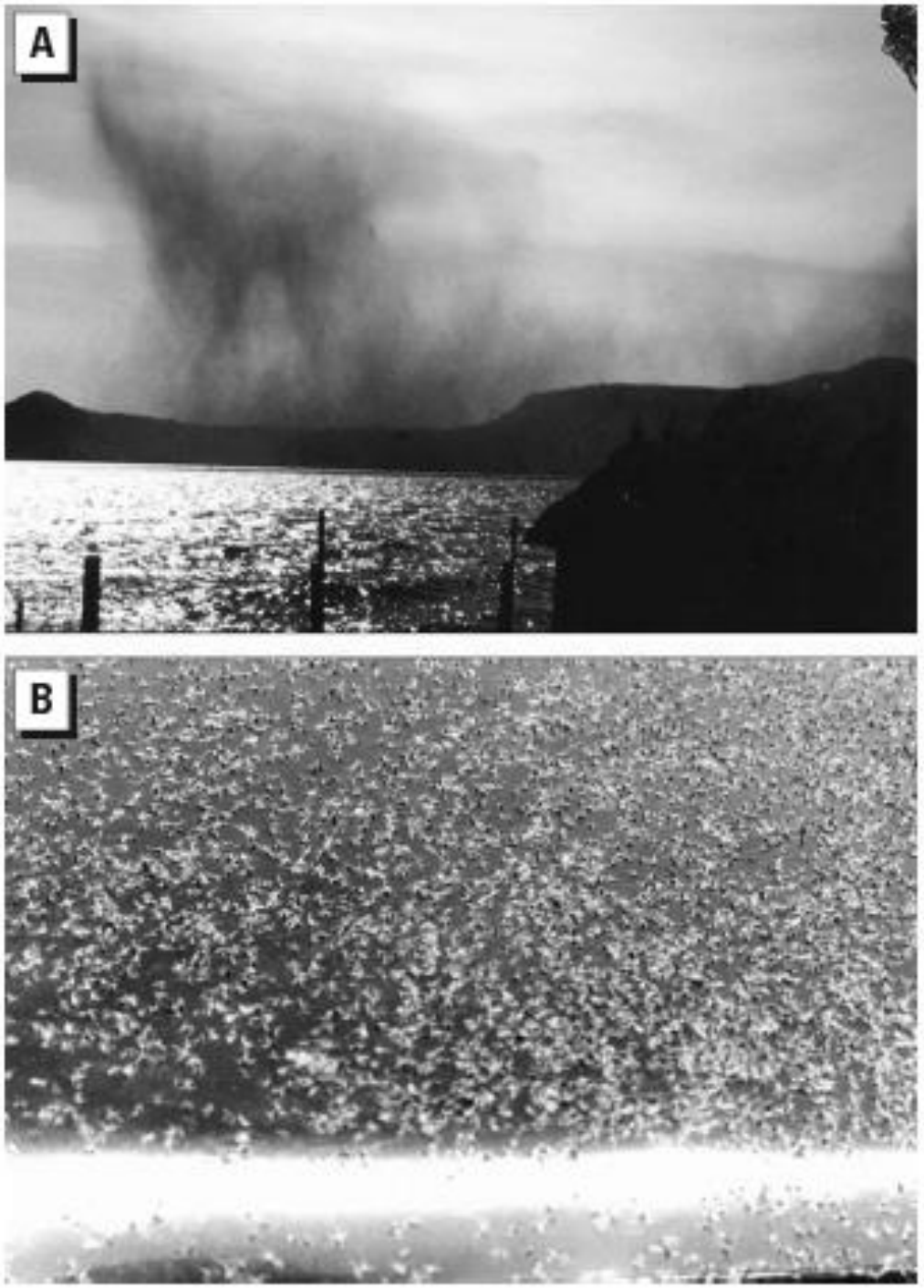
Livet handler om å overleve og formere seg,

og derved spre sine gener.



Charles Darwin 1809-1882 (malt av John Collier, 1881)

Svevemygg





http://www.bugsdirect.com/



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Boklus, *Liposcelis* Sp.:

Dans i bokhylla




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http://www.vedenina.iitp.ru

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Fra Verdens dyr
Red.: Arne Semb-Johansen

Orkidébie, *Euglossa* sp.





Catasetum saccatum, Catasetinae



Coryanthes alborosea, Stanhopeinae

Foto: Wikimedia Commons

«Den spanske flue»



Wikimedia Commons



Marquis de Sade

St Hans-orm
Lampyris noctiluca



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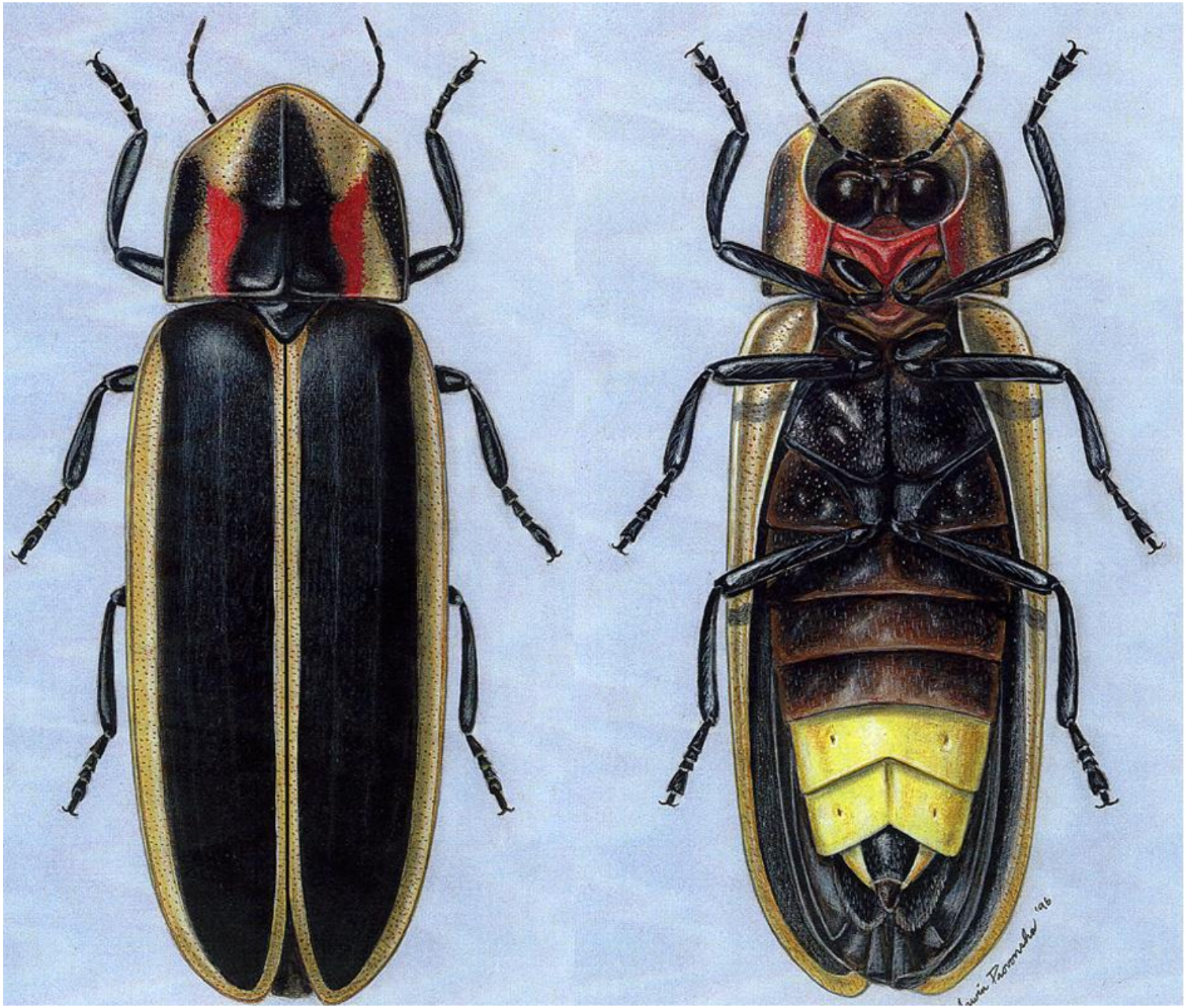


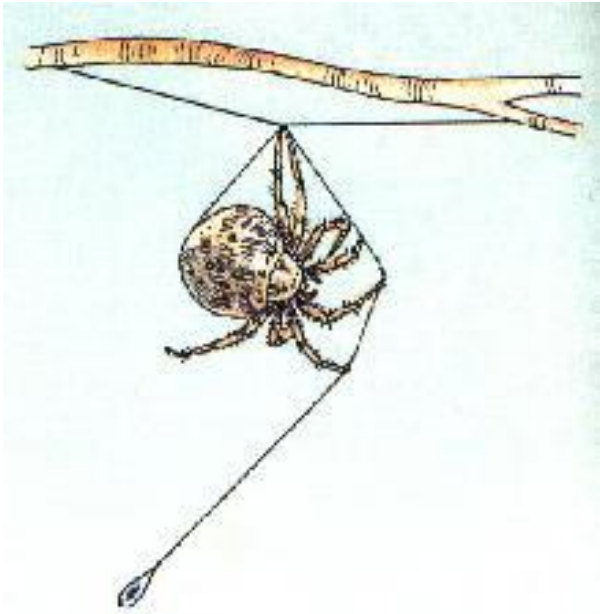
Says ildflue (*Pyractomena angulata*), Tegnet av Arwin Provonsha, Purdue Department of Entomology.



Foto: Tsuneaki Hiramatsu



thegrassisgreenerontheudderside.blogspot.com





http://www.exchangedlife.com

Bolaedderkopp
Mastophora hutchinsoni



Foto: Rudy Scheibner, University of Kentucky Department of Entomology



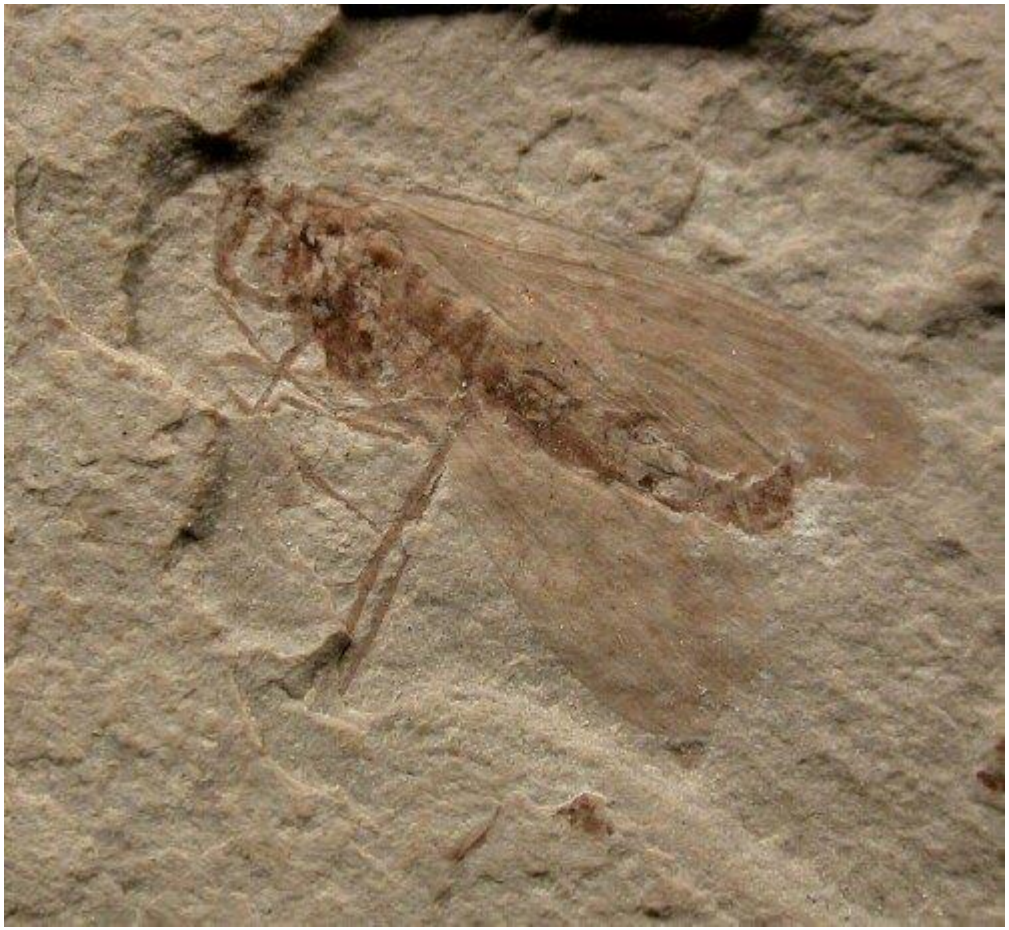
Skorpionflue, eller nebbflue: Panorpa communis https://www.flickr.com

Prostitusjon hos insekter:
Jo større matbit,
desto lengre samleie



Gullan and Cranston, 1994

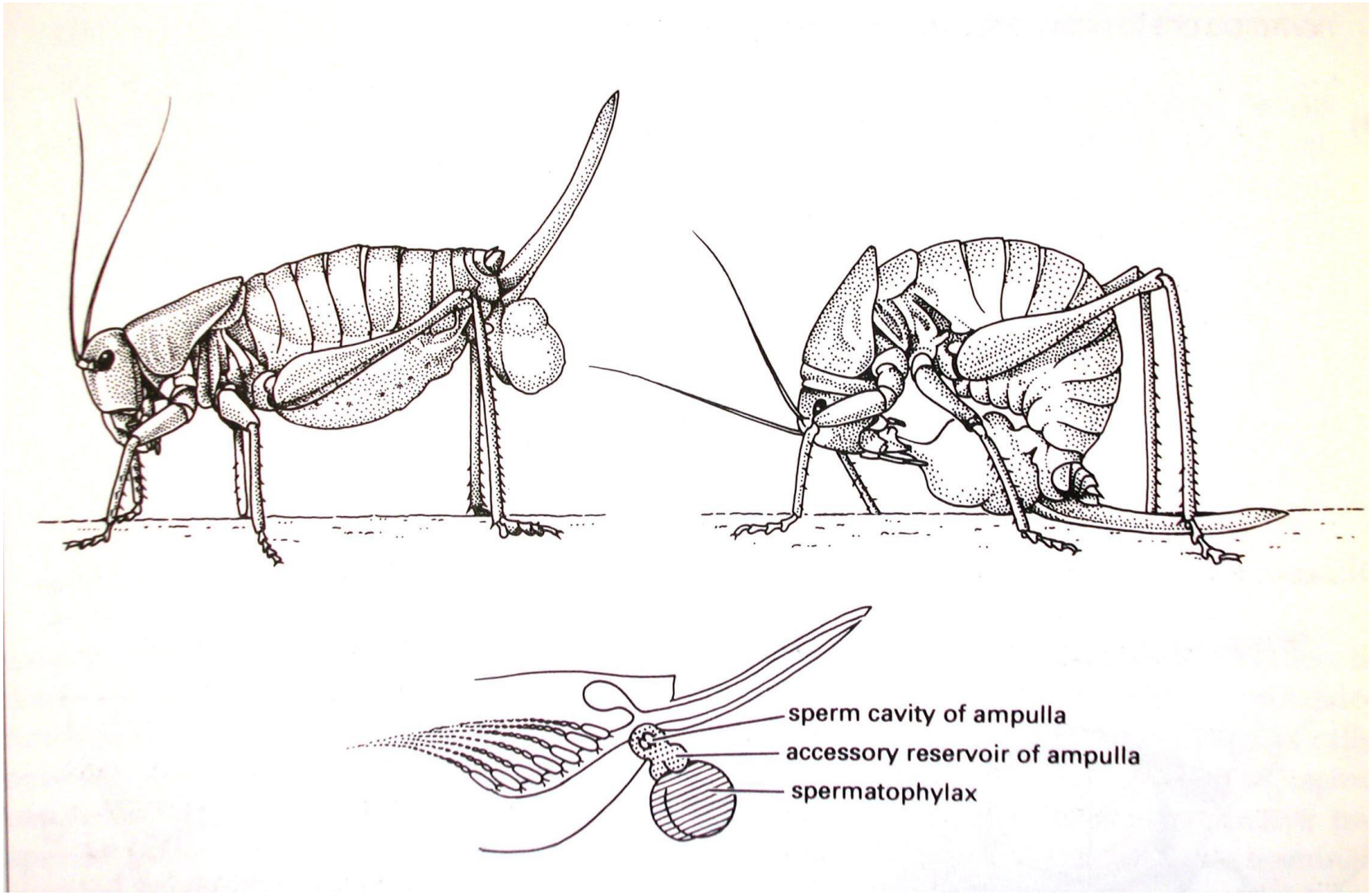
Prostitusjon er ikke
noe nytt



Skorpionflue, Mecoptera
~125 millioner år gammelt fossil
Fra Yixian-formasjonen, Chao Yang, Liaoning, Kina
http://www.fossilmuseum.net/

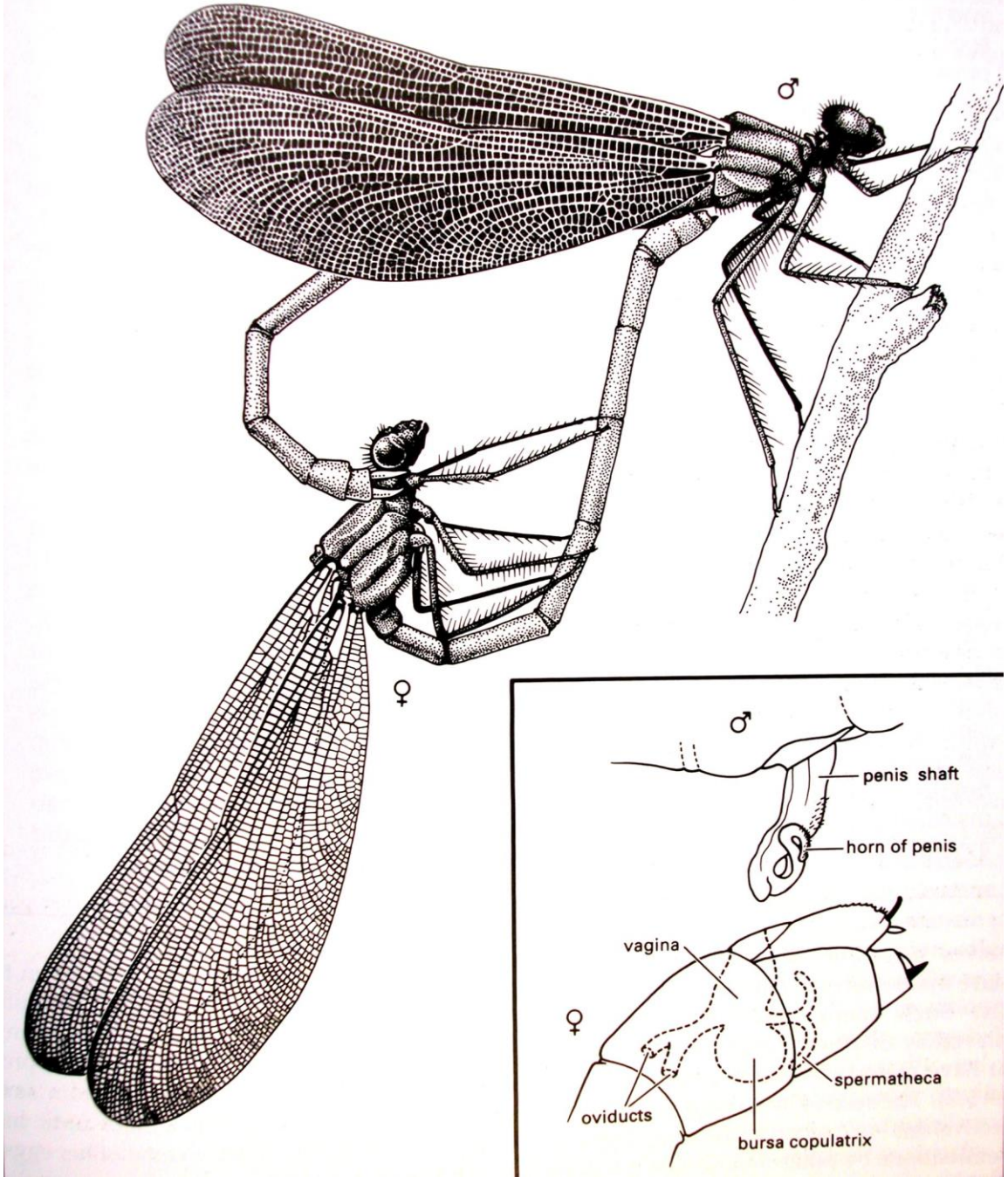


Gullan and Cranston, 1994



Gullan and Cranston, 1994

SPERM PRECEDENCE



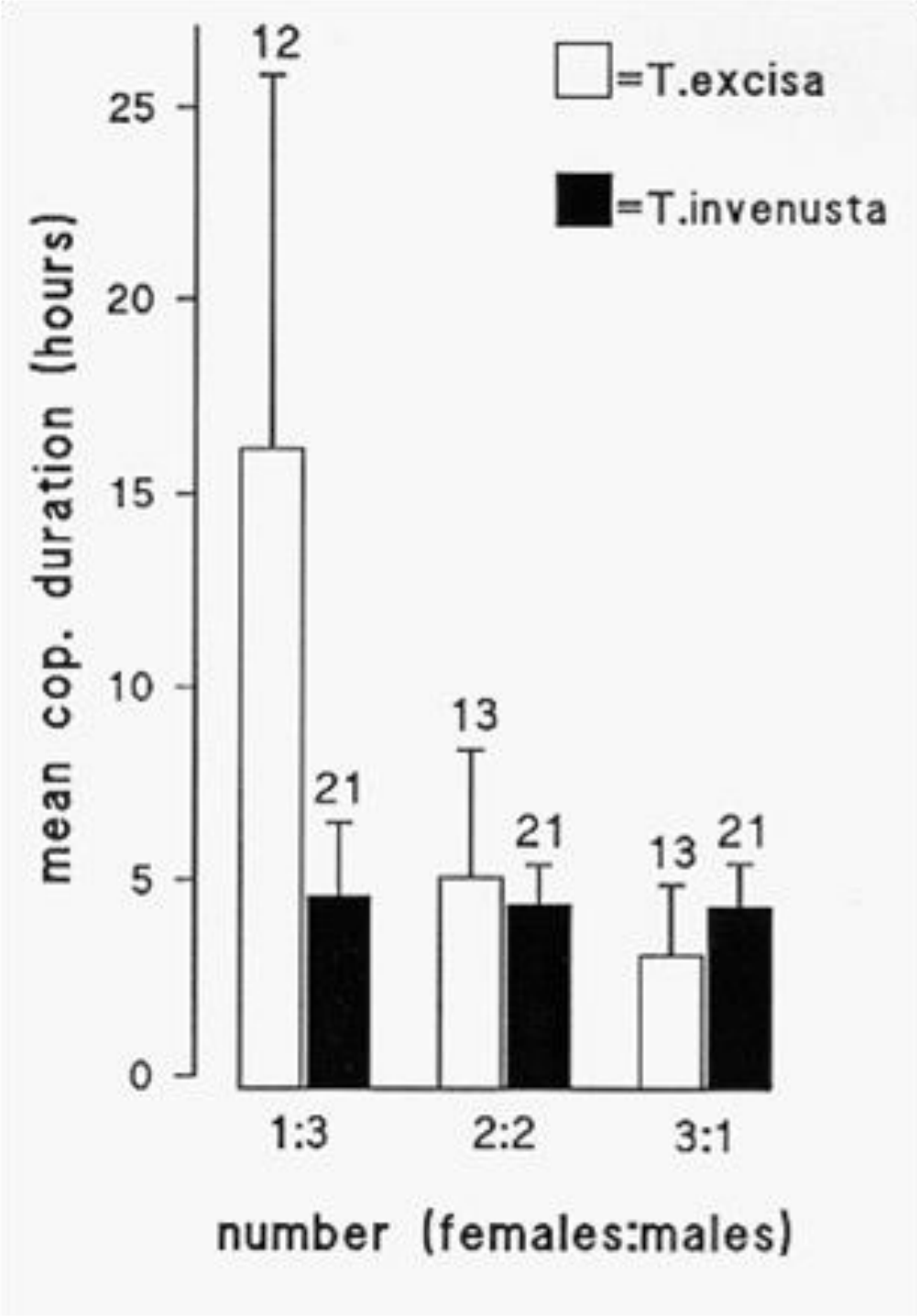
Gullan and Cranston, 1994

Insektsexolog
Camilla Ihlebæk:




Tipula excisa
Wikimedia Commons

Tipula- excisa-moralen er:
Er det lite damer gjelder det for en mann å holde på den man har så lenge som mulig.
Er det nok av damer får man spredd genene best om man skifter partner ofte.



Referanse:
Camilla Ihlebæk 1993. Swarming behaviour and copulation duration in two alpine crane flies; Tipula excisa Scum. and Tipula invenusta Ried. Hovedfagsoppgave. Det matematisk-naturvitenskapelige fakultet, Universitetet i Bergen


http://forum.kvinneguiden.no/

Jomfru eller ikke?



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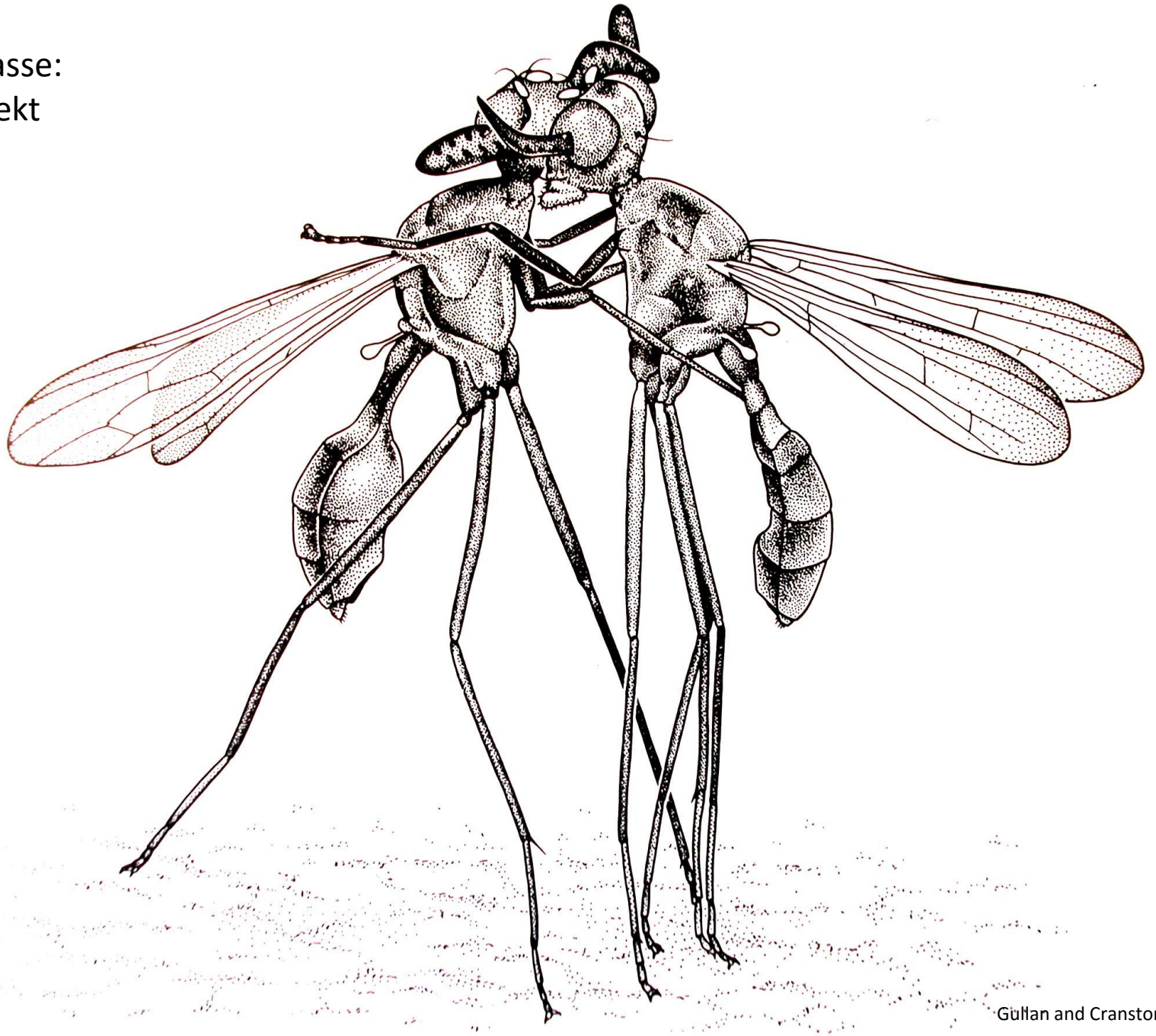
myggvekt



Gullan and Cranston, 1994

Eikehjort
Lucanus cervus



Fra Verdens dyr
Red.: Arne Semb-Johansen


Latrodectus mactans
Den Sorte Enke


http://www.slate.com/articles/video/video/2014/01/spiders_twerking_video_of_dances_male_black_widow_spiders_perform_to_avoid.html

Vinnere og tapere i et trekantforhold



Fra Verdens dyr
Red.: Arne Semb-Johansen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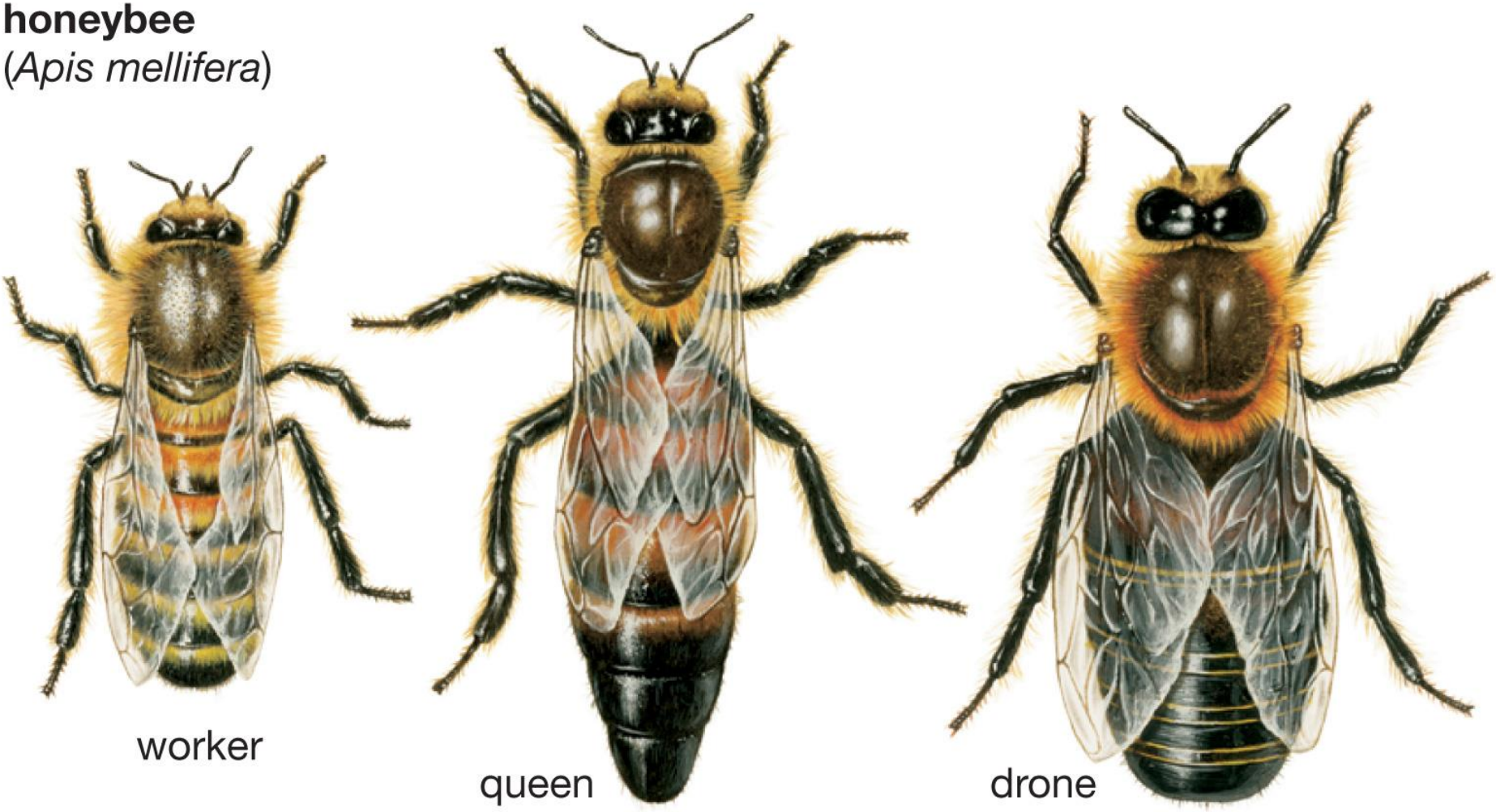
honeybee
(*Apis mellifera*)



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Viftevinger – Strepsiptera
En ukjent og uanselig orden,
med kanskje det mest oppsiktsvekkende
forplantningslivet i hele dyreriket



https://no.pinterest.com

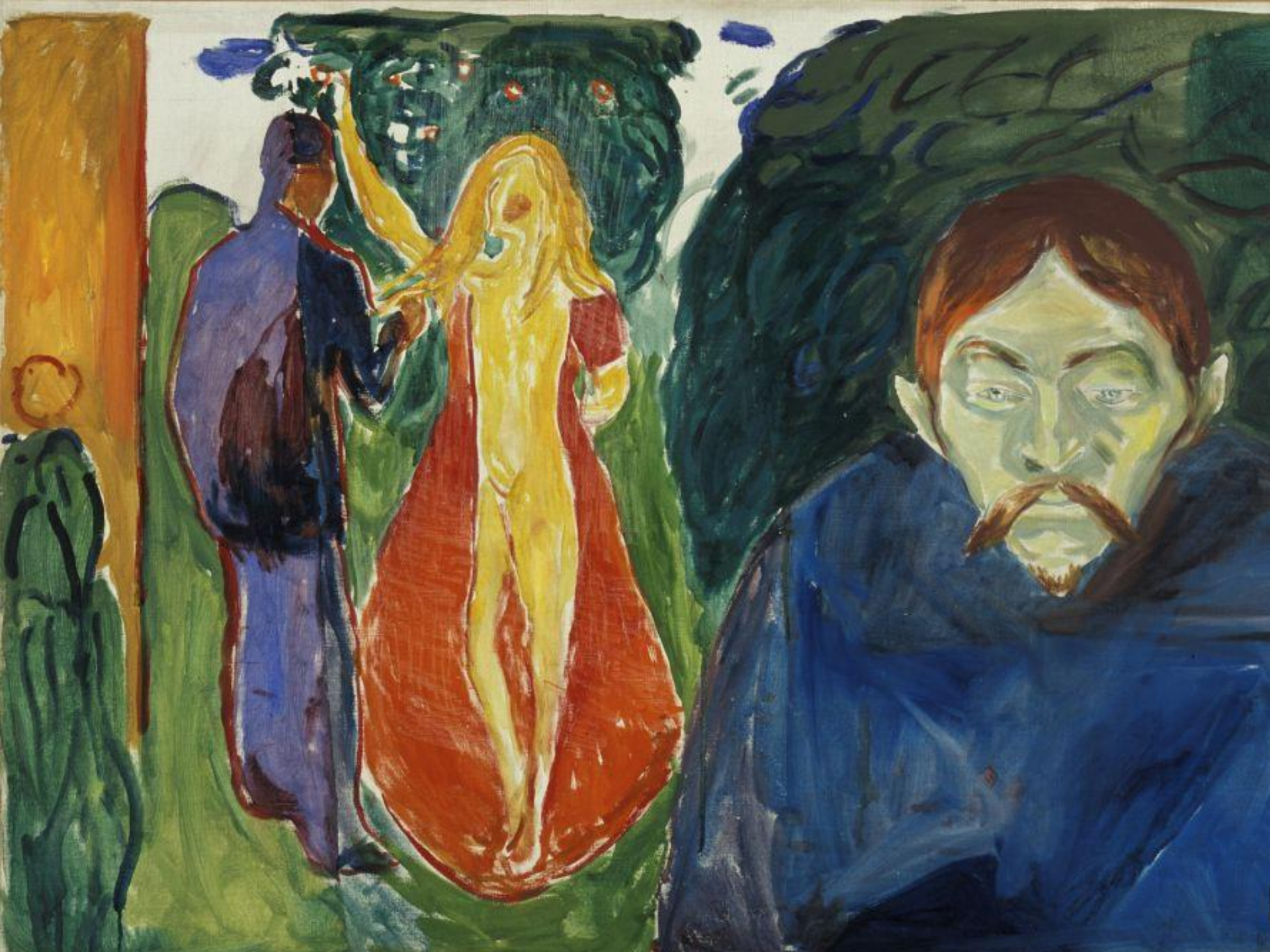


https://www.youtube.com/watch?v=cw9XP01QnIw

Bladlusjomfruer føder gravide unger når næringstilgangen er god



http://npic.orst.edu/



Skogflått, *Ixodes ricinus*: Larve, nymfe, voksen hann og hunn, fullspist hunn







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J. Parasitol., 94(2), 2008, pp. 345–347
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MULTIPLE PATERNITY IN *IXODES RICINUS* (ACARI: IXODIDAE), ASSESSED BY MICROSATELLITE MARKERS

Gunnar Hasle, Knut H. Røed*, and Hans Petter Leinaas
Department of Biology, University of Oslo, P.O. Box 1050 Blindern, N-0316 Oslo, Norway. *e-mail: hasle@reiseklinikken.no*

ABSTRACT: This investigation examines multiple paternity in *Ixodes ricinus* (Acari: Ixodidae). Previous studies have shown that multiple mating occurs in this tick, but this is the first evaluation of multiple paternity. Three family groups were examined by a panel of polymorphic microsatellite loci; all ticks were bred from wild-collected engorged females with a copulating male attached. For most larvae, the attached males could be excluded as possible sire, and in the 3 tested families, at least 2 of 3 females mated successfully with more than 1 male. This finding suggests that multiple paternity is a common reproductive strategy in *I. ricinus*, which may have consequences for the ticks' dispersal success by increasing the genetic diversity in broods from single females colonizing new sites.

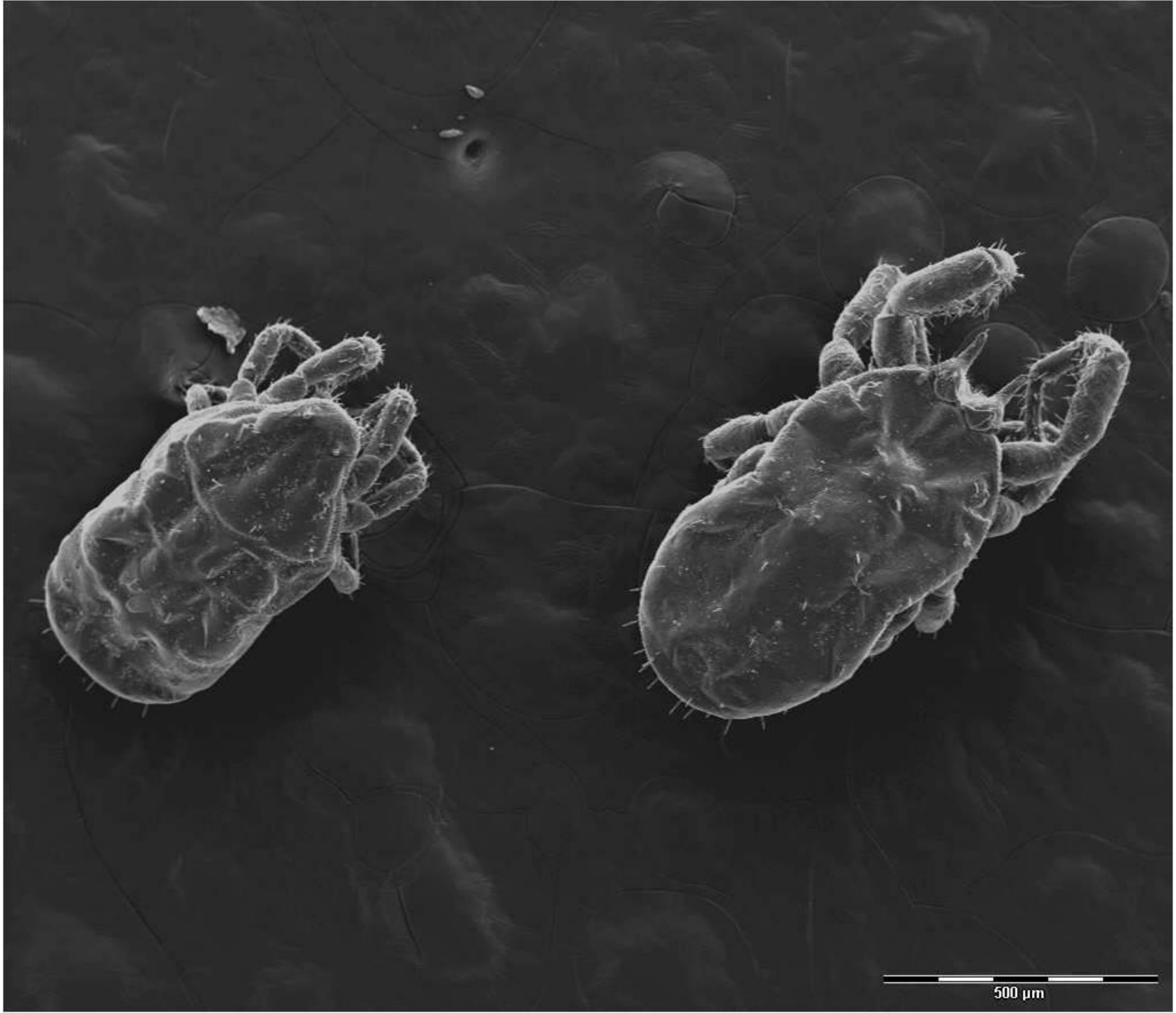
Mating patterns have received much attention in the study of the reproductive strategies of arthropods (e.g., Barnard, 2004; Alcock, 2005). Multiple paternity will increase the offspring's genetic diversity. This may have a positive effect on founding success by reducing the risk of local, stochastic extinction by inbreeding and by improving tolerance to environmental variability (e.g., Saccheri et al., 1998; Frankham et al., 2004). In Europe, *Ixodes ricinus* show clear signs of increasing abundance and expansion along the northern part of its range (Lindgren and Gustafson, 2001), and increasing attention has been paid to this species, notably as a vector of the pathogenic bacteria *Borrelia burgdorferi* s.l. and tick-borne encephalitis (Randolph, 2001). Several studies exist on the mating patterns of ixodid ticks (Bouman et al., 1999; Kiszewski et al., 2001; Zemek et al., 2002), but multiple paternity in *I. ricinus* has not been studied specifically. In an observational study of *I. ricinus*, repeated mating was observed both in males (maximum 4 times) and females (maximum 2 times) (Graf, 1978). Multiple

was isolated using DNeasy® Tissue kit (QIAGEN, Valencia, California). DNA was amplified in polymerase chain reaction (PCR) with 10 different *I. ricinus*-specific microsatellite primers (IRN-4, IRN-7, IRN-8, IRN-12, IRN-14, IRN-15, IRN-17, IRN-30, IRN-31, and IRN-34; Røed et al., 2006). In our analysis of paternity, we used only the 3 loci where both the mother and the attached male were in most cases scored as heterozygote, i.e., IRN-14, IRN-15, and IRN-34. The forward primers were end-labeled with fluorescence, and the PCR was performed on a GeneAmp PCR System 9700 (Applied Biosystems, Foster City, California). Each PCR contained 10-ml reaction mixtures, 20–40 ng of genomic template DNA, 50 mM KCl, 1.5 mM MgCl, 10 mM Tris-HCl, 0.2 mM dNTP, and 0.5 U of *Taq* polymerase (QIAGEN). Thermocycling parameters after denaturation at 94 C for 5 min were 30 cycles of 95 C for 1 min, annealing temperature (cf. Røed et al., 2006) for 30 sec, followed by extension at 72 C for 1 min. The last polymerization step was extended to 10 min. PCR products were added to buffer containing formamide and 5-carboxytetramethylrhodamine–labeled standard (Applied Biosystems), and electrophoresed using an ABI Prism 3100 Genetic Analyzer (Applied Biosystems).

In contrast to the microsatellites used by McCoy and Tirard (2000, 2002) in *I. uriae*, microsatellites of *I. ricinus* are often associated with genotypes deviating from Hardy–Weinberg equilibrium by heterozygote

Professor Pieter Theron, Sør-Afrika:

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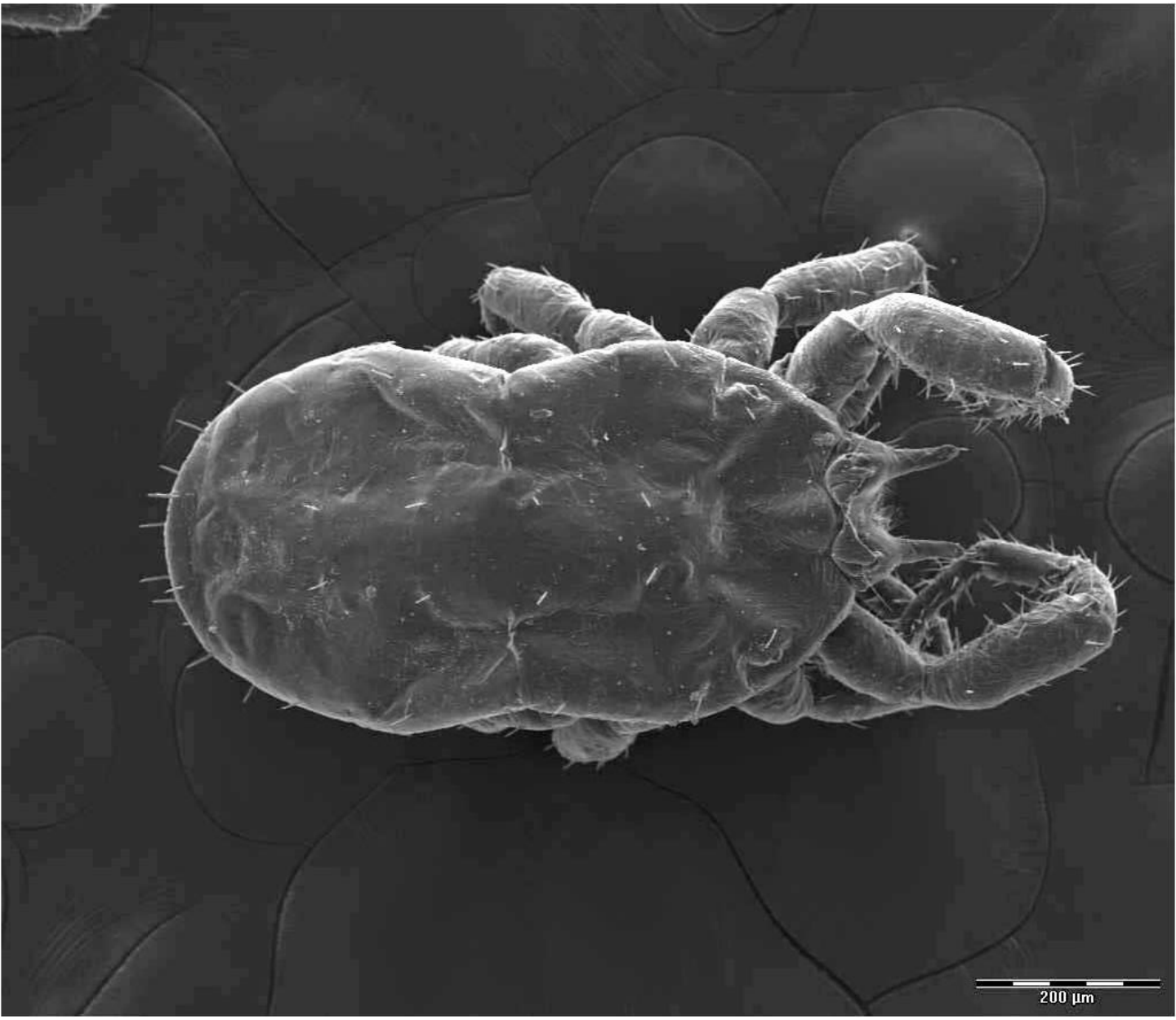
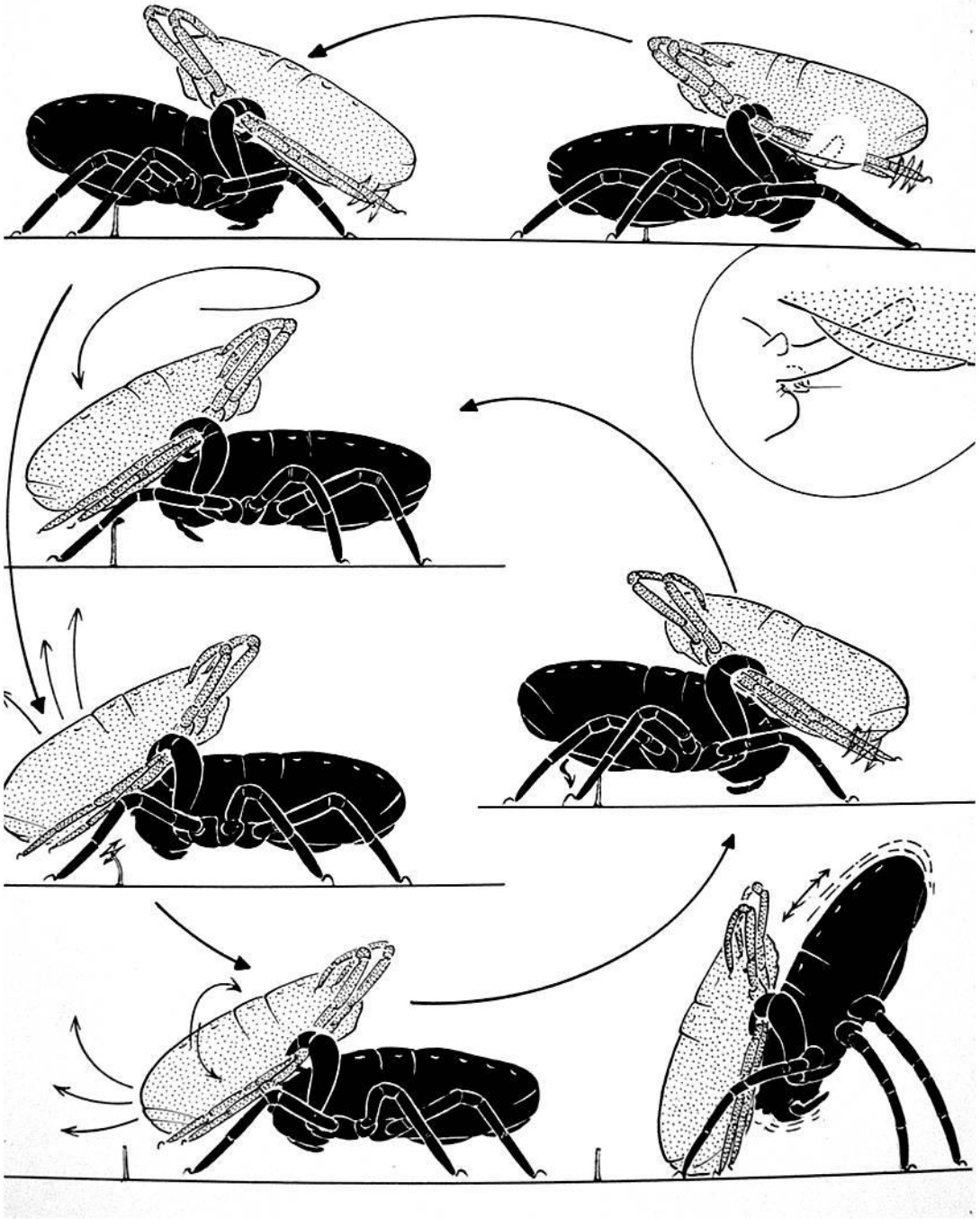

200 µm


50 µm


200 µm


200 µm


50 µm





Det fleste poengene i dette foredraget er fra:

Gullan and Cranston, 1994. Insects. An outline of entomology

https://www.youtube.com/watch?v=JVqkGuRvY7c