

A key to the Flour beetles of the genus *Tribolium* MacLeay in Sweden (Coleoptera, Tenebrionidae), with distributional notes

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An illustrated key for *Tribolium madens* (Charpentier), *T. destructor* Uyttenboogaart, *T. castaneum* (Herbst) and *T. confusum* Jacquelin du Val (i.e. the four species occurring in Fennoscandia and the Baltic States) is presented, together with distributional notes. A key is also presented for the American species of the genus *Cynaesus* Leconte introduced to Sweden.

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Introduction

There have been important revisions of the genus *Tribolium* by Uyttenboogaart (1934), Good (1936) and Hinton (1948). Halstead (1969) redescribed *Tribolium madens* (Charpentier) and separated this species from another closely related american species, *Tribolium audax* Halstead. More recently, keys to the species dealt with here were published for the storage fauna in Canada (Bousquet 1990) and that found in the USA (Spilman 1991). However, the *Tribolium* species found in Sweden can not be identified using available Swedish literature (Lindroth 1967; Landin 1970:334-345) because important characters, e.g. the male genitalia, are not included.

According to literature, four species of *Tribolium* have been found in Sweden: *T. castaneum* (Herbst), *T. madens* (Charpentier), *T. confusum* Jacquelin du Val and *T. destructor* Uyttenboogaart. These *Tribolium* species can be difficult to identify and *T. madens* may have been confused with *T. destructor* in Sweden in the past.

The species belonging to the genus *Tribolium* are similar to the members of the american genus *Cynaesus* Leconte. Since findings of two different species of *Cynaesus* (*C. opacus* Champion and *C. angustus* Leconte) in Sweden (Andersson & Ferrer 1989, Lundberg comm. pers. 1993) and several specimens of *C. opacus* in Finland (Mannerkoski & Ferrer 1992) have been made within a short

time, a key to the species belonging to this genus is also given. Probably *C. opacus* and *C. angustus* are permanently established in the Nordic countries. The third species, *C. depressus* Horn, can be expected to be introduced in Sweden.

Key to species of *Tribolium* and *Cynaesus* occurring in Fennoscandia and the Baltics

1. Elytra with lateral intervals carinate. Meso- and metatibiae simple (genus *Tribolium*) 2
- Elytra with lateral intervals without carinae. Meso- and metatibiae with a fine crenulate ridge on outer surface (genus *Cynaesus*) 5
2. Club of antenna 3-segmented, well differentiated, ninth antennal segment about one third as broad as eighth (Figs 14 & 17). Head with margins above eyes not forming a distinct ridge 3
- Club of antenna feebly differentiated, 5-segmented, ninth and eighth antennal segments of approximately equal breadth (Figs 15 & 16). Head with margins above eyes forming a distinct ridge.. 4
3. Eyes ventrally larger, extending to level of maxillary fossa. Their narrowest part, where they are divided by genal canthus, no broader than 3 or 4 facets (Fig. 20). Aedeagus with paramere tube (apical part) broader (Fig. 7). Pronotum less transverse (Fig. 12). Less robust species. Length 2.3-4.4 mm. Colour reddish brown although a black

mutant form occasionally occurs (forma *evertsi* MacGillavry) *Tribolium castaneum* (Herbst)
 - Eyes ventrally smaller, not extending to level of maxillary fossa, their breadth, where divided by genal canthus, equal to 4 or 5 facets (Fig. 21). Aedeagus with paramere tube relatively narrow (Fig. 8). Pronotum more transverse (Fig. 13). More robust species. Colour very dark brown to black. Length 3.9-5.0 mm.

..... *Tribolium madens* (Charpentier)
 4. Genae more or less rounded at eye. Eye, where divided by genal canthus, usually as broad as 2 facets (Fig. 19), exceptionally only as 1 facet (Fig. 18). Punctures on head and pronotum oval, comparatively coarse and tending to become confluent on vertex and at sides of pronotum (Fig. 10). Aedeagus as in fig. 3-6 with paramere tubeless narrow than in *T. madens*. Colour very dark reddish brown to black. Larger species, length 4.5-5.5 mm. *Tribolium destructor* Uyttenboogaart
 - Genae angulate at eye. Eye, where divided by genal canthus, no broader than 1 facet (Fig. 18). Punctures on head and pronotum round, less coarse and not tending to be confluent. Aedeagus as in Fig. 7. Colour reddish brown but occasionally a black mutant form occurs (general features of this species resemble those of *T. castaneum*). Smaller species, length 2.6-4.4 mm.

..... *Tribolium confusum* Jacquelin du Val
 5. Body depressed, dull and of a uniformly ferruginous colour. Entire upper surface very densely punctured. 6

- Head and pronotum reddish brown, elytra black, not shining. Length 6.9 mm. [Not recorded from Europe.] *Cynaenus depressus* Horn

6. Pronotum transverse, about twice as broad as long, elytral striae more regularly impressed and intervals less convex than in *C. angustus*. Length 5.5 mm. [This species was recently introduced into the province of Småland (Bengt Andersson & Stig Lundberg pers. comm.). In Finland it was found by Ilpo Mannerkoski in a waste heap on a farm in the southern part of the country (Nummi-Pusula) and also in a local dumping area in Nurmijärvi (Mannerkoski & Ferrer 1992).]

..... *Cynaenus opacus* Champion
 - Pronotum trapezoidal, about 1.5 times broader than long, elytral striae feebly impressed with flattened intervals. Aedeagus lanceolate. Apex of paramers acuminate, not rounded as in *C. opacus*. Length 7 mm. [In Sweden this species has been

found climbing a birch tree in Västerhaning in the province of Södermanland. (Andersson & Ferrer 1989).] *Cynaenus angustus* (LeConte)

Tribolium madens (Charpentier)

This species, which was described from "Silesia" (i.e. Schlesien, Poland), is rather uncommon, occurring in stored products and also outdoors in various European countries. It has also been recorded from stored products in Canada (Becker 1982), is probably established in Egypt and Portugal (Halstead 1969) and has been recorded from stored products in China. Although the largest specimens are similar in size to the widely distributed *T. destructor*, it is on average a smaller species. Lundberg (1986) records *T. madens* from Finland, Karelia and the Baltic States. In Sweden it has been found outdoors at Strömsholm near Västerås in the province of Västmanland (24.VII.1984, Börje Andersson leg.) and indoors at Seglora in the province of Västergötland 11.X.1957, Robert Essén leg.).

I have compared the single female from Strömsholm (coll. B. Andersson) with specimens from a culture of Yugoslavian origin provided by Dr. D. G. H. Halstead (MAFF, UK).

Tribolium castaneum (Herbst)

A nearly cosmopolitan species which has been recorded from 10 provinces (Skåne to Dalarna) in Sweden and also from Denmark, Norway, Finland, the Baltic States and Karelia (Lundberg 1986). I have examined material from Malaysia (T. Palm leg.).

Tribolium destructor Uyttenboogaart

T. destructor is superficially somewhat similar to *T. madens* but more common. It has long been known from Africa, Europe and N. America infesting stored products and Bousquet (1990) also includes Asia in its distribution. According to Landin (1970), this species sometimes destroys entomological collections. Lundberg (1986) records *T. destructor* from Norway, Denmark, Finland, Karelia and the Baltic States. In Sweden it is known from Skåne to Lappland (Lundberg 1986). I have found it infesting stored products in Stockholm (Haninge, Södermanland, 5.VI.1974 - author's collection).

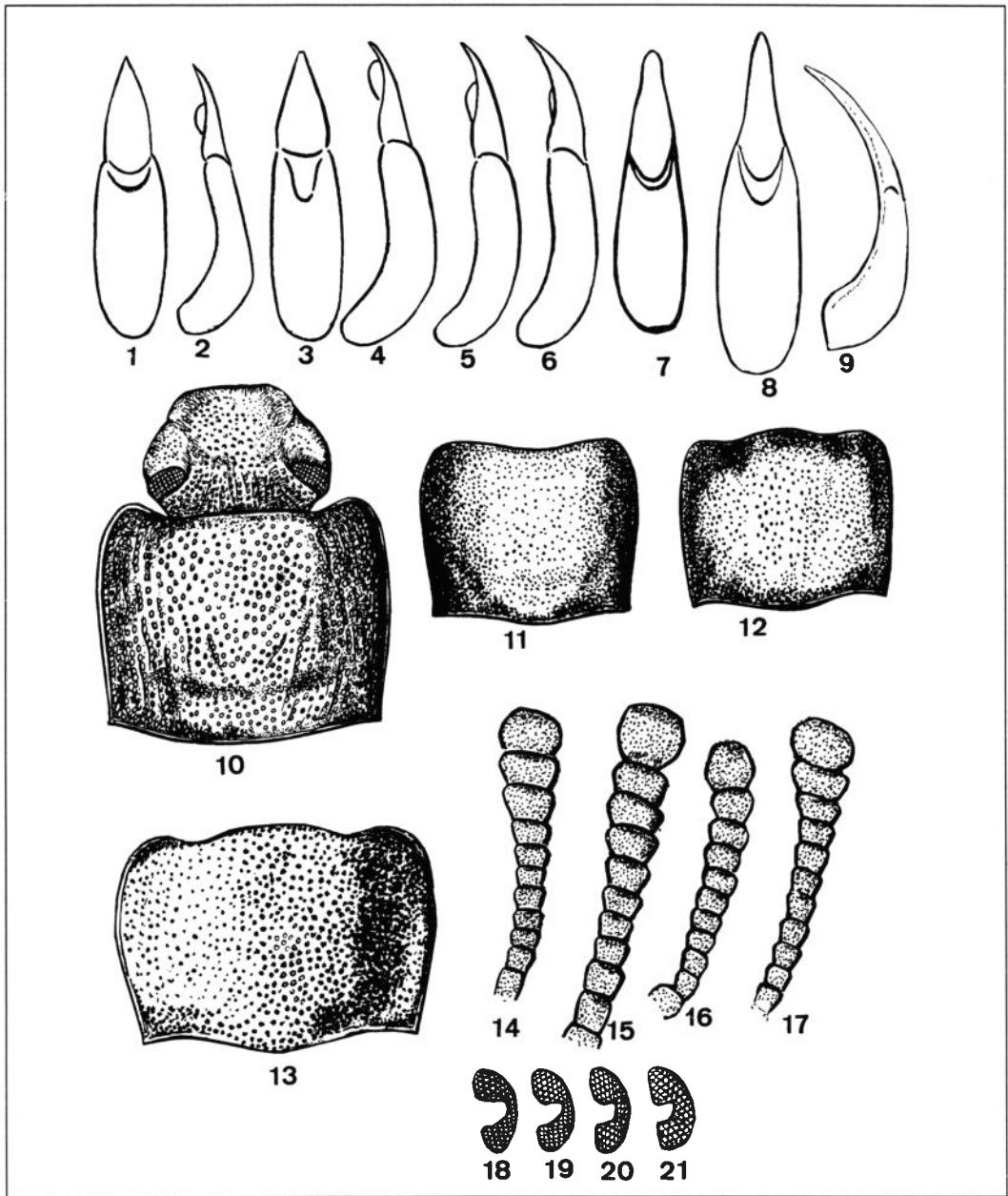


Fig. 1-21. Details of *Tribolium*. - 1-9 Aedeagus, dorsal and lateral views of *confusum* (1-2), *destructor* (3-6, showing variants with median lobe extruded to variable extent), *castaneum* (7) and *madens* (8-9). - 10. Head and pronotum of *destructor*. - 11-13. Pronotum of *confusum* (11), *castaneum* (12) and *madens* (13). - 14-17. Antenna of *madens* (14), *destructor* (15), *confusum* (16) and *castaneum* (17). - 18-21. Eye in lateral view of *confusum* (18), *destructor* (19), *castaneum* (20) and *madens* (21).

Detaljer av aedeagus, huvud, halssköld, antenn och öga hos nämnda mjölbaggav av släktet *Tribolium*.

***Tribolium confusum* Jacquelin du Val**

T. confusum is a cosmopolitan species infesting stored products. According to Lundberg (1986), this species has been recorded from Norway, Finland, Karelia and the Baltic States. In Sweden it has been found from Skåne to Norrbotten. I have examined three males from Huddinge (Stockholm), 27.V.1974, infesting a box of flour - author's collection.

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Sammanfattning

Fyra arter av släktet *Tribolium* är rapporterade från Sverige. *T. madens* (Charpentier) är känd frilevande från Strömsholm, nära Västerås i Västmanland, samt inomhus från Seglora, Västergötland. Denna art kan tidigare ha sammanblandats med den i Sverige väl spridda och inomhuslevande *T. destructor* Uyttenboogaart. Övriga arter, *T. castaneum* (Herbst) och *T. confusum* Jacquelin du Val, är likaså väl spridda i landet och funna inomhus. En bestämningsnyckel tar upp dessa arter och de tre amerikanska *Cynaues*-arter, som liknar *Tribolium*-arterna. Två *Cynaues*-arter (*C. opacus* Champion och *C. angustus* Leconte) har nyligen påträffats i Sverige och Finland och den tredje arten, *C. depressus* Horn, kan förväntas bli införd till Norden.

Sökes: Getingbon!

För mina studier av genetisk struktur inom bon av sociala insekter behöver jag bon av getingar (med innevävnare!). Alla arter är av intresse även om jordgetingar (*Vespula* spp.) är de som jag har svårast att få tag i, och därmed är extra tacksam över. Ring eller faxa mig om ni har något hett tips och ni gör en getingforskare i Uppsala lycklig! Företrä-

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