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Study on the Palaearctic Dolerus Panzer, 1801 species (Hymenoptera: Tenthredinidae)

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Study on the Palaearctic Dolerus Panzer, 1801 species (Hymenoptera: Tenthredinidae) – In this paper identification keys are given for all Palaearctic *Dolerus* species. 7 new synonym names are established: *Dolerus asceta* Jakovlev, 1891 and *D. lii* Wei et Nie, 1997 are synonyms of *Dolerus cameroni* Kirby, 1882; *Dolerus thargitai* Zombori, 1994 is synonym of *D. scoticus* Cameron, 1881; *D. pseudaeneus* Lacourt, 1988 is synonymous with *D. aeneus* Hartig, 1837; *D. kurahashii* Togashi, 1981 with *D. pakistanicus* Muche, 1981; *D. nipponicus* Haris, 1996 with *D. ephippiatus* Smith, 1874 and *D. persicus* Haris, 1996 with *D. hispanicus* Mocsáry, 1881. *D scoticus* Cameron, 1881 is revised.

Key words: *Dolerus,* Palaearctic, key, new synonyms.

INTRODUCTION

The subfamily Dolerinae consists of two genera, namely: *Prionourgus* Goulet, 1986 and *Dolerus* Panzer, 1801 according to Goulet's system. In the other system, established by Konow (1890), this genus is also divided into two genera: *Dolerus* Panzer, 1801 and *Loderus* Konow, 1890. Goulet (1986) combined the two existing genera (*Dolerus* Panzer, 1801 and *Loderus* Konow, 1890) together and made a large new genus which he named *Dolerus* Panzer, 1801 and took out a single species, on which he established a new genus named *Prionourgus* Goulet, 1986. Goulet divided the genus *Dolerus* Panzer into seven subgenera and one species group: *Dicrodolerus* Goulet, 1986; *Loderus* Konow, 1890; *Oncodolerus* Goulet, 1986; *Dosytheus* Leach, 1817; *Neodolerus* Goulet, 1986; *Dolerus* Panzer, 1801; *Archaeotprion* Goulet, 1986 and *nitens* group. The genus *Prionourgus* is established on *Loderus salmani* (Ross, 1935), (syn. *Loderus cajonensis* Smith, 1980) only. The relationship between the two systems is scheduled here: genus *Prionourgus* Goulet, 1986 in Konow's system is a member of genus *Loderus* Konow, 1890. The species of the subgenera *Dicrodolerus* Goulet, 1986, *Loderus* Konow, 1890 and *Oncodolerus* Goulet, 1986 are members of the genus *Dolerus* Panzer, 1801 according to Goulet (1986), but are members of genus *Loderus* Konow, 1890 in Konow's system. The species of the subgenera *Dosytheus* Leach, 1817, *Neodolerus* Goulet, 1986, *Dolerus* Panzer, 1801, *Archaeotropion* Goulet, 1801 and the *nitens* group are members of genus *Dolerus* Panzer, 1801 in both classifications. Those species which have large eyes, narrow genae and frequently coloured with white on the thorax are members of the genus *Loderus* Konow, 1890 and those species which have small eyes, wider genae and

never coloured with white on the thorax are members of the genus *Dolerus* Panzer, 1801. The genus *Dolerus* Panzer, 1801 according to Konow's interpretation is a smaller genus than the same genus in Goulet's (1986) interpretation, therefore, we call it *Dolerus* Panzer, 1801 (sensu stricto) following Konow (1890).

Zhelochovtsev (1988) kept the original generic divisions of Konow (1890) and divided the genus *Dolerus* Panzer, 1801 into four subgenera: *Poodolerus* Zhelochovtsev, 1988, *Juncilerus* Zhelochovtsev, 1988, *Cyperolerus* Zhelochovtsev, 1988 and *Dolerus* Panzer, 1801. The relationship between the two generic and subgeneric divisions (i.e. Holarctic and Palaearctic) needs further study.

In this paper, I propose to study the genus *Dolerus* Panzer, 1801 (sensu stricto) in Konow's interpretation, and I decline to prepare a key for the species of the genus *Loderus* Konow, 1890.

This is the first identification key for the Palaearctic species of this genus which is based on the structure of serrulae besides the usual sawsheath and penis valve figures. Serrulae were studied with 15.000 times magnification. This is a new and very useful approach for a safe identification of many closely related species. Several species are newly synonymised and revised here. This paper is a summary of my works having completed in the last five years. In this time, I checked many types (as many as I was lucky to receive) and identified approximately 5000 specimens, and described 9 new species. This paper is a status report of a long project which aims the better understanding of the systematics of this genus.

The studied material (approx. 5000 specimens) comes partly from the *Dolerus* collection of the Department of Zoology of the Hungarian Natural History Museum and partly from my own collection. Additionally I also checked a high number of loaned material from world-wide. The types I studied are deposited in the following institutions:

Deutsches Entomologisches Institut, Eberswalde
Museum für Naturkunde, Berlin
Zoologisches Staatssammlung, München
The Natural History Museum, London
Laboratoire d'Entomologie, Museum national d'Histoire naturelle, Paris
Zoologisk Museum, København
Natur Historiska Riksmuseet, Stockholm
Smithsonian Institute, Washington
Zoological Institute of the Russian Academy of Sciences, St. Petersburg
Zoological Museum of the Moscow Lomonosov State University, Moscow
National Science Museum, Tokyo

There are a few species which have not been seen (for instance: type series of *Dolerus coccinatus* Zhelochovtsev, which is probably lost) these I included after the original descriptions and genitalia figures.

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LIST OF SPECIES

Dolerus aeneus Hartig, 1837
Dolerus longicornis Zaddach, 1859
Dolerus elongatus C. G. Thomson, 1871
Dolerus zaddachi Konow, 1836
Dolerus pseudaeneus Lacourt, 1988
Dolerus aericeps C. G. Thomson, 1871
Dolerus bajulus Lepeletier, 1823
Dolerus mandibularis Konow, 1884
Dolerus quadricinctus Kiaer, 1896
Dolerus aericeps var. *erythropus* Enslin, 1913
Dolerus aericeps var. *guttatus* Zirngiebl, 1954
Dolerus affinis Cameron, 1876
Dolerus afghanicus Haris, 1999
Dolerus albertii Muche, 1969
Dolerus albolineolatus Haris et Blank, 1996
Dolerus alpinus Benson, 1965
Dolerus altivolus Lacourt, 1988
Dolerus anthracinus (Klug, 1818)
Tenthredo mutilata Klug, 1814
Dolerus atricapillatus Hartig, 1837
Dolerus violaceus Pigeot, 1918 (?)
Dolerus anticus (Klug, 1818)
Dolerus klugi Scholtz, 1848
Dolerus anticus seljuki Benson, 1968
Dolerus armillatus Konow, 1896
Dolerus jesoensis Matsumura, 1912
Dolerus okeanskajensis Rohwer, 1927
Dolerus austerus Muche, 1965
Dolerus asper Zaddach, 1859
Dolerus carbonarius Zaddach, 1859
Dolerus oblungus Cameron, 1882
Dolerus tectus MacGillivray, 1914
Dolerus planatus Hartig, 1837
Dolerus derzavini Malaise, 1931
Dolerus asper megapteroides Muche, 1965
Dolerus bensoni P. R. Müller, 1988
Dolerus bimaculatus (Geoffroy, 1785)
Tenthredo tristis Fabricius, 1804
Tenthredo analis Fallén, 1808
Tenthreo abietis Fallén, 1808
Dolerus saxatilis Hartig, 1837
Dolerus cameroni Kirby, 1882
Dolerus asceta Jakovlev, 1891
Dolerus lii Wei et Nie, 1997
Dolerus ciliatus Konow, 1891
Dolerus quasiciliatus Kerensky, 1926

Dolerus chevini Lacourt, 1988
Dolerus coccinatus Zhelochovtsev, 1928
Dolerus coracinus (Klug, 1818)
Dolerus violaceus Pigeot, 1918 (?)
Dolerus coreanus Takeuchi, 1927
Dolerus merops Zhelochovtsev, 1928
Dolerus cothurnatus Lepeletier, 1823
Dolerus junci Stephens , 1835
Dolerus quadricinctus Zetterstedt, 1858
Dolerus busaei Vollenhoven, 1858
Dolerus dathei Muche, 1973
Dolerus docilus Benson, 1956
Dolerus dentipennis Wei et Nie, 1997
Dolerus elderi Kincaid, 1900
Dolerus pusillus Jakovlev, 1891 (preocc. by Lepeletier, 1823)
Dolerus cohaesus MacGillivray, 1908
Dolerus nutricius MacGillivray, 1923
Loderus acriculus MacGlillivray, 1923
Dolerus negotiosus MacGillivray, 1923
Dolerus nyctelius MacGillivray, 1923
Dolerus pullulus Zhelochovtsev, 1928
Dolerus elderi var. *auraneus* Ross, 1931
Dolerus elderi var. *rubricanus* Ross, 1931
Dolerus elderi var. *melanus* Ross, 1931
Dolerus orchonensis Muche, 1965
Dolerus ephippiatus Smith, 1874
Dolerus nipponicus Haris, 1996
Dolerus umbraticus Marlatt, 1898
Dolerus etruscus (Klug, 1818)
Dolerus pratensis var. *testaceus* De Stephani, 1883
Dolerus bicolor Pigeot, 1918
Dolerus ferrugatus Lepeletier, 1823
Dolerus brevicornis C. G. Thomson, 1871
Dolerus thoracicus Ed. André, 1880
Dolerus thomsoni Konow, 1884
Dolerus frigidus Benson, 1965
Dolerus fumosus Stephens, 1835
Dolerus brevis Zaddach, 1859
Dolerus gracilis Zaddach, 1859
Dolerus ravus Zaddach, 1859
Dolerus germanicus (Fabricius, 1775)
Tenthredo hortorum O. F. Müller, 1776
Tenthredo melanocephala Geoffroy, 1785
Tenthredo rufipes Geoffroy, 1785
Tenthredo pedestris (Panzer, 1801)
Tenthredo erythrogona Spinola, 1801
Dolerus subfuscus Lepeletier, 1823
Dolerus xanthopus Stephens, 1835

Dolerus fulviventris Cameron 1884
Dolerus germanicus var. *fennicus* Ed. André, 1881
Dolerus germanicus var. *laterater* Enslin, 1913
Dolerus germanicus var. *mediater* Enslin, 1913
Dolerus germanicus var. *meridianus* Zhelochovtsev, 1928
Dolerus pratensis ssp. *claripennis* Zhelochovtsev, 1935
Dolerus pratensis ssp. *subsolanus* Zhelochovtsev, 1935
Dolerus pratensis ssp. *aterrimus* Zhelochovtsev, 1935
Dolerus pratensis ssp. *orientalis* Zhelochovtsev, 1935
Dolerus pratensis ssp. *sibiricus* Zhelochovtsev, 1935
Dolerus germanicus var. *terminater* Enslin, 1913
Dolerus pratensis var. *major* Zirngiebl, 1954

Dolerus gessneri Ed. André, 1880
Dolerus gessneri ssp. labiosus Konow, 1897
Dolerus kamchaticus Malaise, 1931

Dolerus gibbosus Hartig, 1837
Dolerus stygius Förster, 1860

Dolerus gonager (Fabricius, 1781)
Tenthredo erythrogona Schrank, 1781
Tenthredo crassa Schrank, 1781
Tenthredo geniculata Fourcoy, 1785
Dolerus magnicornis Eversmann, 1847
Dolerus femoratus Ed. André, 1880
Dolerus lucidus Zirngiebl, 1930 (preocc. by Freymuth)

Dolerus grombczewskii Jakovlev, 1891

Dolerus haematodes (Schrank, 1781)
Dolerus opacus (Panzer, 1781)
Dolerus collaris (Donovan, 1808)
Dolerus coerulescens Hartig, 1837
Dolerus micans Zaddach, 1859
Dolerus haematodes var. *rufatus* Enslin, 1913

Dolerus harukawai Waterston, 1926

Dolerus harwoodi Benson, 1947

Dolerus hibernicus Lacourt, 1988

Dolerus hispanicus Mocsáry, 1881
Dolerus nigriceps Konow, 1891
Dolerus africanus Forsius, 1919
Dolerus persicus Haris, 1996

Dolerus hordei Rohwer, 1925

Dolerus hyrcanus Benson, 1968

Dolerus ibericus Chevin, 1987

Dolerus japonicus Kirby, 1882

Dolerus kamimurai Togashi, 1989

Dolerus klutchianus Malaise, 1931

Dolerus kokujevi Konow, 1902

Dolerus lacteus Scholtz, 1847 (uncertain taxonomic status)

Dolerus lepidus Konow, 1903
Dolerus tadshikistanicus Muche, 1976

Dolerus laevigatus Hellén, 1955
Dolerus nivalis Benson, 1963
Dolerus lewisii Cameron, 1885
Dolerus liogaster C. G. Thomson, 1871
Dolerus schmidti Konow, 1884
Dolerus rugosus Konow, 1884
Dolerus rugosulus Dalla Torre, 1894
Dolerus soniensis Dubois, 1920
Dolerus liogaster var. *rufonotatus* Enslin, 1913
Dolerus longicerus Wei et Nie, 1997
Dolerus lucidus Freymuth, 1870
Dolerus madidus (Klug, 1818)
Dolerus lateritius Klug, 1818
Dolerus chapelli Cameron, 1877
Dolerus lamprechti Konow, 1884
Dolerus manticatus Konow, 1907
Dolerus megapterus Cameron, 1881
Dolerus fumosus Zaddach, 1859
Dolerus melanopterus Konow, 1888
Dolerus melanopterus ssp. **tauricus** Zhelochovtsev, 1918
Dolerus montivagus Benson, 1968
Dolerus montjoinensis Lacourt, 1993
Dolerus murcius Konow, 1895
Dolerus niger (Linné, 1767)
Tenthredo angusta Gmelin, 1790
Tenthredos opaca Fallén, 1808
Dolerus nigratus (O. F. Müller, 1776)
Tenthredo caenescens Gmelin, 1790
Dolerus leucobasis Hartig, 1837
Dolerus cenchris Hartig, 1837
Dolerus fissus Hartig, 1837
Dolerus hartigi Scholtz, 1848
Dolerus analis Konow,
Dolerus nigrominutus Haris, 1999
Dolerus nitens Zaddach, 1859
Dolerus corruscans Konow, 1890
Dolerus vanda Ross, 1935
Dolerus nonultimus Zhelochovtsev, 1961
Dolerus novograblenovi Malaise, 1931
Dolerus nubilus P. R. Müller, 1988
Dolerus oertzeni Konow, 1887
Dolerus pachycerus Hartig, 1837
Dolerus taeniatus Zaddach, 1859
Dolerus tinctipennis Cameron, 1881
Dolerus mocsáryi Konow, 1855
Dolerus pakistanicus Muche, 1982
Dolerus kurahashii Togashi, 1989

Dolerus picipes (Klug, 1818)
Dolerus leucopterus Zaddach, 1859
Dolerus ochroneurus Förster, 1860
Dolerus intermedius Cameron, 1882
Dolerus sulcatus Konow, 1884
Dolerus brevitarsus Hartig, 1837
Dolerus phalipi Chevin, 1988
Dolerus poecilomallosis Wei, 1997
Dolerus possilensis Cameron, 1882
Dolerus pratensis (Linné, 1758)
Tenthredo abietis Panzer, 1799
Tenthredo dubia Klug, 1818
Tenthredo timida Klug, 1818
Tenthredo deserta Klug, 1818
Tenthredo eglanteriae Klug, 1818
Dolerus pratensis var. *atratus* Enslin, 1913
Dolerus pseudojaponicus Haris et Blank, 1996
Dolerus puncticollis C. G. Thomson, 1871
Dolerus croaticus Konow, 1890
Dolerus purus Jakovlev, 1891
Dolerus quadrinotatus Bíró, 1884
Dolerus romanus Benson, 1954
Dolerus rosti Konow, 1890
Dolerus rufogeniculatus Zhelochovtsev, 1924
Dolerus humeralis Benson, 1967
Dolerus rufotorquatus O. Costa, 1864
Dolerus rugosus Freymuth, 1870
Dolerus fulvinotus Ed. André, 1881
Dolerus orthomasticus, Konow, 1903
Dolerus porcatus Konow, 1905
Dolerus sachalinensis Takeuchi, 1936
Dolerus salmanticensis Vigil, 1988
Dolerus samarkandicus Haris, 1997
Dolerus sanguinicollis Klug, 1818
Dolerus sanguinicollis var. *confusus* Enslin, 1913
Dolerus lucens Ed. André, 1880
Dolerus reicherti Konow, 1894
Dolerus brachygaster Hartig, 1837
Dolerus schneideri Kiaer, 1896
Dolerus schultessi Konow, 1887
Dolerus scoticus Cameron, 1881
Dolerus thargitai Zombori, 1994
Dolerus shanghaiensis Haris, 1996
Dolerus sinensis Wei, 1997
Dolerus subalatus Kerenszky, 1926
Dolerus subarcticus Hellén, 1955
Dolerus willoughbyi Benson, 1956

Dolerus subfasciatus Smith, 1874
Dolerus picinus Marlatt, 1898
Dolerus neoaprilis MacGillivray, 1908
Dolerus pseudoanticus Malaise, 1931
Dolerus picinus rhodogaster Zhelochovtsev, 1935
Dolerus thaumatus Wei et Nie, 1997
Dolerus thoracicus (Fallén, 1808)
Dolerus blanki Liston, 1995
Dolerus triplicatus (Klug, 1818)
Tenthredo tremula Klug, 1818
Dolerus trimaculatus Lepeletier, 1823
Dolerus dimidiatus Lepeletier, 1823
Dolerus lugubris Gimmerthal, 1834
Dolerus steini Konow, 1885
Dolerus tremulus var. *aemula* Konow, 1902
Dolerus tritici Chu, 1949
Dolerus truncatus Lacourt, 1988
Dolerus uliginosus (Klug, 1818)
Dolerus variator Enslin, 1923
Dolerus variegatus Jakovlev, 1891
Dolerus varispinus Hartig, 1837
Dolerus vernalis Ermolenko, 1964
Dolerus puncticollis var. *confudens* Zirngiebl, 1937
Dolerus vernus Zhelochovtsev, 1961
Dolerus vulneratus Mocsáry, 1879
Dolerus yokohamensis Rohwer, 1925
Dolerus bimaculatus Cameron, 1885 (preocc. by Geoffroy)
Dolerus yukonensis Norton, 1872
Dolerus lateralis Konow, 1895
Dolerus arcticola Kiaer, 1898
Dolerus mundinus MacGillivray, 1923
Dolerus nuntius MacGillivray, 1923

KEY TO SPECIES

1 (12) Females
2 (7) Body mainly or entirely black, abdomen nearly always black (except *Dolerus vernus* Zhelochovtsev), thorax frequently marked with dark red, legs may be coloured with yellow. Number of serrulae: 15–24. Serrulae without lateral spines (except *Dolerus rufogeniculatus* Zhelochovtsev and *Dolerus samarkandicus* Haris). Cerci short with short hairs (except *D. longicerus* Wei et Nie)
3 (4) Legs coloured with yellow **Table A**
4 (3) Legs never coloured with yellow
5 (6) Thorax more or less coloured with dark red **Table B**
6 (5) Body except cenchri, entirely black **Table C**

7 (2) Abdomen nearly always more or less red (except *D. laevigatus* Hellén, *Dolerus scoticus* Cameron, *Dolerus pachycerus* Hartig, *Dolerus gessneri* Ed. André, *Dolerus variator* Enslin, *Dolerus sachalinensis* Takeuchi and *D. subfasciatus* Smith). Cerci long with long apical hairs. Number of serrulae: 9–15.

8 (9) Abdomen more or less covered with transverse sculpture. Mesopleuron with crater-like punctures (punctures larger than abdominal spiracles) **Table D**

9 (8) Abdomen smooth and shining

10 (11) Legs more or less red, at least the first knees. Mesopleuron with crater-like punctures **Table E**

11 (10) Legs entirely black. Mesopleuron roughly punctured but without crater-like punctures **Table F**

12 (1) Males

13 (14) Abdomen nearly always black. Thorax sometimes coloured with dark red and/or legs with yellow. Mesopleuron roughly punctured but without crater-like punctures **Table G**

14 (13) Abdomen more or less red, if black, mesopleuron with crater-like punctures (except *D. harukawai* Waterston and few rarely occurring melanic forms of *D. madidus* (Klug) and *D. ferrugatus* Lepeletier which has black abdomen and rough but not crater-like punctures, in this cases, check penis valve) **Table H**

Table A

1 (20) Thorax entirely black

2 (3) Hind femur entirely red and hind tibia entirely or almost entirely black. Head with well-defined occipital furrows and often contracted behind the eyes. Punctation of thorax and form of sawsheath very close to those of *D. punctipollis* Thomson. 8.0–9.0 mm. Sawsheath in Fig. 53, 4th–6th serrulae in Fig 1. – Rare montaneous species. Europe **liogaster** C. G. Thomson

3 (4) Hind femur more or less black

4 (7 Hind femur almost entirely black only its apex reddish-yellow. First and second legs also black only their knees reddish-yellow

5 (6) Clypeus emarginated to one-third of its total length. Occipital furrows are deep, well marked. Antenna with 8th segment about 3.3 times as long as its basal breadth. Body black densely covered with silvery pubescence. Head behind the eyes parallel. The base of fore and middle tibiae marked with narrow reddish-yellow band which is relatively wider on the hind tibia. Inner teeth of claws minute. Sawsheath in Fig. 54. 8.0 mm. – Rare species. Known only from Austria, Hungary, Italy and Ukraine **vernalis** Ermolenko

6 (5) Clypeus scarcely emarginated to a depth only about one-fifth of the clypeal length. Occipital furrows not clearly marked above. Antenna with 8th segment 5 times as long as its basal breadth. Head subparallel behind the eyes. Punctation coarse with several large interspaces on temples and notably a large spot (as large as 2 or 3 ocelli) adjoining each of the lateral ocelli. Large sparsely punctuate shining areas occur each side of the middle line of the fore lobes.

Abdomen with transversely alutaceous surface sculpture obsolescent on the 1st and middle of the 2nd tergites. Pubescence silvery all over and on the head and thorax, about 2 times longer than the diameter of the fore ocellus. Wings subhyaline with black venation. 9.0–10.0 mm. – Rare montaneous species. Known only from Turkey **montivagus** Benson

7 (4) One- or two-thirds of hind femur and base of hind tibia reddish-yellow. Head parallel-sided or swollen behind in dorsal aspect. Occipital furrow poorly developed

8 (13) Sawsheath in dorsal aspect parallel, rounded apically, or slightly dilated. Wings well developed and only slightly infuscate (Figs 55–57)

9 (10) Apical setae of sawsheath strongly curved apically. Clypeus slightly and triangularly emarginated. Head behind the eyes parallel and roughly punctured. Pubescence greyish-white as long as the diameter of front ocellus. Mesonotum with shining interspaces. Wings hyaline slightly opalescent. Sawsheath in Fig. 57. 9.0–11.0 mm. – Very rare. Known only from the Caucasus **albertii** Muche

10 (9) Apical setae of sawsheath not so strongly curved apically.

11 (12) Lateral lobes of mesonotum closely and conspicuously punctured laterally. Longer lateral setae near the apex of the sawsheath (Fig. 55) are directed more outwards in dorsal aspect, so that they form with the corresponding setae on the other side of the sawsheath an obtuse angle. 4th–6th serrulae in Fig. 2. 8.0–9.0 mm. – Common species. Insect pest in Central Europe **puncticollis** C. G. Thomson

12 (11) Lateral lobes of mesonotum very shining laterally, with sparse and very superficial punctures. Longer lateral setae near the apex of the sawsheath directed more backwards so that they form with the corresponding setae on the other side of the sawsheath an acute angle (Fig. 56). 4th–6th serrulae in Fig. 3. 8.0–9.0 mm. – All Europe and the Caucasus. Common species. Insect pest in Central Europe **gonager** (Fabricius)

13 (8) Sawsheath in dorsal aspect strongly dilated (Figs 58, 89)

14 (15) Wings hyaline with black venation. Head slightly contracted behind eyes. Clypeus broadly emarginated in front to a depth of about one-third of its total length. Antenna with 8th segment about 4 times longer than its basal breadth. Punctuation coarse. Occipital furrows clearly marked. Front lobes of mesonotum punctured laterally but with the middle half shining with shallow sparse punctures; middle lobes shining with sparse shallow punctures on the front half. Pubescence silvery; on head and thorax up to about twice the diameter of ocellus. Sawsheath in Fig. 89. 8.0–9.0 mm. – Very rare. Known only from Turkey **hyrcanus** Benson

15 (14) Wings dark infuscate, occasionally undeveloped

16 (17) Clypeus broadly and triangularly excised to a depth of one-third of its total length. Wings dark infuscate and normally developed. Head densely punctured.

Occipital furrows with two smooth and shining patches alongside. Head above with dark pubescence. 9.0–9.5 mm. – Sporadic species. Turkey and Transcaucasia **kokujewi** Konow

17 (16) Clypeus slightly emarginated. Wings short, venation undeveloped

18 (19) Wings very short and never reach to the half of the abdomen only to the end of the second abdominal segment. Body black although abdomen often dark brown. Head and thorax densely and deeply punctured. Scutellum densely punctured only its fore part with shining interspaces where the punctuation not so dense. Front lobe of mesonotum flat without any furrow. First abdominal segment smooth and shining the others with transverse surface sculpture. Reddish-yellow are the whole fore femur, the apical third of the middle and hind femora and the basal third of tibiae. Sawsheath as in Fig. 58. 5.5–6.5 mm. – Very rare. South-eastern Europe, Transcaucasia, Ukraine **ciliatus** Konow

19 (18) Wings reach to the second third of abdomen. Whole body black. Head and thorax densely punctured. Pubescence short, silvery. Mesonotum and scutellum shining. Red are the apical part of femora and the basal part of tibiae. Sawsheath as in Fig. 58. 7.5 – 9.0 mm. – Very rare. South-eastern Europe, Ukraine **subalatus** Kerensky

20 (1) Pronotum and lateral angles of front mesonotal lobe red

21 (22) Longer setae near apex of the sawsheath strongly curved (Fig. 62). Middle femur red only at extreme apex. Antenna less than twice as long as breadth of the head behind eyes; 3rd segment only ¾ times as long as the longest measure of eye. Basal abdominal tergite with well-developed coriaceous surface sculpture medially. 8.0–9.0 mm. 4th–6th serrulae in Fig. 4. – Sporadic species. Transcaucasia **rufogeniculatus** Zhelochovtsev

22 (21) Longer setae near apex of the sawsheath almost straight (Fig. 63). Middle femur with apical half red. Antenna twice as long as breadth of the head behind eyes; 3rd segment about as long as the longest measure of eye. Basal abdominal tergite with coriaceous surface sculpture more or less obsolete medially. 8.0 mm. – Rare species. Samarkand, Uzbekistan **samarkandicus** Haris

Table B

1 (2) Black, posterior margin of pronotum medially with two red spots. A large central spot on prescutum, mesoscutum, base of propodeum, other abdominal tergites and sternites entirely reddish brown. Legs black. Wings hyaline with long yellowish brown hairs on their basal 2/3. Abdomen strongly shining, polished. 9.4 mm. – Rare. China **thaumatus** Wei et Nie

2 (1) Abdomen black

3 (32) Sawsheath in dorsal view, rounded never dilated apically (Figs 59–61, 64–68, 73, 75)

4 (21) Pronotum red

5 (10) Body with strong greenish-blue iridescence

6 (7) Scutellum with strong violet luster. Body shining greenish-blue. Pronotum, propleuron, tegulae, lateral lobes of mesonotum red. Two further little spots on the inner angles of the fore lobes also red. Head densely and roughly punctured with shining interspaces on the postocellar region. Clypeus deeply emarginated to the half of its total length. Head behind the eyes parallel. Mesonotum shining, although densely punctured. Sawsheath as in Fig. 59. 4th–6th serrulae in Fig. 5. 6.5–7.5 mm. – Japan. Insect pest of *Hordeum* **hordei** Rohwer

7 (6) Scutellum without any violet luster, shining greenish-blue as the major part of the body

8 (9) Apical setae of sawsheath more elongated (Fig. 59). Clypeus emarginated to one-third of its total length. Pronotum tegulae, lateral lobes of mesonotum red. Colour of fore mesonotal lobes vary from black to almost entirely red. Body with shining greenish-blue iridescence. Head densely and deeply punctured. Mesonotum sporadically punctured, shining. 4th–6th serrulae in Fig. 6. 6.5–7.5 mm. – Sporadic. Japan, Korea, Russia **lewisii** Cameron

9 (8) Apical setae of sawsheath similar to those of *D. lewisii* Cameron although more widely curved. Clypeus slightly emarginated to a depth of one-fourth of its total length. Pronotum, tegulae, lateral lobes of mesonotum red. Fore lobes are black. Body with shining greenish-blue iridescence. Temples and postocellar area sporadically punctured with shining interspaces. Mesonotum moderately punctured. Wings hyaline. 6.5–7.5 mm. – Sporadic. Korea, Japan **coreanus** Takeuchi

10 (5) Body without strong greenish-blue iridescence

11 (18) Lateral lobes of mesonotum red

12 (13) Mesopleuron red. Apices of the setae of sawsheath approaching each other, so the distance between them smaller than the greatest breadth of sawsheath (Fig. 60). Pronotum, mesonotum, tegulae and mesopleuron red. Clypeus deeply emarginated. Head shining, deeply punctured. Pronotum with dense and shallow, fore lobes of mesonotum with moderately dense and lateral lobes with sporadic puncture. Abdomen with transverse surface sculpture. 4th–6th serrulae in Fig. 7. 10.0–11.0 mm. – Sporadic. Japan, Sakhalin, Korea **ephippiatus** Smith

13 (12) Mesopleuron black

14 (15) Apices of the setae of sawsheath do not approach each other, so the distance between them larger than the greatest breadth of the sawsheath (Fig. 61). Variable in colour. Pronotum red at most its margin black. Sometimes the postscutellum also red. In most specimens, the mesonotum wholly red, sometimes only the lateral lobes red. Clypeus deeply and roundly emarginated to a depth of half its total length. Head densely punctured, matt, lateral sides behind the eyes converge. Mesonotum moderately and densely punctured. Wings slightly infuscate. 4th–6th serrulae in Fig. 8. 7.0–8.0 mm. – Sporadic. Europe **sanguinicollis** (Klug)

15 (14) Apices of the setae of sawsheath approaching each other, so the distance between them smaller than the greatest breadth of sawsheath (as in Fig. 64, although cerci may be short)

16 (17) Pronotum, mesonotum, tegulae red. Head shining, with dense and deep punctures. Mesonotum shining, sporadically punctured. Scutellum deeply and coarsely punctured. Mesopleuron with deep and dense punctures. Abdominal segments 2–9 with transverse surface sculpture. Pubescence slight, whitish about as long as the diameter of the front ocellus, shorter on the mesonotum. Clypeus deeply emarginated to a half of its total length. Wings slightly infuscated. Serrulae with many fine teeth (Fig. 9). 9.0–10.0 mm. – Sporadic. China. **affinis** Cameron

17 (16) In colour and sculpture similar to *Dolerus affinis* Cameron, however, cerci very long (Fig. 64) and serrulae with only few relatively larger obtuse teeth. 10.2 mm. – Rare. China **longicerus** Wei et Nie

18 (11) Lateral lobes of mesonotum black

19 (20) Pronotum marked with red. Thorax otherwise black, middle lobes of mesonotum sometimes with minute red spots. Head and abdomen with greenish-blue reflection. Lateral lobes of mesonotum evenly and strongly but not very coarsely punctured. Sawsheath in Fig. 65, 4th–6th serrulae in Fig. 10. 9.0–10.0 mm. – Periodic insect pest. Sporadic, common in certain years. C. and N. Europe, Armenia to Baikal **haematodes** (Schrank)

20 (19) Red are the hind margin of pronotum, tegulae and fore lobes of mesonotum Clypeus triangularly excised to a depth of one-third of its total length. Head and thorax with dense white pubescence longer than diameter of front ocellus. Punctures of head slight and irregular. Head behind eyes slightly converging. Mesonotum slightly and sporadically punctured. Wings greyish, nervature black. The first four abdominal segments bald, 5th–9th covered with silvery pubescence. Male unknown. Sawsheath as in Fig. 75. 9.0–10.0 mm. – Very rare. South Europe **rufotorquatus** O. Costa

21 (4) Pronotum black

22 (23) Lateral lobes of mesonotum black. Mesonotum black only lateral edges of fore lobes red. Upper third of mesopleuron also red. Head and thorax with short silvery pubescence about as long as the diameter of front ocellus. Body black without any metallic luster. Clypeus triangulary excised to a depth of one-third of its total length. Head behind the eyes slightly dilated. Wings greyish, nervature and stigma brown. Sawsheath as in Fig. 73. Male unknown. 8.0–10.0 mm. – Very rare. Hungary and Estonia **quadrinotatus** Bíró

23 (22) Lateral lobes of mesonotum red

24 (25) Fore lobes of mesonotum entirely black. Body shining black without greenish-blue iridescence. Lateral lobes of mesonotum and tegulae are red. Head roughly and deeply punctured with shining interspaces on the vertex. Occipital furrows slightly developed. Head parallel behind the eyes. Mesonotum deeply and sporadically punctured as is pronotum. Scutellum coarsely and deeply punc-

tured with smooth area in the middle above. Wings slightly infuscated. Sawsheath in Fig. 66. 9.0–10.0 mm. – Sporadic in Korea
albolineolatus Haris et Blank

25 (24) Fore lobes of mesonotum at least partly red

26 (27) Fore lobes of mesonotum marked with red alongside their outer margins. Lateral lobes are entirely red. Tegulae and the other part of the thorax black. Head densely punctured, temples and vertex deeply but more sporadically punctured with shining interspaces. Mesonotum and scutellum deeply punctured with shining interspaces. Wings hyaline. Pubescence whitish, as long as diameter of an ocellus. Sawsheath in Fig. 60, 4th–6th serrulae in Fig. 11. 10.0–11.0 mm. – Sporadic in Japan **yokohamensis** Rohwer

27 (26) Fore lobes of mesonotum entirely red

28 (29) Tegulae, fore and side lobes of mesonotum red. Distance between the apices of longest setae of the sawsheath larger than the apical breadth. Head roughly and densely punctured, behind the eyes parallel. Clypeus emarginated to a depth of two-fifths of its total length. Wings hyaline, their apical half, beyond the stigma, slightly infuscated. Mesonotum deeply and densely, scutellum roughly and densely punctured. Sawsheath in Fig. 68. 10.0–12.0 mm. – Sporadic species. Russia, Korea **vulneratus** Mocsáry

29 (28) Tegulae black, mesonotum red

30 (31) Apices of setae of sawsheath approaching each other so the distance between them shorter than the breadth of the sawsheath. Mesonotum entirely, mesopleuron on the upper 1/2–2/3 red. Body black without any metallic luster. Head and thorax with long silvery pubescence about 1.5–2 times longer than diameter of front ocellus. Head densely punctured with fine transverse sculpture. Clypeus triangularly excised to a depth of one third of its total length. Head behind eyes parallel. Apical third of fore wings and hind wings infuscate. First and mainly the second abdominal tergites smooth and shining, 3rd–9th with transverse surface sculpture. 10.0–11.0 mm. – Very rare. Central Europe
thoracicus Fallén.

31 (30) Black, mesonotum red. Wings blackish infuscate. Sawsheath narrow and acute (Fig. 67). Mesonotum with golden, scutellum with black hairs. Wings with long cilia. Sawsheath in Fig. 67. 9.5–10.0 mm. – Montaneous species. China
poecilomallosis Wei

32 (3) Sawsheath dilated apically (Figs 58, 69–71, 83)

33 (38) Sawsheat moderately dilated (Figs 69–70, 83)

34 (35) Pronotum, tegulae, upper part of mesopleuron red. Colour of mesonotal lobes very various. Sometimes all mesonotal lobes entirely red, sometimes these lobes more or less black. Head roughly punctured, vertex with shining interspaces. Mesonotum shining, sporadically punctured. Scutellum deeply punctured, postscutellum smooth and shining. Wings slightly infuscated. 8.0–10.0 mm. Sawsheath in Fig. 69, 4th–6th serrulae in Fig. 12. – Frequent in the mountainous regions of Mongolia **manticatus** Konow

35 (34) Mesopleuron black, pronotum, tegulae, median lobes of mesonotum red

36 (37) Setae of sawsheath curved inward (Fig. 70). Head and mesonotum densely and roughly punctured. Head behind the eyes parallel. Wings hyaline. 8.0–9.0 mm. – Rare. Northern Europe, Ural **schneideri** Kiaer

37 (36) Setae of the sawsheath straigth (Fig. 83), 4th–6th serrulae in Fig. 28. Red colour variation. (See also *D. nigratus* (O. F. Müller) in Table C.)
nigratus (O. F. Müller)

38 (33) Sawsheath strongly dilated (Figs 58, 71)

39 (40) Pronotum, tegulae, fore lobes of mesonotum red. Shining black. Head densely but not roughly punctured with shining interspaces near the postocellar furrows. Vertex between the postocellar furrows sporadically and deeply punctured. Clypeus slightly emarginated. Fore lobes of mesonotum sporadically and deeply, lateral lobes more densely and shallowly punctured. Scutellum shining and wrinkled. Mesopleuron densely and coarsely punctured. Abdominal segments from the 2nd on with transverse surface sculpture. Wings hyaline. Sawsheath in Fig. 71. – Insect pest on *Triticum* in China **tritici** Chu

40 (39) Mesopleuron partly red

41 (42) Pronotum, tegulae, upper third of mesopleuron red. Fore lobes of mesonotum with red on their margins, a triangular black spot starting from the upper edge and reaching the middle of the fore lobes. Head black and densely punctured with smaller shining interspaces on the temples. Clypeus slightly emarginated. Cenchri large, brownish white. Pronotum densely and shallowly punctured. Anterior margin of the fore lobes smooth and shining. Fore lobes even more sporadically punctured than pronotum, lateral lobes and scutellum densely punctured, matt. Pubescence white, moderately dense and about as long as the diameter of an ocellus. Wings hyaline. Abdomen with fine surface sculpture including the first segment. 8,5–10.0 mm. Sawsheath in Fig. 58, 4th–6th serrulae in Fig. 13. – Known only from Shanghai, China **shanghaiensis** Haris

42 (41) Pronotum, tegulae, mesopleuron coloured as *D. shanghaiensis* Haris, however, prescutum red with only a middle black spot. Wings hyaline. Abdominal tergites strongly coriaceous. Setae of sawsheath brown. Mesopleuron with large and sparse punctures. Sawsheath similar to the one of *Dolerus tritici* Chu, however, sides are straight not concave. 7.5–8.0 mm. – Frequent. China
sinensis Wei

Table C

1 (40) Sawsheath in dorsal aspect narrowing to the tip so as to appear more or less pointed, though as a rule bluntly (Figs. 72–81, 85, 61)

2 (37) Fore lobes of mesonotum strongly convex, and usually with a median depression or channel normally developed

3 (30) The longer hairs near the apex of the sawsheath directed strongly backwards and curved so that the apices of the long hairs on one side approach those on the other side and the tips are closer together than the greatest breadth of the sawsheath when viewed dorsally (Figs 72–78)

4 (15) Longer hairs on the sawsheath evenly curved and directed strongly backwards from the base (Figs. 72–73). Fore lobes of the mesonotum punctured all over although more densely at the sides

5 (8) Upper part of head and mesonotum and mesopleuron clothed in dense woolly pubescence much longer than apex of fore basitarsus. Sawsheath as in Fig. 72.

6 (7) Clypeus with its front margin sharply incurved and emarginate to a depth of much less than half of its total length. Sawsheath in Fig. 72, 4th–6th serrulae in Fig. 14. 9.0–10.5 mm. – Rare. Europe **megapterus** Cameron

7 (6) Clypeus similar with *D. megapterus* Cameron, however, abdominal tergites 1–3 smooth and shining, 4th–7th polished only medially. Sawsheath and serrulae as in Figs 72 and 14. (Possible synonym of *D. megapterus* Cameron. Its validity is not confirmed.) – Tibet, China **tibetanus** Wei et Nie

8 (5) Upper part of head and mesonotum with short pubescence. Longest hairs scacerly longer than the diameter of an ocellus. Pubescence on middle of mesopleuron shorter than apex of fore basitarsus. Clypeus almost flat and usually emarginated to a depth of the half of the clypeal length. Sawsheath in Fig. 73.

9 (12) Pubescence on head, mesonotum and mesopleuron dense, and in profile much of this is seen to be as long as, or even longer than, the diameter of an ocellus.

10 (11) Abdominal tergites from the 2nd on with well-developed transverse sculpture. Sawsheath as in Fig. 73, 4th–6th serrulae in Fig. 15. Smaller, 8.5–10.0 mm. – Rare. N. and C. Europe, Ukraine, Baikal **harwoodi** Benson

11 (10) At least the 2nd tergite partly smooth and shining. Sawsheath as in Fig. 73. Larger, 10.0–11.0 mm. – Rare. N. and C. Europe **gibbosus** Hartig

12 (9) Whole body with sparse and very short pubescence; hairs on the head and on the mesopleuron above are seen in profile is less than diameter of an ocellus.

13 (14) Clypeus roundly emarginated. Sawsheath in Fig. 73, 4th–6th serrulae in Fig. 17. 8.5–10.0 mm. – Holarctic species. Sporadic **asper** Zaddach

14 (13) Clypeus triangularly excised. Sawsheath as in Fig. 73. 10.0–11.0 mm. – Rare. Austria, Italy and Russia **docilus** Benson

15 (4) Longer hairs on the sawsheath more strongly curved apically than basally and directed more outwards from the base (Figs 74–78)

16 (27) Pubescence on the middle of mesonotum about as long as diamater of an ocellus

17 (18) Smaller species, 7.5–8.5 mm. Fourth antennal jointh much longer than third (11: 14). Wings hyaline. Sawsheath in Fig. 74, 4th–6th serrulae in Fig. 16. – Sporadic in the French Alps **hibernicus** Lacourt

18 (17) Larger species 8.0–10.5 mm. Third antennal joint longer or subequal with the fourth

19 (20) Fore lobes of mesonotum densely and uniformly punctured. Body matt. Wings sligthly but clearly infuscate. Sawsheath as in Fig. 78, 4th–6th serrulae in Fig. 18. – Sporadic. Armenia, Turkey, Transcaucasia **nonultimus** Zhelochovtsev

20 (19) Fore lobes of mesonotum densely punctured laterally, the middle and front parts more or less sporadically punctured. Body with or without metallic reflection

21 (22) Fore lobes of mesonotum densely punctured laterally; the middle parts adjoining the medial furrow and the front, very sporadically, nearly without punctures. Head with bluish metallic reflection. Sawsheath in Fig. 75, 4th–6th serrulae as in Fig. 19. 8.5–10.0 mm. – Sporadic. N. and C. Europe, N. America **nitens** Zaddach

22 (21) Middle parts of the fore mesonotal lobes more or less sporadically punctured. Body frquently shining but never with metallic reflection

23 (24) Mesosternum sporadically punctured. Abdominal tergites from the 2nd tergite with well-developed transverse sculpture. Body frequently shining but never with metallic reflection. Wings hyaline. Sawsheath in Fig. 77. 8.0–9.0 mm. – Rare montaneous species. Known only from France **altivolus** Lacourt

24 (23) Mesosternum densely punctured

25 (26) Transverse sculpture of the abdominal tergites more or less obsolescent. OOL : POL : OCL 1.2–1.3 : 1.0 : 1.1–1.2. Sawsheath as in Fig. 78, 4th–6th serrulae in Fig. 20. 8.0–10.0 mm. – Sporadic in the mountains of Austria, Switzerland, France and Italy **frigidus** Benson

26 (25) Abdomen smooth and shining. OOL : POL : OCL 1.6-1.7 : 1.0 : 1.5. Sawsheath in Fig. 76. 10.5 mm. – Rare montaneous species. Known only from France **chevini** Lacourt

27 (16) None of the pubescence on the middle of the mesonotum longer than the diameter of an ocellus. Most of them about half as long as diameter of an ocellus.

28 (29) Pubescence on the middle of mesonotum (in profile) only about half as long as diameter of a lateral ocellus, and on mesopleuron all shorter than apical width of tibia. Tergites with normal transverse surface sculpture. Mesosternum with shallow punctures all over. Sawsheath in Fig. 78, 4th–6th serrulae in Fig. 21. 8.5–10.0 mm. – Rare. Britain, Ireland and Holland **possilensis** Cameron

29 (28) Mesosternum impunctate laterally. Pubescence on mesonotum in part as long as diameter of a lateral ocellus, and on mesopleura in part longer than apical width of front tibia. Tergites with transverse microsculpture more or less obscolescent. 8.0–10.0 mm. Sawsheath as in Fig. 78, 4th–6th serrulae in Fig. 22. – Sporadic in the high mountains of Austria, Switzerland, France and Italy **alpinus** Benson

30 (3) Distance between the tips of the longest hairs of the sawsheath surpassing the width of the sawsheath in dorsal view. The mesonotum and the head (in profile) always densely clothed with curved and long hairs, much longer than the diameter of an ocellus (Figs 61, 79–81, 85)

31 (34) Longest setae of sawsheath straigth or broken, never curved apically (Figs 79–80)

32 (33) Smaller species, not longer than 9.0 mm. Only the first abdominal segment is smooth and shining, sometimes sporadically punctured. Hind margins of abdominal segments whitish. Fore lobes of mesonotum densely and deeply punctured. The central part of these lobes sporadically punctured, almost smooth. Side lobes of mesonotum smooth and shining. Scutellum deeply and

sporadically punctured. Wings hyaline. Sawsheath in Fig. 79. 8.0–8.5 mm. – Sporadic. Known only from Spain **salmanticensis** Llorente Vigil

33 (32) Larger species, usually 10.0–11.0 mm. Abdomen dull above and more strongly rugosely sculptured, so that tergite 1, for instance, is without large lateral or medial unpunctured areas. Clypeus deeply emarginated to a depth of half of its total length. Occipital furrows are short and deep. Mesonotum shining, fore lobes strongly, lateral lobes slightly punctured. Sawsheath in Fig. 80, 4th–6th serrulae in Fig. 23. – Sporadic. N. and C. Europe, Siberia **niger** (Linné)

34 (31) Setae near apex of sawsheat strongly curved apically in dorsal view (Figs 61, 81, 85)

35 (36) Antenna with the flagellar segments unusually long and slender, the 3rd and 4th antennal segments being almost equal in length. Setae near apex of sawsheath directed more backwards. Head narrowed behind the eyes with a clearly defined occipital furrow; mesonotum very shining with sparse punctures. Sawsheath in Fig. 81, 4th–6th serrulae in Fig. 24. 6.0–10.0 mm. (*Dolerus montjoinensis* Lacourt is probably synonymous with *D. aeneus* Hartig, however, it has strongly shining temples. Sawsheath in Fig. 85.) – Frequent in the montaneous regions. Palaearctic **aeneus** Hartig

36 (35) Antenna less elongate, the 3rd segment distinctly longer than the 4th. Cerci usually black or dark. Curved setae of the sawsheath directed more strongly outwards as in Fig. 61. 7.0 – 8.0 mm. – Sporadic. N. and C. Europe **fumosus** Stephens

37 (2) Fore lobes of mesonotum flat, scacerly convex, densely punctured all along the middle line which appears but slightly channelled or keeled medially.

38 (39) Fore lobes of mesonotum with a very fine, almost invisible medial groove, sometimes without one. Mesopleuron above with rather long pale hairs (longer than apical breadth of front basitarsus). Mesosternum almost impunctate. Body hardly shining, rather matt. Wings normal. Sawsheath as in Fig. 75, 4th–6th serrulae in Fig. 25. 9.0–10.0 mm. – Rare. C. and E. Europe, England and Korea **coracinus** Klug

39 (38) Fore lobe of mesonotum with a fine medial keel. Mesopleuron above with much shorter and sparser hairs (shorter than the apical breadth of front basitarsus). Mesonotum evenly and strongly punctate all over. Body strongly shining. Wings often do not reach apex of abdomen. Sawsheath in Fig. 75, 4th–6th serrulae in Fig. 26. 9.0–10.0 mm. – C. N. and W. Europe, Baltic Sea **anthracinus** Klug

40 (1) Sawsheath clearly dilated apically, the tip very broadly rounded, truncate or appearing emarginated (Figs 58, 82–84, 86)

41 (42) Wings never reach the apex of abdomen (brachypterous), dark infuscate. Pubescence on head and thorax brownish infuscate. Head with elongated pubescence as long as the second flagellomere of antenna. Clypeus slightly emarginated. Nervature of wings incomplete: *Rs1, 3rm* and *2mcu* are missing. Sawsheath as in Fig. 58. Male unknown. 7.0 mm. – Very rare. Known only from Greece (Parnassus Mountain). **oertzeni** Konow

42 (41) Wings reach over the apex of abdomen, hyaline. Clypeus widely emarginated to a depth at least one-third of its total lenght. Head and thorax with silvery pubescence

43 (44) Sawsheath extraordinarily dilated apically, the width here being about the same as the apical width of the hind tibia; each side of apex of sawsheath with long curved setae (Fig. 82). 4th–6th serrulae in Fig. 27. 8.0–9.0 mm. – Frequent European species **picipes** Klug

44 (43) Sawsheath in dorsal aspect not extremely or only slightly dilated apically, the width here being less than three-quarters of the hind tibia (Figs 83–84, 86).

45 (46) Sawsheath with the long setae almost straight (Fig. 83), 4th–6th serrulae in Fig. 28. 9.0–10.5 mm. – Common European species. Insect pest on cereal and grass cultures **nigratus** (O. F. Müller)

46 (45) Apical setae of sawsheath slightly curved apically (Figs 84–86).

47 (48) Longer setae of sawsheath sligthly curved (Fig. 84). 4th–6th serrulae in Fig. 29. 9.0–10.5 mm. – Sporadic species. Korea and Kamchatka **novograblenovi** Malaise

48 (47) Sawsheath with the long setae on each side longer and more curved apically (Fig. 86). 4th–6th serrulae in Fig. 30. 8.0–9.0 mm **varispinus** Hartig

Table D

1 (6) Body entirely black, or dominantly black with brownish yellow spots

2 (3) Robust black species. Mouthparts, mesonotum, mesopleuron, pronotum more or less coloured with brownish yellow spots. Labrum, basis of mandibel, clypeus, all tibiae, lower two-thirds of the first two femora, the lower third of hind femur, tegulae, sawsheath dorsally yellowish-brown. Sometimes the mouthparts almost entirely black. The other parts of the body black. Clypeus deeply emarginated. Third antennal joint much longer than the fourth. Head behind eyes slightly converging, densely and deeply punctured as is the mesonotum. Mesopleuron roughly and densely punctured. Pubescence short and whitish. Wings hyaline. Sawsheath in Fig. 88. 10.0–12.0 mm. – Sporadic. Known only from Kamchatka, Russia **variator** Enslin

3 (2) Entirely black insects, only legs may be coloured with red.

4 (5) Entirely black species, including legs, with the middle of the fore and lateral lobes of the mesonotum as well as the middle of the scutellum covered with a large shining area being impunctate or feebly punctate. Sawsheath in Fig. 96. 8.0–9.5 mm. – Rare European species **pachycerus** Hartig

5 (4) Larger (9.0–10.0 mm.). Normally entirely black except for the red front and middle knees; in some specimens, however, the abdomen is more or less girdled with red. (*Dolerus yukonensis* Norton may also has black colour variation, check couplet 15 (16).) Setae on sides of sawsheath very slightly curved and set more backwards, so that the longer ones on one side form an acute angle with those of the other (as in Fig. 94). 4th–6th serrulae in Fig. 33. – Sporadic. Europe, Siberia, Mongolia and N. America **gessneri** Ed. André

6 (1) At least abdomen more or less red

7 (12) Abdomen mainly red, only the first tergite and the genitalia more or less black

8 (9) Last abdominal tergite with a large triangular projection covering the major part of the sawsheath. Head black, behind the eyes slightly dilated and then contracted. Pronotum, tegulae, fore lobes of mesonotum red. Anterior margin of mesonotum with a little black spot, scutellum with large black spot and lateral lobes of mesonotum with curved black band. Metanotum and postscutellum black. Mesopleuron mainly red. First tibiae red, second brownish-red, third black with red strip on the outer side. First femora on their apical third, the second and third knees red. First abdominal segment black, the other part of the abdomen red. Mesonotum shining, densely punctured. Wings subhyaline. Head and thorax with dense, whitish pubescence as long as diameter of an ocellus. Sawsheath in Fig. 90. 10.0 mm. – Very rare. Known only from Kamchatka, Russia **klutchianus** Malaise

9 (8) Last abdominal tergite without any projection

10 (11) Head entirely black, behind the eyes parallel. Prothorax, tegulae, mesonotum, upper part of mesopleuron, two lateral spots on the scutellum red. First abdominal segment and sawsheath black, the other parts of the abdomen red. Legs black, fore tibiae and middle knees red. Mesonotum sporadically, scutellum roughly punctured with shining interspaces. Wings slightly infuscate. Sawsheath in Fig. 91, 4th–6th serrulae in Fig. 35. 9.0–10.0 mm. – Sporadic. East Siberia, Mongolia **variegatus** Jakovlev

11 (10) Head black, thorax red but lateral lobes of mesonotum except their hind corner, meso- and metascutellum, mesepisternum, mesepimeron, metapleuron, meso- and metasternum black. Legs black, first femora and coxae with small red spots, abdomen entirely red, only the first tergum with two minute black longitudinal strips. Basal one-fifth of costa red, venation black. Wings hyaline. Sawsheath in Fig. 92. 11.5 mm. – Rare species. Known only from Afghanistan **afghanicus** Haris

12 (7) Often abdomen more or less red-banded, first and at least 7th–9th segments are always black. Fore legs marked with red (except in a rare form of *D. pratensis* (Linné)). Middle parts of mesonotal lobes and scutellum densely or sparsely punctured, but never with shining interspaces larger than 2 or 3 diameters of a puncture

13 (14) Scutellum very densely, irregulary and coarsely punctured, the coarser punctures much larger than those in the middle of the lateral lobes of mesonotum; these punctures are very irregular, often confluent at the sides and coarser in the middle, where they are widely separated. Abdomen red-girdled and tegulae also red. Abdomen with dense transverse sculpture. Sawsheath acute in lateral aspect and dorsally with the lateral hairs slightly curved (Fig. 93). 4th–6th serrulae in Fig. 31. 8.5–10.0 mm. – Sporadic European species **bimaculatus** (Geoffroy)

14 (13) Scutellum with regular punctures thinning out in front where there are shining interspaces. In size, the punctures are scacerly larger than those in the middle

of the mesonotal lobes. On the lateral lobes of the mesonotum, the punctures are small, more evenly spread and separated from each other

15 (16) Smaller species (6.5–8.0 mm) with entirely hyaline wings. Abdomen with shining areas on the tergites between the patches of the fine surface sculpture and without definite punctures on the 1st and 2nd tergites. Sawsheath with lateral setae finer and definitely curved, and in lateral view the sheath is acutely angled apically (Fig. 94). 4th–6th serrulae in Fig. 32. – Sporadic. N. Europe, Siberia, Mongolia and N. America **yukonensis** Norton

16 (15) Larger species (9.0–12.5 mm) with wings slightly infuscate apically. Abdomen densely and transversely striate with definite coarse punctures on the 1st and 2nd tergites. Sawsheath with lateral setae stiff and almost straight

17 (18) Larger (10.5–12.5 mm). Very variable in colour, normally red-girdled, but if the abdomen is entirely black then the legs are also. Setae on sides of sawsheath straight, and set more outwards so that those on one side form almost a right angle with those on the other (Fig. 95). 4th–6th serrulae in Fig. 34. – Sporadic. Europe, Siberia and also found in the mountains of E. Africa **pratensis** (Linné)

18 (17) Smaller (9.0–10.0 mm). Normally entirely black except for the red front and middle knees. In some specimens, however, the abdomen is more or less girdled with red. Setae on sides of sawsheath very slightly curved and set more backwards, so that the longer ones on one side form an acute angle with those of the other (as in Fig. 94). 4th–6th serrulae in Fig. 33. – Sporadic. Europe, Siberia, Mongolia and N. America **gessneri** Ed. André

Table E

1 (8) Body mainly black, occasionally the tegulae and the legs coloured with red or yellowish brown. Abdomen entirely black, or the middle segments with reddish-brown shadow, rarely the second abdominal segment red

2 (3) Larger species, 9.5–11.0 mm. Whole body black. Tibiae and apical fifth of femora red. Head black, the apical part of mandibles reddish-brown. Head behind the eyes parallel, densely and coarsely punctured. Clypeus slightly emarginated. Mesonotum densely punctured, shining. Wings hyaline, nervures and stigma black. Sawsheath in Fig. 98, 4th–6th serrulae in Fig. 36. – Sporadic. Temperate and boreal regions of E. Asia and N. America **subfasciatus** Smith

3 (2) Smaller species, 7.0–8.5 mm

4 (5) Body and legs entirely black. Sawsheath in Fig. 103. – Rare. Austria, Switzerland **laevigatus** Hellén

5 (4) At least, the legs are coloured with yellowish brown or red

6 (7) Body entirely black but labrum, tegulae and apex of sawsheath brownish. Legs black with four anterior knees and anterior tibiae yellovish-brown. Head behind the eyes parallel. Clypeus deeply emarginated. Mesonotum poorly shining and reticulate, the punctures on middle of fore and of lateral lobes sparser

Scutellum rugose. Mesosternum shining with coarse well defined punctures. Wings hyaline, beyond the stigma very slightly dusky, nervures and stigma dark brown. 7.0–8.0 mm. – Rare. Known only from Sakhalin, Russia **sachalinensis** Takeuchi

7 (6) Black, abdomen with reddish-brown shadow on the middle segments. Tegulae red. Pronotum densely punctate. Mesonotum shining, moderately punctured. Scutellum roughly punctate. Mesosternum shining, sporadically punctured. Wings slightly infuscate. Pubescence silvery about as long as a diameter of an ocellus. Sawsheath in Fig. 97. 7.0–8.5 mm. – Sporadic, mainly in mountainous locations of N. and C. Europe **scoticus** Cameron

8 (1) Abdomen coloured with red

9 (32) Long setae on the sides of the sawsheath set more backwards so that, in dorsal aspect, they form with the corresponding setae on the other side of the sawsheath an acute angle (Figs 98–102, 104–105)

10 (13) Thorax including tegula entirely black, sometimes on the pronotum a sligth shade of red visible

11 (12) Wings hyaline, larger species. Sawsheath in Fig. 98, 4th–6th serrulae in Fig. 36. – Sporadic. Temperate and boreal regions of E. Asia and N. America **subfasciatus** Smith

12 (11) Wings dark infuscate, smaller species. (See also *D. germanicus* (Fabricius) at couplet 30 (31).) Dark colour variation **germanicus** (Fabricius)

13 (10) Thorax more extensively red or at least the tegula red

14 (15) Thorax black, only tegulae red and cenchri yellow. Head black, slightly narrowed behind eyes. Clypeus emarginated to a third of its total length. Antenna shorter than costa of fore wing. Mesonotum shining, deeply punctured. Posttergite, metascutellum and metanotum nearly impunctate, shining. Legs black, fore and middle tibiae, all knees and basal two-thirds of hind tibiae are red. Abdomen red, the first and the apical three segments black. Wings slightly infuscate. Sawsheath in Fig. 99. 8.0 mm. – Rare. Pakistan **kamimurai** Togashi

15 (14) Thorax more extensively red

16 (19) Apical part of the abdomen black

17 (18) Apical part of the abdomen from 7th tergite on black. Wings subhyaline. Head black, densely punctured, slightly dilated behind the eyes. Pronotum, tegulae, fore lobes of mesonotum red. Upper edge of mesopleuron with red spots. Mesonotum sporadically punctured but fore lobes somewhat more densely than the lateral lobes. Scutellum with dense punctures. Legs black, fore tibia and apical part of fore femur red. Base of the first tergite and 7th–9th tergites black. Pubescence white and short. Sawsheath in Fig. 100, 4th–6th serrulae in Fig. 37. 10.0 mm. – Rare. prov. "Gan-ssu", China **purus** Jakovlev

18 (17) Tegula black or red. Wings slightly infuscate. Head and thorax black. Abdomen black, only the middle (2nd–5th) segments are red. Head behind the eyes slightly converging. Fore tibia and base of femur red. Sawsheath in Fig. 101. 5.5–7.0 mm. – Sporadic. Scandinavia and Siberia **subarcticus** Hellén

19 (16) Apical part of the abdomen red, first tergite black

20 (21) Basal third of venation of fore wings yellow. Head black. Pronotum, tegulae red, other parts of the thorax black. Abdomen red, lateral margins of the first abdominal segment and two spots on the base black, apical part of abdomen from the hind margin of the 7th segment also black. Legs black. Apical third of fore femora and basal third of fore tibiae red. Mesonotum deeply and densely punctured with shining interspaces. Clypeus deeply emarginated to a half of its total length. Pubescence silvery and dense about as long as diameter of an ocellus. Wings hyaline. Sawsheath in Fig. 102. – Sporadic. Uzbekistan **lucidus** Freymuth

21 (20) Venation dark: brown, black-brown or black. Occasionly the base of the venation reddish (*pakistanicus* Muche) but if these are reddish then wings infuscate

22 (23) Head behind the eyes clearly dilated. Temple sporadically punctured. Occipital furrows deep and straight. Pronotum red. Mesonotum and the edge of mesopleuron red. Wings sligthly infuscate. Legs red only the coxae, trochanters and the base of femora black. Abdomen, with the exception of the first tergite, red. Sawsheath as in Fig. 104. Larger species 9.0–9.5 mm. – Sporadic. South-eastern Europe and Asia Minor **melanopterus** Konow

23 (22) Head behind the eyes parallel or narrowing

24 (25) Larger species. Legs dark brown or black only the first knee red. Wings dark infuscate. 7.0–9.5 mm. Sawsheath in Fig. 105. 4th–6th serrulae in Fig. 38. – Sporadic.Uzbekistan, Tadzhikistan and Turkestan **rugosus** Freymuth

25 (24) Smaller species, if larger, than legs at least the first pair more extensively red.

26 (27) Metanotum around metascutellum red. Mesopleuron often black with a row of red spots. Basal 1/4–1/3 of costa and subcosta red. Scutellum black. Sawsheath in Fig. 106. – Sporadic in Pakistan **pakistanicus** Muche

27 (26) Metanotum around metascutellum black. Mesopleuron never with a row of red spots although the upper third of mesopleuron may be red

28 (29) The very base of costa, subcosta red but it is always shorter than 1/4 of their length. Scutellum black. Wings dark infuscate. Sawsheath as in Fig. 104. 4th–6th serrulae in Fig. 39. – Sporadic. Uzbekistan, Turkmenistan and Tadzhikistan **lepidus** Konow

29 (28) Costa, subcosta even the very base dark brown or black. Scutellum black or red

30 (31) Wings sligthly infuscate, if dark infuscate (former ssp. *sibiricus* Zhelochovtsev) then the 2nd and 3rd legs are mainly black. Sawsheath in Fig. 104, 4th–6th serrulae in Fig. 40. – Common European species **germanicus** (Fabricius)

31 (30) Wings dark infuscate. All the legs extensively red. Sawsheath as in Fig. 104, 4th–6th serrulae in Fig. 41. – Frequent. S. Europe, Asia Minor, Mongolia **etruscus** (Klug)

32 (9) Long setae on the sides of the sawsheat set more outwards so that, in dorsal aspect, they with the corresponding setae on the other side of the sawsheath form an obtuse angle (Figs. 108–113)

33 (40) Abdomen mainly red, only its first tergite and often the sawsheath black

34 (35) Apical setae of the sawsheath straight (Fig. 108). Head black with two large and smooth areas alongside the occipital furrows. Lateral sides of head behind the eyes slightly converging. Clypeus roundly emarginated to a depth of half of its total length. Occipital furrows well developed. Pronotum, mesonotum, tegulae red. Prosternum red with two lateral black spots. Upper third of mesopleuron also red. The other parts of the thorax black. Legs black. Basal part of first coxa, the first knee and the upper half of the fore tibia red. Mesonotum sporadically punctured as is the pronotum. Scutellum deeply and roughly punctured. Abdomen red. The first abdominal segment black. Slight transverse sculpture visible on the middle abdominal segments. Head and thorax moderately covered with whitish pubescence about as long as the diameter of an ocellus. 9.5 mm. – Rare. Korea **pseudojaponicus** Haris et Blank

35 (34) Apical setae of the sawsheath more or less curved apically

36 (37) Wings infuscate. (*D. japonicus* Kirby also has dark winged colour variation. Check also *D. japonicus* Kirby under couplet 38 (39).) Head and antenna black, densely punctured, vertex and temples sporadically punctured, shining. Clypeus deeply emarginated to half of its total length. Prothorax, mesonotum, tegulae red. Fore lobes of mesonotum sometimes with black margin on its lateral side. Pubescence whitish, short and rare. Abdomen red, first abdominal segment and the ventral apex of abdomen black. All knees and fore femora marked with red. 4th–6th serrulae in Fig. 39 **lepidus** Konow

37 (36) Wings hyaline

38 (39) Apical setae of the sawsheath moderately curved, only the apices of the setae bending (Fig. 109). Head and antenna black with moderately large smooth areas alongside the occipital furrows. Pronotum, fore and lateral lobes of mesonotum, tegulae red. Upper third of mesopleuron red. The other parts of thorax black. Legs mainly black. Fore coxae, fore knees and fore femora marked with red. Abdomen red, only the first abdominal segment and the sawsheath are black. Mesonotum sporadically punctured with shining interspaces. Scutellum roughly punctured. Pubescence whitish as long as a diameter of an ocellus. – Frequent in Japan and also recorded from Korea **japonicus** Kirby

39 (38) Setae on the sides of the sawsheath strongly curved apically in dorsal aspect (Fig. 110). Mesonotum with the lateral lobes entirely, and often the fore lobes also red. Head with a bronzy sheen and occipital furrows obsolete. Lateral lobes of mesonotum with irregular punctures which are obsolete in the middle. 4th–6th serrulae in Fig. 42. 7.0–8.0 mm. – Frequent European species **aericeps** C. G. Thomson

40 (33) First tergite and apical tergites are black. Abdomen with a red band

41 (42) Thorax including tegulae entirely black. Setae on sides of sawsheath only very slightly curved (as in Fig. 113). Abdominal segments 3–5 red. Head with clearly defined occipital furrows. Lateral lobes of mesonotum with fine and regular punctures all over. 4th–6th serrulae in Fig. 45. 8.0–9.0 mm. – Rare. N. and C. Europe, Siberia and Korea **cothurnatus** Lepeletier

42 (41) Tegulae red

43 (44) Pronotum, fore lobes of mesonotum and tegulae are red, the other parts of thorax black although lateral lobes frequently more or less red. Head and antenna black. Legs black, fore tibia and femur marked with black. Abdominal segments 3–5 or 2–5 , sometimes 2–6 red. Abdomen smooth and shining. Sawsheath in Fig. 113. 8.0 mm. – Sporadic. Siberia, Korea, Japan and Mongolia **armillatus** Konow

44 (43) Mesonotum entirely black

45 (46) Smaller species, 5.0–6.0 mm. Head, antenna and thorax entirely black, only tegulae red. First and apical abdominal segments black, red are the 2nd–6th and the basal part of the 7th segments. Legs black, first femora and all tibiae marked with red. Sawsheath in Fig. 111, 4th–6th serrulae in Fig. 43. – Frequent species. N. Eurasia, mountains of C. Asia and N. America **elderi** Kincaid

46 (45) Larger species, 10.0 mm. Head, antenna, and thorax black, tegulae and pronotum red. Clypeus emarginated to a depth of one-third of its total length. 2nd–5th abdominal segments red, the others black. Legs black, apical third of fore femora and basal third of fore tibiae red. Mesonotum densely and finely punctured, shining. Scutellum with dense puncture, slightly shining. Sawsheath in Fig. 112. 4th–6th serrulae in Fig. 44. – Rare. Known only from Turkestan **grombczewskii** Jakovlev

Table F

1 (20) Abdomen mainly red. Sometimes the first abdominal tergite and the sawsheath marked with black

2 (3) Extensively red species. Head, antennae, mesosternum, legs and the apex of the sawsheath black. Other parts of the body red. Sometimes the tegulae and some spots near the scutellum may be black. Wings dark infuscate. Head behind the eyes dilated. Antenna long and slender, longer than the abdomen. Third and fourth antennal segments are subequal. Mesonotum sporadically punctured. 9.0–10.0 mm. Male unknown. – Rare species. China **coccinatus** Zhelochovtsev

3 (2) Body more extensively black. Antenna shorter

4 (13) Lateral lobes of mesonotum almost entirely yellow

5 (6) First abdominal tergite black. Head and antenna black. Pronotum and mesonotum red. Mesopleuron mainly black. Sawsheath similar to that of *D. madidus* (Klug). – Rare. Spain **schultessi** Konow

6 (5) First abdominal tergite red

7 (8) Mesopleuron black. Thorax mainly red, mesoscutellum, mesoscutellar appendage, postscutellum, metepimeron, mesepimeron, mesosternum, metasternum, mesopleuron black. Head behind eyes parallel. Wings hyaline. 4th–5th serrulae in Fig. 49. 9.0–10.0 mm. – Sporadic. Spain **murcius** Konow

7 (8) Mesopleuron at least on the upper third red

9 (10) Head behind the eyes converging. Occipital furrows are very short, sometimes as short as a puncture. Prothorax, mesonotum (except scutellum) and abdomen (except sawsheath) yellow. Sawsheath narrow in dorsal aspect with straight lateral setae near apex (Fig. 114). 4th–6th serrulae in Fig. 46. 9.0–10.5 mm. – Sporadic European species **madidus** Klug

10 (9) Head behind the eyes parallel, sometimes slightly dilated. Occipital furrows are deep and long. Thorax mainly red. Wings infuscate. Legs black. Abdomen red, sometimes the sawsheath black. 9.5–11.0 mm

11 (12) Apical setae of the sawsheath are straight as in Fig. 114. – Rare C. and E. European species **uliginosus** Klug

12 (11) Apical setae of the sawsheath sometimes curved at their apices (Fig. 120). (Female not really differentiable from that of *D. uliginosus* (Klug).) 4th–6th serrulae in Fig. 47. The different distribution (i.e. Europe or Japan) of the two species may be helpful in separating the females. – Frequent insect pest in Japan **harukawai** Waterston

13 (4) Lateral lobes of mesonotum with at least the posterior two-thirds black

14 (15) First abdominal tergite and frequently the scutellum red. Hind tibial spurs slender, more than 5 times longer than their basal breadth. Large species, 9.5–10.5 mm long, with thorax above (except side lobes and front of fore lobes of mesonotum) and the whole abdomen yellow. (Dark colour variation: var. *aemulus* (Konow) has its whole thorax black.) Sawsheath in Fig. 115. 4th–6th serrulae in Fig. 48. – Sporadic European species **triplicatus** Klug

15 (14) Scutellum and 1st abdominal tergite black. Hind tibial spurs broadened basally so that they are only 3–4 times longer than their basal breadth

16 (17) Larger species, 11.0–13.0 mmm. Head and antennae black. Prothorax, tegulae, fore lobes of mesonotum red. The other parts of the thorax black. Sometimes the anterior half of the lateral lobes red. Head behind the eyes parallel. Clypeus triangulary excised. Mesonotum shining but densely, scutellum little less densely punctured, shining. Mesopleuron strongly and distinctly punctured. Wings infuscate. Apical setae of sawsheath are longer on the outer side and shorter on the inner side (Fig. 118). 4th–6th serrulae in Fig. 50. – Sporadic. Southern China **cameroni** Kirby

17 (16) Smaller species, 9.0–10.5 mm. Setae of sawsheath different

18 (19) Anterior part of the lateral lobes red (sometimes entirely red except where they meet). Sawsheath in dorsal aspect wide (more than twice the width of a cercus), with slightly curved lateral setae (Fig. 117). 9.0–10.5 mm. – Sporadic European species **anticus** Klug

19 (18) Lateral lobes of mesonotum entirely black. Sawsheath much narrower with almost straight lateral setae (Fig. 116). 9.0–10.0 mm. 4th–6th serrulae in Fig. 51. – Sporadic European species **ferrugatus** Lepeletier

20 (1) Abdomen with a red band. First and 7th–9th abdominal tergites black. Thorax entirely black

21 (22) Larger species, 10.0 mm. Body mainly black, abdominal tergites 3–6 and hind part of 2 red. Head above densely and roughly punctured. Mesonotum with

moderately dense puncture with shining interspaces. Scutellum densely, deeply and distinctly punctured, shining. Wings hyaline. Sawsheath in Fig. 119. 4th–6th serrulae in Fig. 52. – Rare species. Known only from Spain
rostii Konow

22 (21) Smaller species, 8.0–9.0 mm. Mostly black. Abdominal tergites 2–6 sometimes 7 red. Sawsheath in Fig. 87. – Rare. Known only from Tien Shan
vernus Zhelochovtsev

Table G

1 (24) Hind legs with tibia or femur marked with reddish yellow
2 (3) Pronotum extensively red. 7.0–8.0 mm. Penis valve in Fig. 131.
rufogeniculatus Zhelochovtsev
3 (2) Thorax black
4 (7) Head and wings with black (dark) pubescence
5 (6) Clypeus broadly emarginated. Larger species, 8.0–9.5 mm. Penis valve in Fig. 121.
kokujewi Konow
6 (5) Clypeus slightly emarginated. Smaller species, 5.0–6.5 mm. Penis valve in Fig. 122.
ciliatus Konow
7 (4) Pubescence on head never black, wings with silvery pubescence or without any black hairs
8 (9) Hind femur entirely red, hind tibia black, sometimes a narrow reddish yellow ring at the base. Penis valve in Fig. 123. 8.0–9.0 mm **liogaster** Thomson
9 (8) At least the basal 1/3 of hind femur black
10 (11) Fore tibiae and apex of fore knees always but sometimes all tibiae and apicex of all femora reddish yellow. Wings hyaline. 8.0–10.0 mm. Penis valve in Fig. 178.
ephippiatus Smith
11 (10) Legs differently coloured, penis valve different
12 (15) Hind femur red only at apex and tibia at base (i. e. hind knees red)
13 (14) Penis valve in Fig. 124. 8.0 mm **vernalis** Ermolenko
14 (13) Penis valve in Fig. 125. 9.0–10.0 mm **montivagus** Benson
15 (12) Apical 1/2–1/3 of hind femora and basal 1/2–1/4 of hind tibiae red
16 (17) Lateral lobes of mesonotum shining with sparse and very superficial punctures. Penis valve in Fig. 130. 8.0–9.0 mm **gonager** Fabricius
17 (16) Lateral lobes of mesonotum closely and relatively densely punctured. Four species. Their safe identification is possible by their penis valve structure
18 (19) Penis valve in Fig. 126. 8.0–9.0 mm **puncticollis** C. G. Thomson
19 (18) Penis valve different
20 (21) Penis valve in Fig. 127. 7.0–9.0 mm **subalatus** Kerenszky
21 (20) Penis valve different
22 (23) Penis valve in Fig. 128. 9.0–10.0 mm **albertii** Muche
23 (22) Penis valve in Fig. 129. 7.0–8.0 mm **hyrcanus** Benson
24 (1) Hind legs entirely black
25 (40) Thorax marked with red

26 (27) Only the pronotal edges and tegulae red. Penis valve in Fig. 171. 8.0–10.0 mm **haematodes** (Schrank)

27 (26) Mesonotum at least partly red

28 (29) Only the lateral lobes red. Penis valve in Fig. 132. 8.0–9.0 mm **albolineolatus** Haris et Blank

29 (28) Thorax more extensively coloured with red

30 (33) Upper 1/3 or 1/2 of mesopleuron coloured with red

31 (32) Prothorax, tegulae, upper 1/3 of mesopleuron, margins of median mesonotal lobes red. Penis valve in Fig. 133. 7.0–8.0 mm **shanghaiensis** Haris

32 (31) Pronotum, tegulae, mesopleuron coloured as those of *D. shanghaiensis* Haris, however, prescutum red with middle black spot. Penis valve in Fig. 208. 6.8–7.5 mm **sinensis** Wei

33 (30) Mesopleuron without red

34 (35) Pronotum, propleuron, tegulae, median lobes of mesonotum red. Penis valve in Fig. 134. 8.0–9.0 mm **tritici** Chu

35 (34) Differently coloured

36 (37) Pronotum and tegulae black, mesonotum red. Wings blackish infuscate. Mesonotum with golden, scutellum with black hairs. Wings with long cilia. Penis valve in Fig. 135. 8.0 mm **poecilomallosis** Wei

37 (36) Pronotum and tegulae red

38 (39) Smaller species, 6.0–7.0 mm. Pronotum, tegulae, mesonotum red. Penis valve in Fig. 145. **sanguinicollis** (Klug)

39 (38) Robust species, 10.0–12.0 mm. Prothorax, tegulae, mesonotum, upper margin of mesepisternum reddish brown. Penis valve in Fig. 199. **cameroni** Kirby

40 (25) Thorax without red markings

41 (44) Body with very shining bluish-green lustre

42 (43) Penis valve in Fig. 136. 6.0–7.5 mm **lewisii** Cameron

43 (42) Penis valve in Fig. 137. 6.0–7.5 mm **coreanus** Takeuchi

44 (41) Body matt, or strongly shining but never has strong bluish-green iridescence. Penis valve different

45 (74) Fore angle of penis valve with a little hook or a long projection directed downward (Figs 138–152)

46 (51) Fore angle of penis valve with a hook (Figs 138–140)

47 (48) Clypeus with the front margin sharply reflexed and with a rounded emargination to a depth of less than half the total length of the clypeus. Head and scutellum without shining interspaces between the fine dense punctures. Occipital furrow deep and clearly defined. 8th antennal segment about 3 times longer than its apical breadth. Penis valve in Fig. 138. 8.5–10 mm **megapterus** Cameron

48 (47) Clypeus almost flat, not reflexed

49 (50) Clypeus roundly excised to a depth of at least half of the total length of clypeus. Occipital furrows on head obsolete. 8th antennal segment about 4 times longer than its apical breadth. Penis valve in Fig. 139. 8.0–9.0 mm. **asper** Zaddach

50 (49) Clypeus sharply and triangulary excised not deeper than half of its total length. Occipital furrows deep and clearly defined. Penis valve in Fig. 140. 8.0–9.0 mm **docilus** Benson

51 (46) Fore angle of penis valve with projection directed downward (Figs 141–152)

52 (53) Wings infuscate. Penis valve in Fig. 141. 8.0–9.0 mm. – Female unknown. Sporadic. Caucasus **dathei** Muche

53 (52) Wings hyaline

54 (55) Head including the face beneath the antennae clothed with dark or sooty hairs. Head usually metallic blue-black and the whole body with metallic reflections. 3rd tergite with large hair-patch extending over its middle third. Wings sub-infuscate. Penis valve in Fig. 142. 8.5–10.0 mm **anthracinus** (Klug)

55 (54) Head with whitish or greyish-white hairs

56 (59) Large species, 10.0 mm or more

57 (58) 8th tergite with a large subtriangular glabrous and unpunctured area wide behind, where it occupies about one-third of the hind margin of the segment and narrowing in front. Penis valve in Fig. 143. 10.0–11.0 mm **niger** (Linné)

58 (57) 8th tergite without any subtriangular glabrous area. Penis valve in Fig. 144. 9.0–10.0 mm **vulneratus** Mocsáry

59 (56) Smaller species, less than 10 mm

60 (63) The pale membraneous part of the 8th tergite small, lunulate or subtriangular, but not reaching back to the middle of the segment. Smaller species (6.0–7.0 mm). Mesonotum shining, finely punctured. Head strongly narrowed behind the eyes with occipital furrows strong. Two similar species

61 (62) Penis valve in Fig. 145 **sanguinicollis** (Klug)

62 (61) Penis valve in Fig. 146 **fumosus** Stephens

63 (60) 8th tergite of abdomen without any white lunulate or subtriangular area

64 (69) Hind angle of penis valve acute or upper edge with excision (Figs 147–148, 152)

65 (66) Upper edge of penis valve with an excision. Penis valve in Fig. 148. 8.0–9.5 mm **yokohamensis** Rohwer

66 (65) Hind angle of penis valve acute without an excision (two species)

67 (68) Penis valve in Fig. 147. 8.0–9.0 mm **alpinus** Benson

68 (67) Penis valve in Fig. 152. 9.4 mm. – Female unknown. Only the holotype is known. Possible male of *Dolerus affinis* Cameron. **dentipennis** Wei et Nie

69 (64) Hind angle of penis valve rounded, upper edge without any excision (Figs 149–151, 153–177)

70 (71) Matt species. Abdominal tergites 4–7 densely clothed with pubescence. Penis valve in Fig. 151. 8.0–9.0 mm **picipes** (Klug)

71 (70) Shining species with slight metallic lustre

72 (73) Larger species, 8.5–9.5 mm. Penis valve in Fig. 149 **nitens** Zaddach

73 (72) Smaller species, 7.5 mm. Penis valve in Fig. 150. – Female unknown. Only known from Spain **ibericus** Chevin

74 (45) Fore angle of penis valve without a little hook or a long projection directed downward (Figs 153–178)

75 (102) Dorsal and ventral edges of penis valve subparallel, the shape of penis valve subrectangular (Figs 153–169)
76 (85) Lower edge of penis valve concave (Figs 153–157)
77 (78) Abdomen with a red crossband. Penis valve in Fig. 153 **vernus** Zhelochovtsev
78 (77) Abdomen black (four species)
79 (80) Head behind the eyes strongly contracted. 7.0–8.0 mm. Penis valve in Fig. 157 **hibernicus** Lacourt
80 (79) Head behind the eyes moderately or not contracted (three species).
81 (82) Length 8.5–9.5 mm. Penis valve in Fig. 154 **nubilus** Müller
82 (81) Penis valve different.
83 (84) Length 8.5–9.5 mm. Penis valve in Fig. 155 **frigidus** Benson
84 (83) Length 9.5– 10.5 mm. Penis valve in Fig. 156 **chevini** Lacourt
85 (76) Lower edge of penis valve never concave (Figs 158–169)
86 (89) Penis valve without thorn (two species). (Figs 158–159)
87 (88) Hypopygium rounded apically. 8.0–9.0 mm. Penis valve in Fig. 158 **harwoodii** Benson
88 (87) Hypopygium truncated apically. 8.0 mm. Penis valve in Fig.159 **truncatus** Lacourt
89 (86) Penis valve with a thorn (Figs 160–169)
90 (91) Penis valve with a ventral and a dorsal thorn. Penis valves in Figs 161–163. (*Dolerus phalipi* Chevin is a probable synonym of this species, penis valve in Fig. 160. This species needs further study.) **salamanticensis** Vigil
91 (90) Penis valve either with a ventral or a dorsal thorn (Figs 164–166)
92 (97) Penis valve with a dorsal thorn only (three species). (Figs 167–169)
93 (94) Length 8.0–10.0 mm. Penis valve in Fig. 167 **manticatus** Konow
94 (93) Penis valve different.
95 (96) Length 8.5–10.0 mm. Penis valve in Fig. 168 **bensoni** Müller
96 (95) Length 8.0–10.0 mm. Penis valve in Fig. 169 **novogablenovi** Malaise
97 (92) Penis valve with a ventral thorn only (Figs 164–166)
98 (99) Slender, elongated species. Head behind the eyes strongly contracted. 6.0–10.0 mm. Penis valve in Fig. 164 **aeneus** Hartig
99 (98) More stout insects (two species)
100 (101) Length 7.5–8.0 mm. Penis valve in Fig. 165 **altivolus** Lacourt
101 (100) Length 8.0–9.0 mm. Penis valve in Fig. 166 **varispinus** Hartig
102 (75) Penis valve wide, more or less rounded, never subrectangular (Figs 170–177)
103 (104) known. Rare. Known only from Hungary **nigrominutus** Haris
108 (107) Larger species. Penis valve different
109 (110) Abdomen with dense pubescence which is about 1.5 times longer than diameter of front ocellus. Penis valve in Fig. 173. 8.0 mm. – Female unknown. Rare. Known only from Italy **romanus** Benson
110 (109) Abdomen without dense pubescence (four species)
111 (112) Penis valve in Fig. 174. 8.0–10.5 mm **thoracicus** (Fallén)
112 (111) Penis valve different

113 (114) Penis valve in Fig. 175. 7.5–9.0 mm **nonultimus** Zhelochovtsev
114 (113) Penis valve different
115 (116) Penis valve in Fig. 176. 6.5 mm. (This name is a junior homonym of *D. shanghaiensis* Haris, see Notes) **shanghaiensis** Wei
116 (115) Abdominal tergite 8 with large subtriangular glabrous and unpunctured area. Clypeus slightly emarginated to a depth at most one-third of its total length. Penis valve in Fig. 177. 9.0–10.0 mm **gibbosus** Hartig

Table H

1 (14) Abdomen at least from the 4th tergite on with general coriaceous sculpture usually strong, but very fine in *D. yukonensis* Norton
2 (7) Mainly black insects
3 (4) Larger, robust species, 10.0–12.0 mm. Thorax, mouthparts, legs richly coloured with brownish-yellow spots **variator** Enslin
4 (3) Body entirely black
5 (6) Middle and the fore lobes of mesonotum as well as the middle of the scutellum covered each with a large shining impunctate or feebly punctate area. Penis valve as in Fig. 179. 8.0–9.5 mm **pachycerus** Hartig
6 (5) Entirely black except the front and middle knees. Head contracted behind the eyes in dorsal aspect. Larger species: 9.0 – 10.0 mm. Penis valve as in Fig. 180. (Black colour variation rarely occurs in *D. pratensis* (Linné) and *D. yukonensis* Norton, if so check penis valve: Figs 182–183.) **gessneri** Ed. André
7 (2) Abdomen with a red crossband
8 (9) Scutellum very densely, irregularly and coarsely punctured all over, the coarser punctures much larger than those in the middle of the lateral lobes of mesonotum; and on these lobes too the punctures are very irregular, often confluent at the sides and coarser in the middle, where they are widely separated. Penis valve in Fig. 181. 8.0–10.0 mm **bimaculatus** (Geoffroy)
9 (8) Scutellum with regular punctures thinning out in front, where there are shining interspaces. In size, the punctures are scacerly larger than those in the middle of the mesonotal lobes. On the lateral lobes of the mesonotum, the punctures are small, more evenly spread and separated from each other
10 (11) Smaller species, 6.5–8.0 mm. Wings hyaline throughout. Abdomen with shining areas between the patches of fine surface sculpture without definite coarse punctures on the first and following tergites. Penis valve in Fig. 182 **yukonensis** Norton
11 (10) Larger species, 10.0–11.0 mm
12 (13) Very variable in colour. Usually red-girdled and with all legs marked with red, but if the abdomen is entirely black then the legs are also. Head not contracted behind the eyes in dorsal view. Penis valve in Fig. 183 **pratensis** (Linné)
13 (12) Smaller species, 9.0–10.0 mm. Head contracted behind the eyes in dorsal aspect. Penis valve in Fig. 180. (Red colour variation the former var. *labiosus* (Konow).) **gessneri** Ed. André

14 (1) Abdomen from the on 2nd and 3rd tergites on smooth and shining without surface sculpture visible at 45 times magnification

15 (56) Legs with at least the front knees red or rarely yellowish-brown

16 (27) Abdomen black sometimes with reddish-brown shadow

17 (18) Smaller species, 6.5 mm. Labrum, tegulae, four anterior knees and anterior tibiae yellowish-brown. Body black. Clypeus deeply emarginated. Mesonotum poorly shining, punctures little sparser on the middle parts of the lobes. Scutellum rugose, metascutellum with coarse punctures **sachalinensis** Takeuchi

18 (17) Larger species, pale parts of the body not yellowish-brown

19 (20) Tegulae and for knees red. Body black, middle of abdominal tergites with reddish-brown shadow. Penis valve in Fig. 192. 7.0–8.0 mm **scoticus** Cameron

20 (19) Tegulae black.

21 (22) Body entirely black, including legs. Penis valve in Fig. 184 **laevigatus** Hellén

22 (21) At least the legs with red markings

23 (24) Smaller species, 7.0–8.0 mm. Body black, only fore tibia and fore knee red. Wings infuscated. Penis valve in Fig. 198 **japonicus** (Kirby)

24 (23) Larger species, 9.0–11.0 mm. Wings hyaline

25 (26) Body black, apices of fore femora, fore tibiae entirely and middle knees red. Vertex roughly and densely punctured, temples roughly punctured with shining interspaces, about 2–4 times as large as a puncture. Mesonotum densely and uniformly punctured. Penis valve in Fig. 197. 9.0–9.5 mm **armillatus** Konow

26 (25) Body black, fore and middle legs coloured with dark reddish-brown. 9.0–11.0 mm. Penis valve similar to that of *D. gessneri* Ed. André, however, its dorsal margin convex (not straight) and ventral margin straight (not concave). (Black colour variation the former *D. picinus* Marlat) **subfasciatus** Smith

27 (16) Abdomen entirely or partly red

28 (29) Basal 1/4 of costa mainly yellow. Head and thorax black, tegulae red. First and apical segments black, 2nd–6th red. Penis valve in Fig. 185. 9.0–10.0 mm **lucidus** Freymuth

29 (28) Costa entirely or nearly entirely black

30 (49) Hind tibiae dominantly black

31 (34) Smaller species, 5.0–6.5 mm

32 (33) The smallest *Dolerus* species, 5.0–6.0 mm. Head and thorax black. 2nd–5th abdominal segments red. Red segments with black spots, especially on the lateral side of the last red segments. Clypeus emarginated to one-third of its median length. Penis valve in Fig. 186 **elderi** Kincaid

33 (32) Somewhat bigger species, 5.5–6.5 mm. Red abdominal segments without black spots. Clypeal emargination about half as long as its median length. Penis valve in Fig. 187 **subarcticus** Hellén

34 (31) Larger species, 7.0–11.0 mm

35 (36) Mesonotum partly red. Sometimes entirely red, or with more or less extensive black spots on lateral and fore lobes. Red spots may occur on mesopleuron. First and apical segments of abdomen black. Wings infuscate. Penis valve in Fig. 188. 8.0–9.0 mm **lepidus** Konow

36 (35) Mesonotum entirely black

37 (46) Wings infuscate. Head, mainly the thorax, first and apical segments of abdomen black

38 (39) Hind femur and tibia are partly red. Head dilated behind the eyes. Penis valve similar to that of *D. germanicus* (Fabricius) (Fig. 189) **melanopterus** Konow

39 (38) Hind legs always black

40 (41) Smaller species, 7.0–8.0 mm. 3rd–4th tergites red. Wings infuscate. Penis valve in Fig. 198 **japonicus** (Kirby)

41 (40) Larger species, 7.0–11.0 mm. 2nd–6th or 2nd–5th tergites red

42 (43) Length 9.0–11.0 mm. Hind legs black. Head contracted behind the eyes. Penis valve in Fig. 191 **rugosus** Freymuth

43 (42) Length 7.0–9.0 mm

44 (45) Penis valve in Fig. 189 **germanicus** (Fabricius)

45 (44) Penis valve in Fig. 190 **pakistanicus** Muche

46 (37) Wings hyaline. Head, thorax, first and apical abdominal segments black

47 (48) Head in dorsal view behind the eyes sligthly converge. Penis valve in Fig. 193 **grombczewskii** Jakovlev

48 (47) Head in dorsal view behind the eyes strongly converging. Penis valve similar to that of *D. gessneri* Ed. André, however, its dorsal margin convex (not straight) and ventral margin straight (not concave). 9.0–11.0 mm **subfasciatus** Smith

49 (30) Middle and hind tibiae entirely or at least mostly red

50 (53) Antenna short, much shorter than abdomen. Wings hyaline. Apical third of hind tibia mostly black

51 (52) Penis valve with a hook. Fig. 194. 7.0 mm **kamimurai** Togashi

52 (51) Penis valve rounded. Fig. 195. 6.0–7.0 mm **aericeps** C. G. Thomson.

53 (50) Antenna longer, nearly as long as abdomen

54 (55) Hind tibia red. Penis valve similar to that of *D. germanicus* (Fabricius) (Fig. 189) 7.5–9.0 mm **etruscus** (Klug)

55 (54) Hind tibia piceous or brown along the whole length of its inner or lower side. Penis valve in Fig. 196. 7.0–8.0 mm **cothurnatus** Lepeletier

56 (15) Legs entirely black

57 (64) Abdomen entirely black (four species)

58 (59) Robust species, 10.0–12.0 mm. The whole body black. Sometimes the mesonotum marked with red. Penis valve in Fig. 199 **cameroni** Kirby

59 (58) Smaller species. Penis valve different. (*D. laevigatus* Hellén may run here, so check also couplet 21 (22))

60 (61) Antenna distinctly longer than the abdomen and very slender, with segment 8 more than 4 times longer than the basal breadth. Head in dorsal view clearly but moderately strongly narrowed. Thorax without red spots. Occipital furrows reduced, very short. The red girdle on the abdomen of this species is often reduced or obsolete. (Entirely black forms sometimes occur, the former var. *unicinctus* Enslin.) Penis valve in Fig. 201. 9.0–10.0 mm **madidus** (Klug)

61 (60) Antenna at most about as long as the abdomen; segment 8 at most little more than 3 times longer than broad

62 (63) Head in dorsal view very strongly narrowed behind the eyes. Body black with red spots on the mesopleuron, mesoscutellum and mesonotum. 9.0–10 mm **harukawai** Waterstone

63 (62) Head clearly but not so strongly contracted. Thorax entirely black. (Black colour variation the former var. *miricolor* Konow.) Penis valve in Fig. 200. 8.5–10.0 mm **ferrugatus** Lepeletier

64 (57) Thorax frequently but abdomen always more or less red

65 (70) Abdomen without any black on the apical tergites

66 (67) Mesonotum densely and finely punctured. Thorax entirely black. In some specimens, fore lobes of mesonotum and scutellum extensively red. Penis valve in Fig. 202. 9.5–10.5 mm **triplicatus** (Klug)

67 (66) Mesonotum more sporadically punctured with shining interspaces (two species)

68 (69) Mesonotum and tegula red. 10 mm. Penis valve in Fig. 209 **hispanicus** Mocsáry

69 (68) Thorax entirely black. 9.0–10.0 mm. Penis valve in Fig. 203 **murcius** Konow

70 (65) Abdomen with some of the apical tergites black

71 (78) Antenna distinctly longer than abdomen and very slender, with segment 8 more than 4 times longer than its basal breadth

72 (73) Head in dorsal view behind the eyes strongly narrowed. Occipital furrows reduced, very short. Abdominal segments 2–6 red which is sometimes reduced. Penis valve in Fig. 201. 9.0–10.0 mm **madidus** (Klug)

73 (72) Head behind the eyes parallel or very slightly dilated. Occipital furrows well developed

74 (75) Length 9.0–10.0 mm. Penis valve in Fig. 206 **schultessi** Konow

75 (74) Penis valve different

76 (77) Temple shorter. Length of the eye in dorsal : length of the temple in dorsal = 1.4 : 1.0. 9.0–10.5 mm. Penis valve in Fig. 204 **uliginosus** (Klug)

77 (76) Temple longer. Length of the eye in dorsal : length of the temple in dorsal = 1.0 : 1.0. 9.0–10.0 mm. Penis valve in Fig. 153 **vernus** Zhelochovtsev

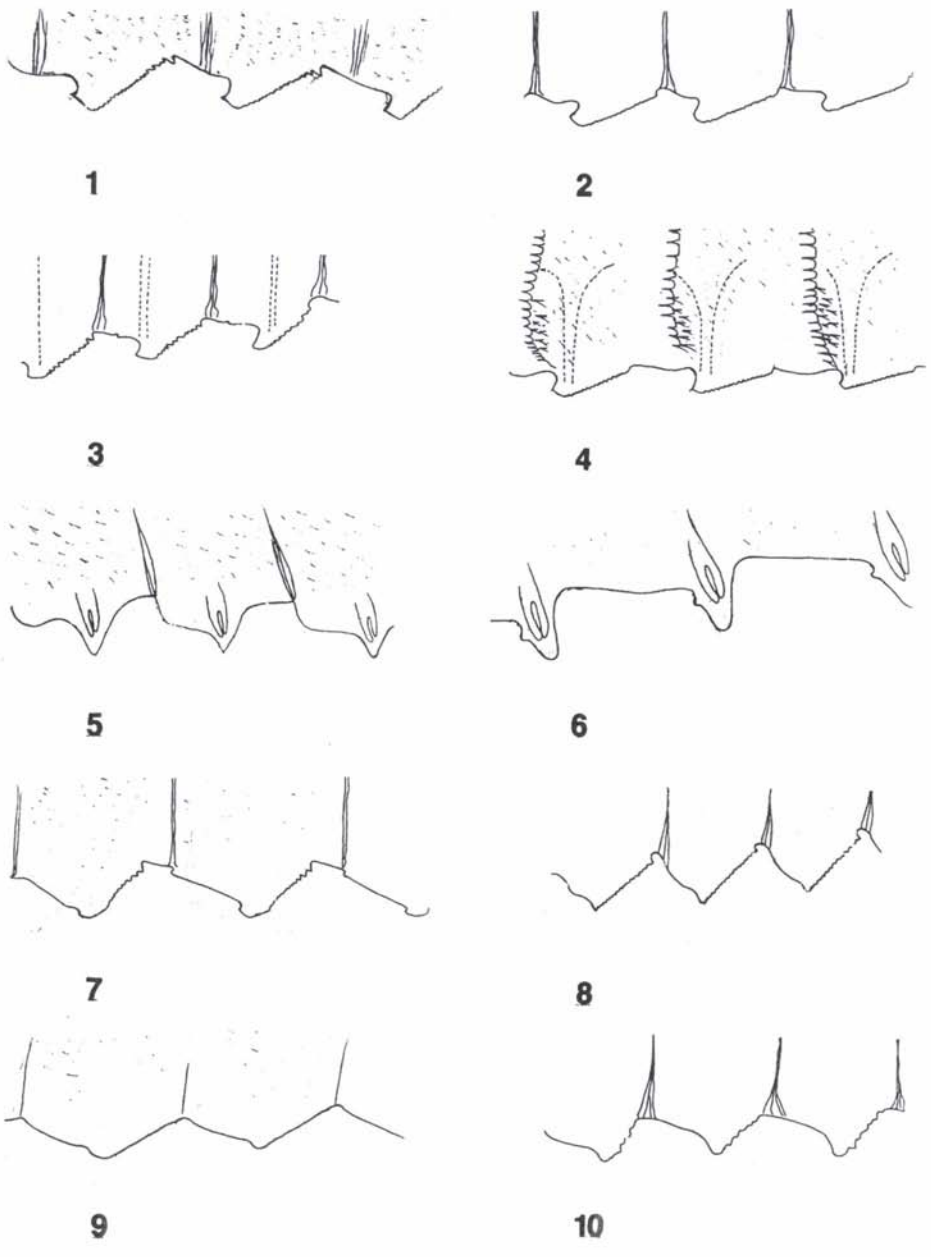
78 (71) Antenna at most about as long as the abdomen; segment 8 at most little more than 3 times longer than broad

79 (80) Antenna usually short and stout; segment 8 scacerly twice as long as its basal breadth. Wings slightly infuscate. Abdomen with red girdle, but the 2nd tergite always has either a dark spot on each side of the middle line or a dark mark right across it. Penis valve in Fig. 205. 8.5–10.0 mm **anticus** Klug

80 (79) Antenna longer and less robust; segment 8 about 3 times longer than its basal breadth. Wings subhyaline. Abdomen normally with red girdle covering the 2nd tergite which has no dark spot, though the red girdle is sometimes more or less obsolete. 2 species

81 (82) Length 8.5–10.0 mm. Penis valve in Fig. 200 **ferrugatus** Lepeletier

82 (81) Length 8.5 mm. Penis valve in Fig. 207 **rosti** Konow



Figs 1–10. 4th–6th serrulae of *Dolerus* (original) — 1: *D. liogaster* C. G. Thomson, 2: *D. punctiicollis* C. G. Thomson, 3: *D. gonager* (Fabricius), 4: *D. rufogeniculatus* Zhelochovtsev, 5: *D. hordei* Rohwer, 6: *D. lewisii* Cameron, 7: *D. ephippiatus* Smith, 8: *D. sanguinicollis* (Klug), 9: *D. affinis* Cameron, 10: *D. haematodes* (Schrank)

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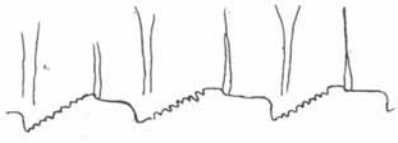

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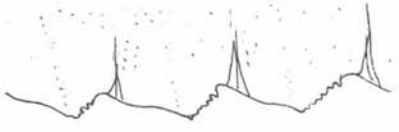

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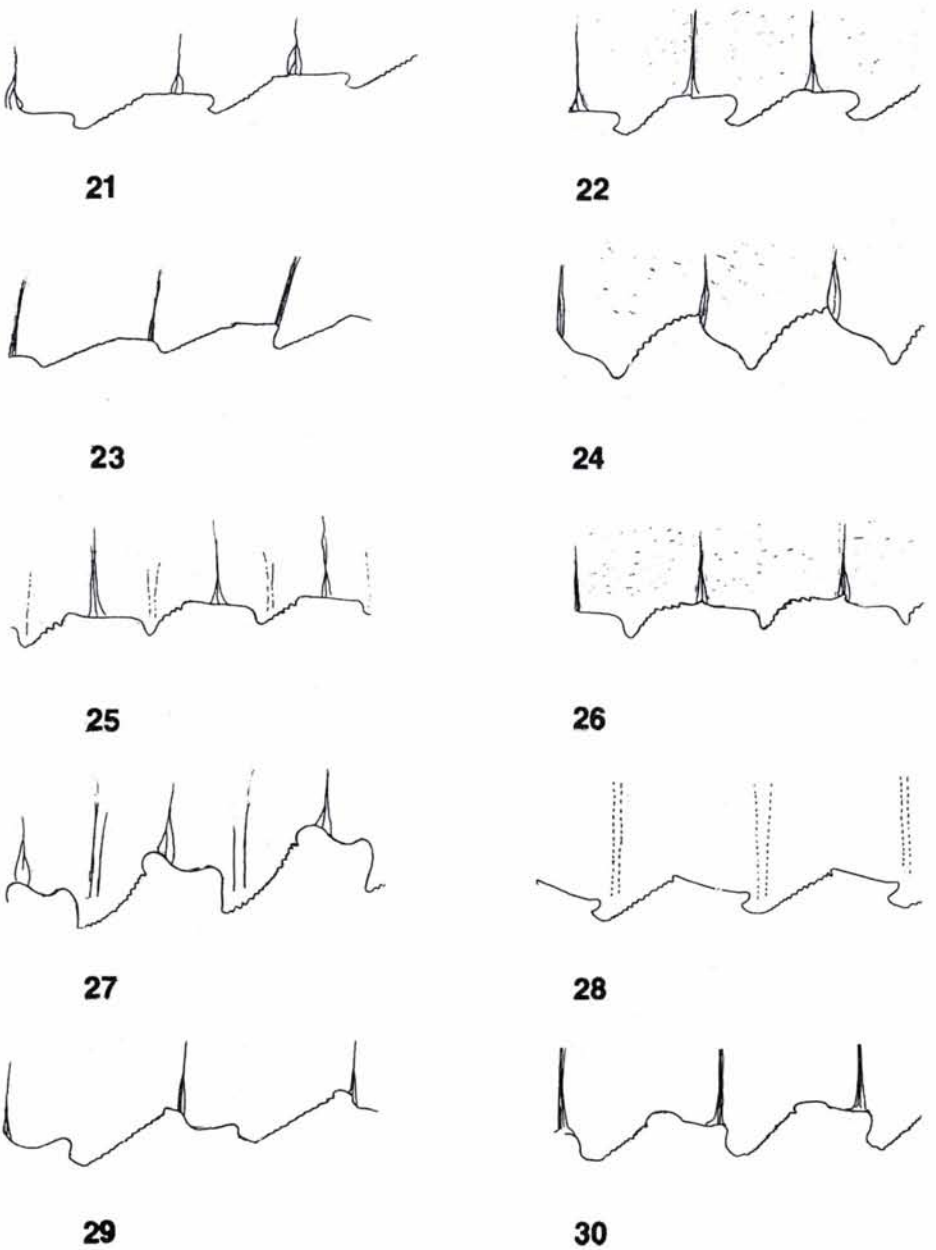
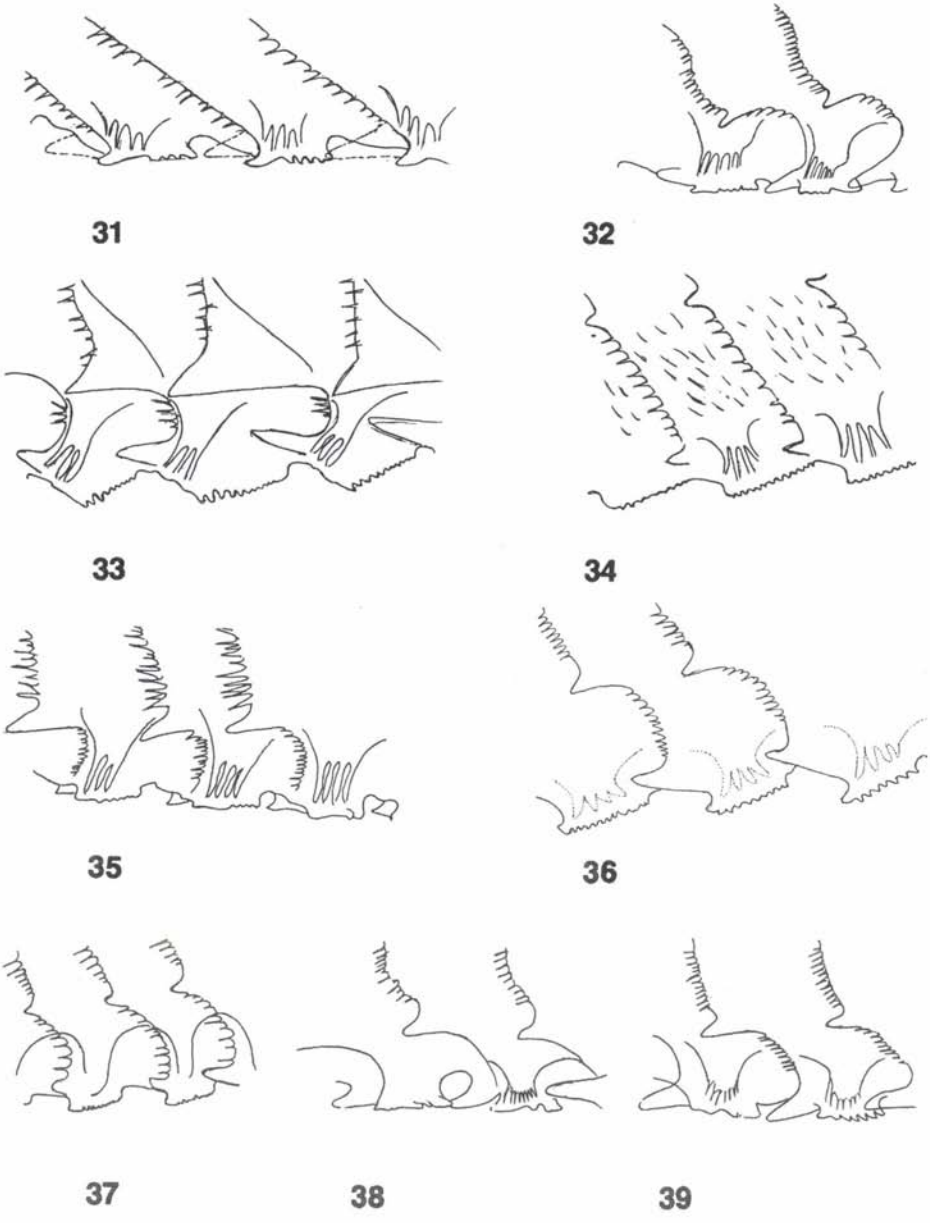
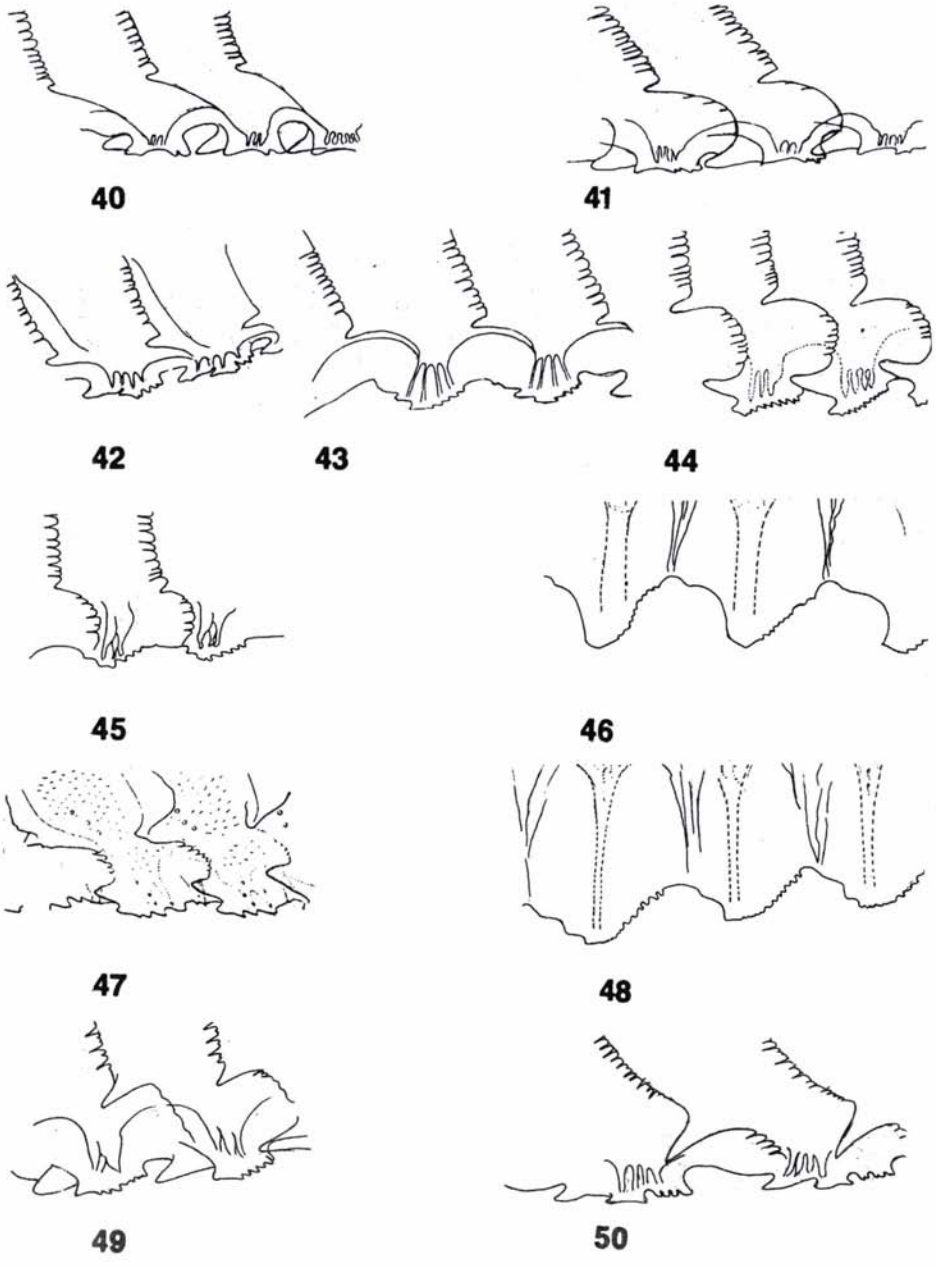
Figs 11–20. 4th–5th (6th) serrulae of *Dolerus* (original) — 11: *D. yokohamensis* Rohwer, 12: *D. manticatus* Konow, 13: *D. shanghaiensis* Haris, 14: *D. megapterus* Cameron, 15: *D. harwoodi* Benson, 16: *D. hibernicus* Lacourt, 17: *D. asper* Zaddach, 18: *D. nonultimus* Zhelochovtsev, 19: *D. nitens* Zaddach, 20: *D. frigidus* Benson



Figs 21–30. 4th–5th (6th) serrulae of *Dolerus* (original) — 21: *D. possilensis* Cameron, 22: *D. alpinus* Benson, 23: *D. niger* (Linné), 24: *D. aeneus* Hartig, 25: *D. coracinus* (Klug), 26: *D. anthracinus* (Klug), 27: *D. picipes* (Klug), 28: *D. nigratus* (O. F. Müller), 29: *D. novograblenovi* Malaise, 30: *D. varispinus* Hartig



Figs 31–39. 4th–5th (6th) serrulae of *Dolerus* (original) — 31: *D. bimaculatus* (Geoffroy), 32: *D. yukonensis* Norton, 33: *D. gessneri* Ed. André, 34: *D. pratensis* (Linné), 35: *D. variegatus* Jakovlev, 36: *D. subfasciatus* Smith, 37: *D. purus* Jakovlev, 38: *D. rugosus* Freymuth, 39: *D. lepidus* Konow



Figs 40–50. 4th–5th (6th) serrulae of *Dolerus* (original) — 40: *D. germanicus* (Fabricius), 41: *D. etruscus* (Klug), 42: *D. aericeps* C. G. Thomson, 43: *D. elderi* Kincaid, 44: *D. grombczewskii* Jakovlev, 45: *D. cothurnatus* Lepeletier, 46: *D. madidus* (Klug), 47: 3rd–4th serrulae of *D. harukawai* Waterston, 48: *D. triplicatus* (Klug), 49: *D. murcius* Konow, 50: *D. cameroni* Kirby

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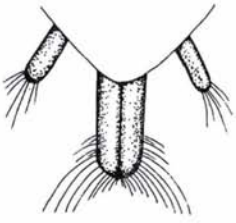

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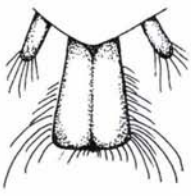

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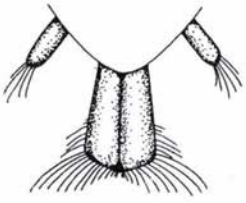

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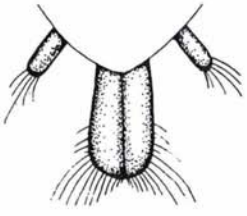

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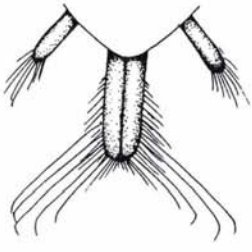

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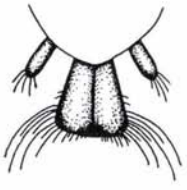

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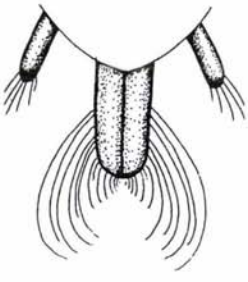

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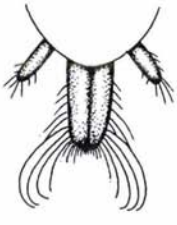

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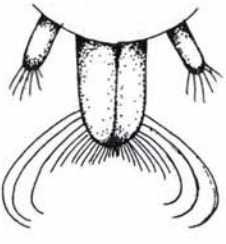

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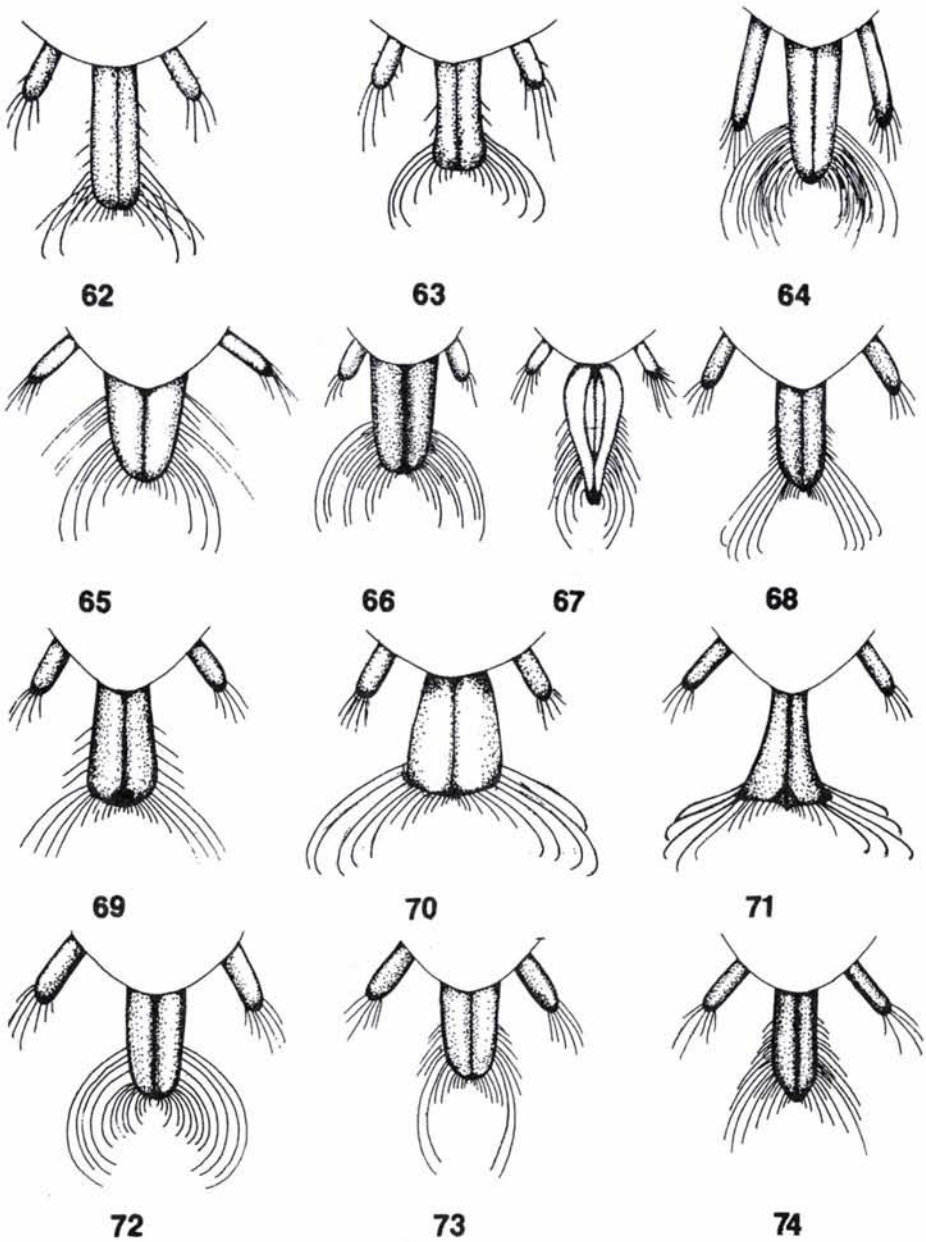
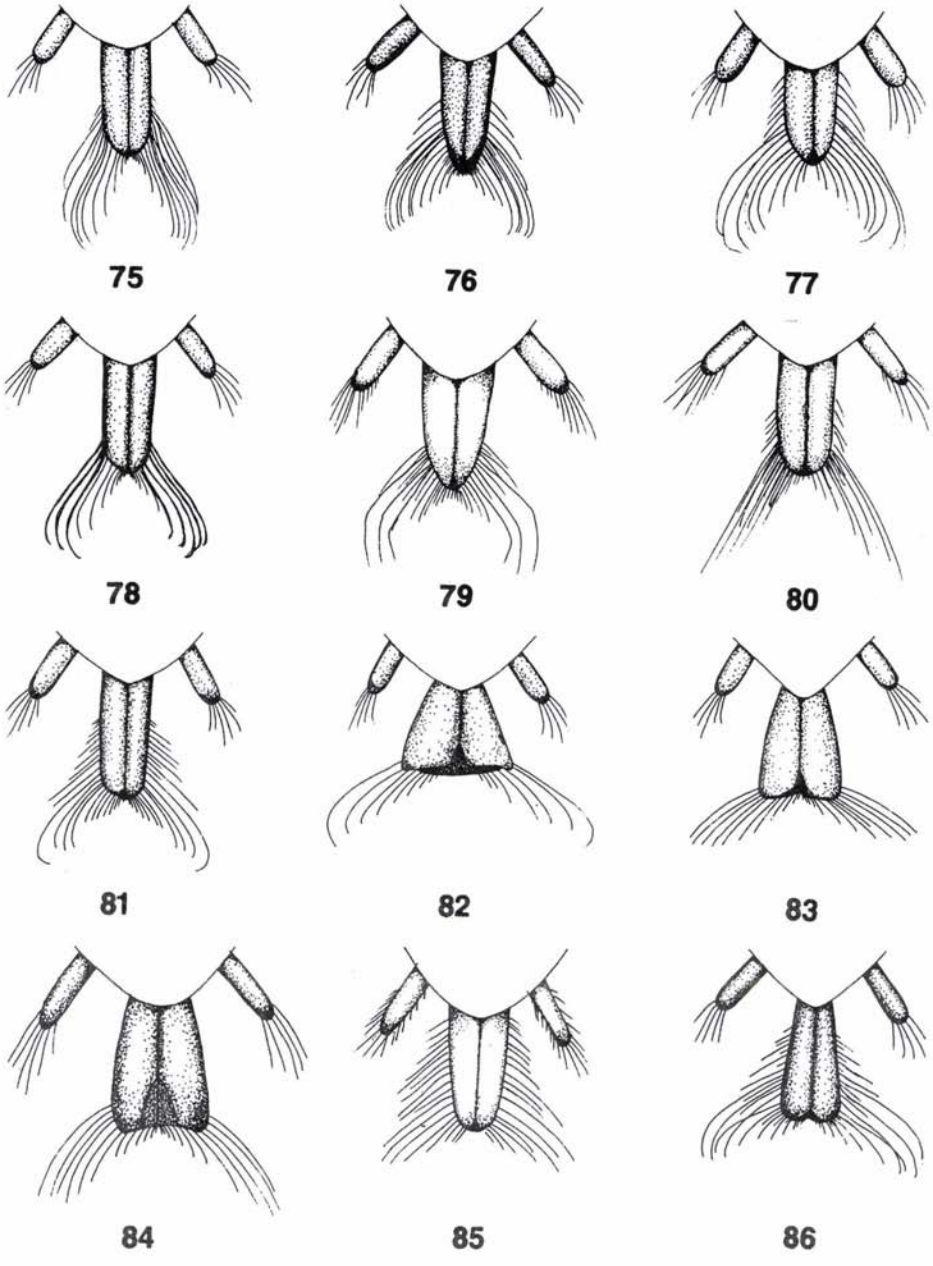
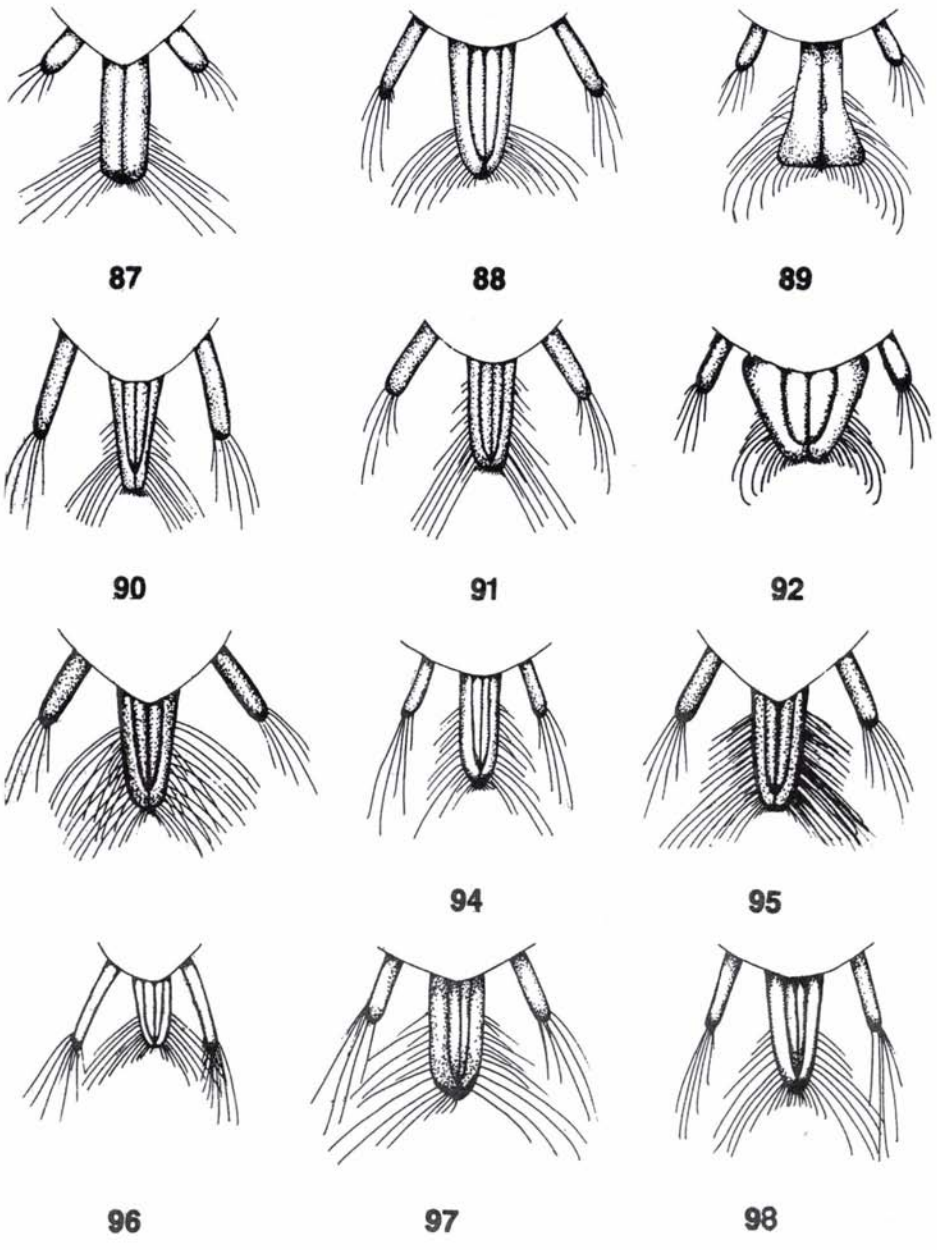
Figs 51–52. 4th–5th serrulae of *Dolerus* (original); Figs 53–61. Sawsheath of *Dolerus* in dorsal view (original) — 51: *D. ferrugatus* Lepeletier, 52: *D. rosti* Kono, 53: *D. liogaster* C. G. Thomson, 54: *D. vernalis* Ermolenko, 55: *D. puncticollis* C. G. Thomson, 56: *D. gonager* (Fabricius), 57: *D. alberti* Muche, 58: *D. shanghaiensis* Haris, 59: *D. lewisii* Cameron, 60: *D. ephippiatus* Smith, 61: *D. sanguinicollis* (Klug)



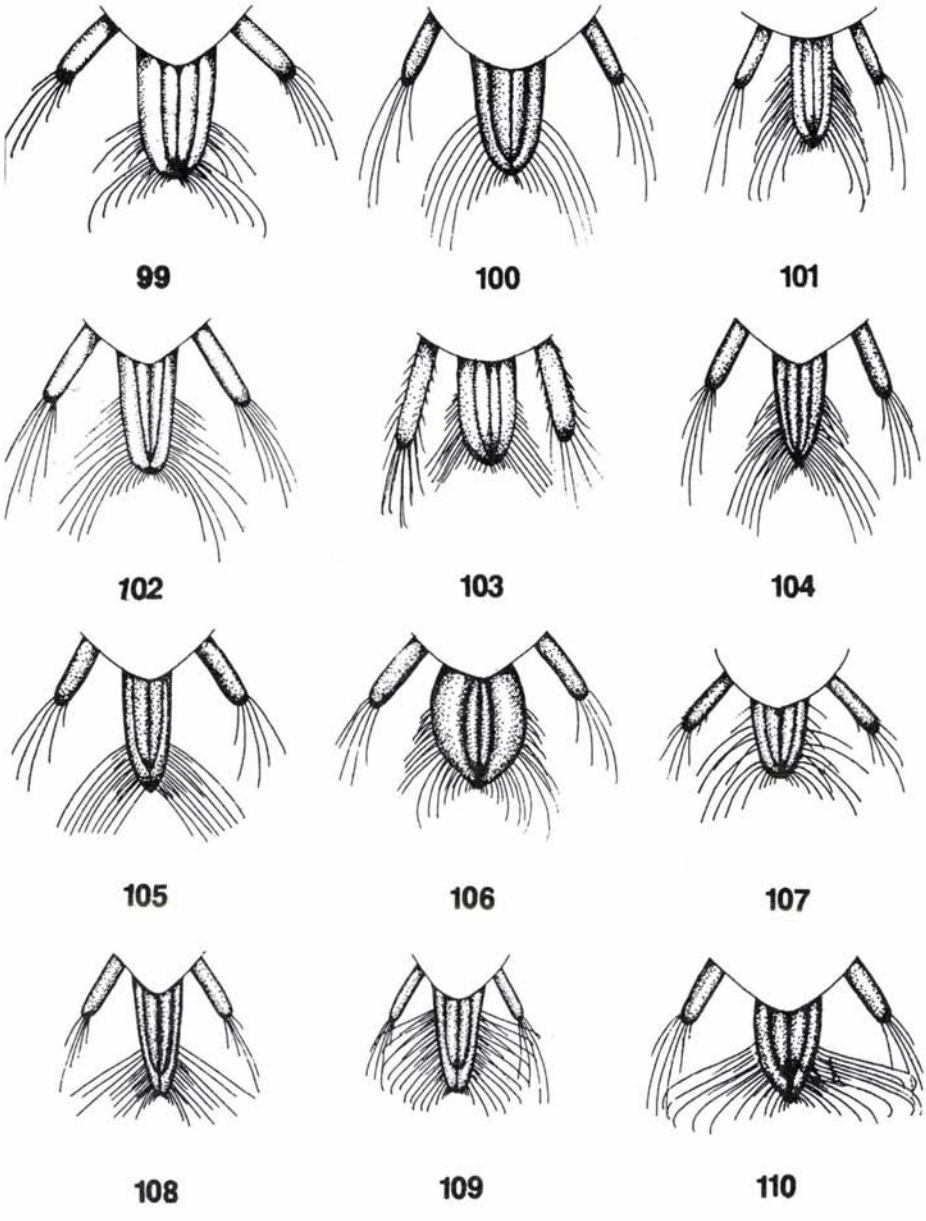
Figs 62–74. Sawsheath of *Dolerus* in dorsal view (original) — 62: *D. rufogeniculatus* Zhelochovtsev, 63: *D. samarkandicus* Haris, 64: *D. longicerus* Wei et Nie, 65: *D. haematodes* (Schrank), 66: *D. albolineolatus* Haris et Blank, 67: *D. poecilomallosis* Wei, 68: *D. vulneratus* Mocsáry, 69: *D. manticatus* Konow, 70: *D. schneideri* Kiaer, 71: *D. tritici* Chu, 72: *D. megapterus* Cameron, 73: *D. asper* Zaddach, 74: *D. hibernicus* Lacourt



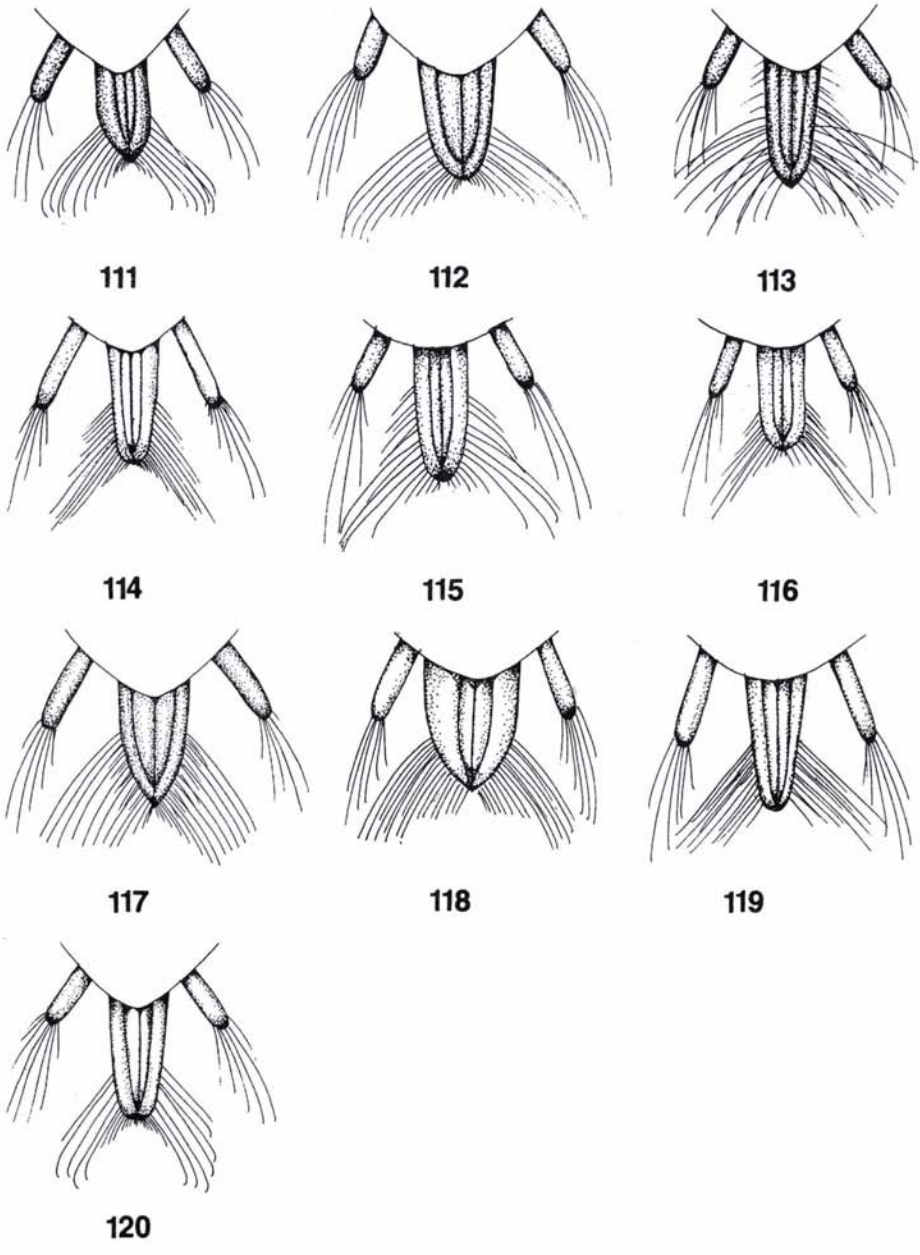
Figs 75–86. Sawsheath of *Dolerus* in dorsal view (original) — 75: *D. anthracinus* (Klug), 76: *D. chevini* Lacourt, 77: *D. altivolus* Lacourt, 78: *D. possilensis* Cameron, 79: *D. salmanticensis* Llorente Vigil, 80: *D. niger* (Linné), 81: *D. aeneus* Hartig, 82: *D. picipes* (Klug), 83: *D. nigratus* (O. F. Müller), 84: *D. novograblenovi* Malaise, 85: *D. montjoinensis* Lacourt, 86: *D. varispinus* Hartig



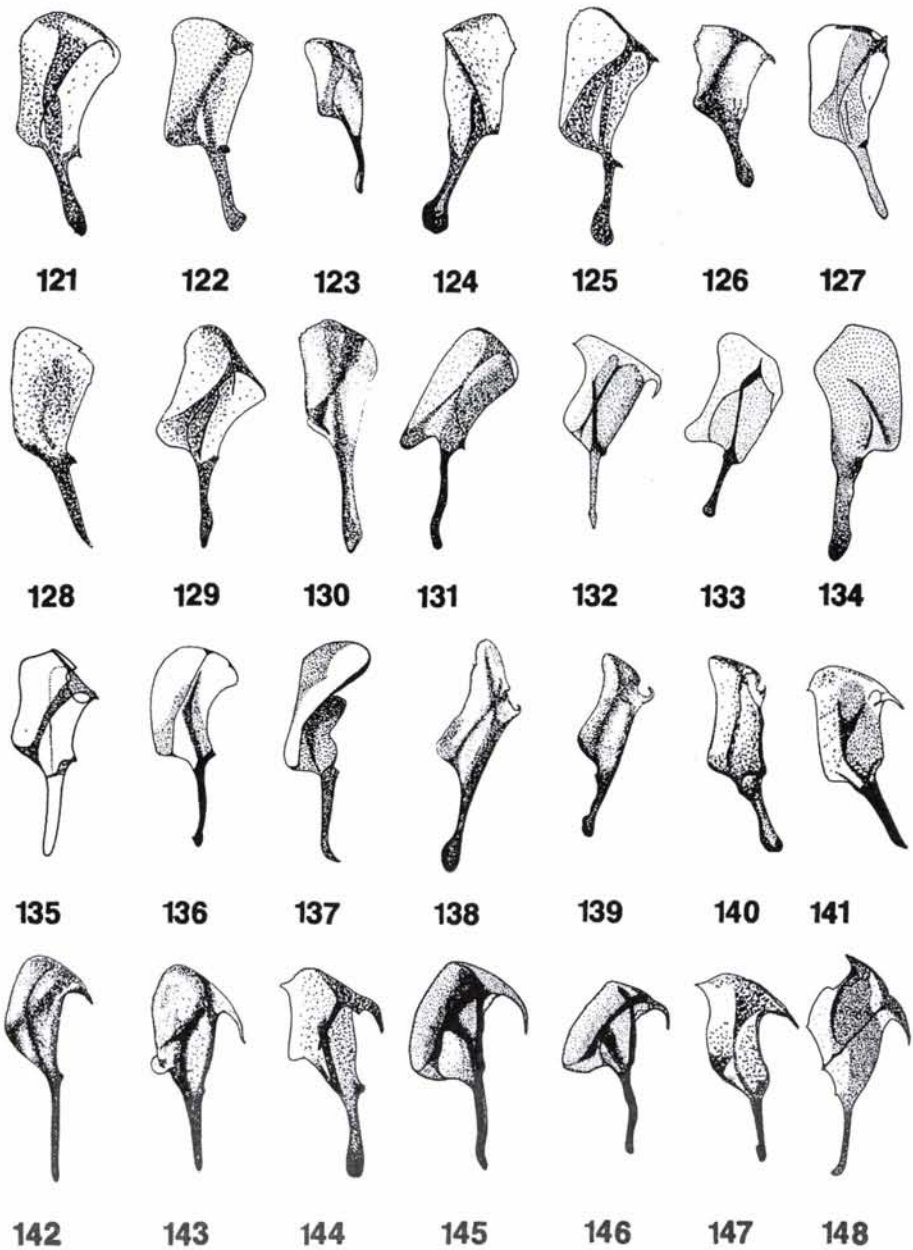
Figs 87–98. Sawsheath of *Dolerus* in dorsal view (original) — 87: *D. vernus* Zhelochovtsev 88: *D. variator* Enslin, 89: *D. hyrcanus* Benson, 90: *D. klutchianus* Malaise, 91: *D. variegatus* Jakovlev, 92: *D. afghanicus* Haris, 93: *D. bimaculatus* (Geoffroy), 94: *D. gessneri* Ed. André, 95: *D. pratensis* (Linné), 96: *D. pachycerus* Hartig, 97: *D. scoticus* Cameron, 98: *D. subfasciatus* Smith



Figs 99–110. Sawsheath of *Dolerus* in dorsal view (original) — 99: *D. kamimurai* Togashi, 100: *D. purus* Jakovlev, 101: *D. subarcticus* Hellén, 102: *D. lucidus* Freymuth, 103: *D. laevigatus* Hellén, 104: *D. germanicus* (Fabricius), 105: *D. rugosus* Freymuth, 106: *D. pakistanicus* Muche, 107: *D. hispanicus* Mocsáry, 108: *D. pseudojaponicus* Haris et Blank, 109: *D. japonicus* Kirby, 110: *D. aericeps* C. G. Thomson



Figs 111–120. Sawsheath of *Dolerus* in dorsal view (original) — 111: *D. elderi* Kincaid, 112: *D. grombczewskii* Jakovlev, 113: *D. armillatus* Konow, 114: *D. madidus* (Klug), 115: *D. triplicatus* (Klug), 116: *D. ferrugatus* Lepeletier, 117: *D. anticus* (Klug), 118: *D. cameroni* Kirby, 119: *D. rosti* Konow, 120: *D. harukawai* Waterston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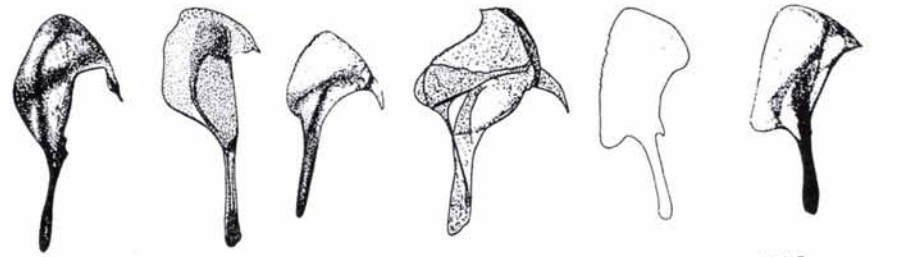

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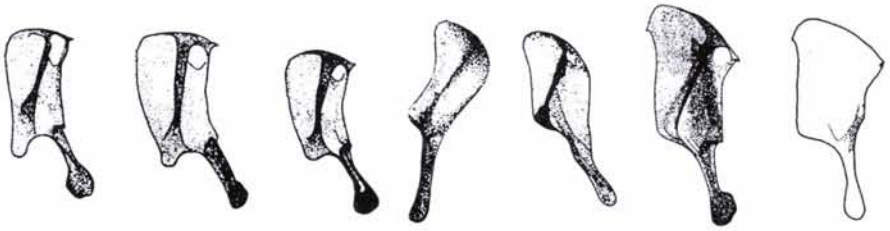

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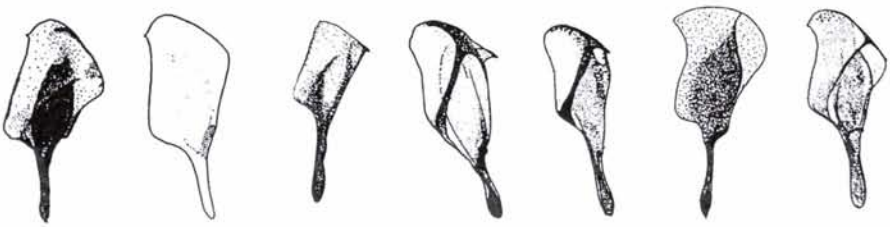

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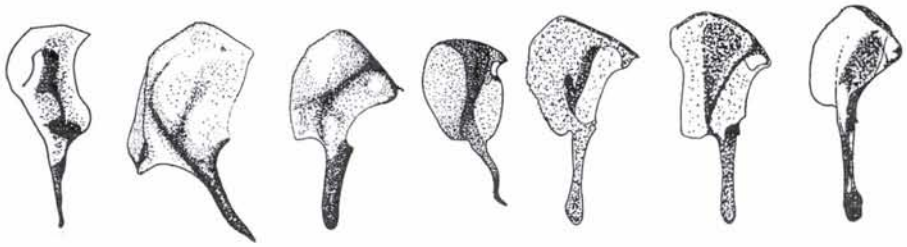

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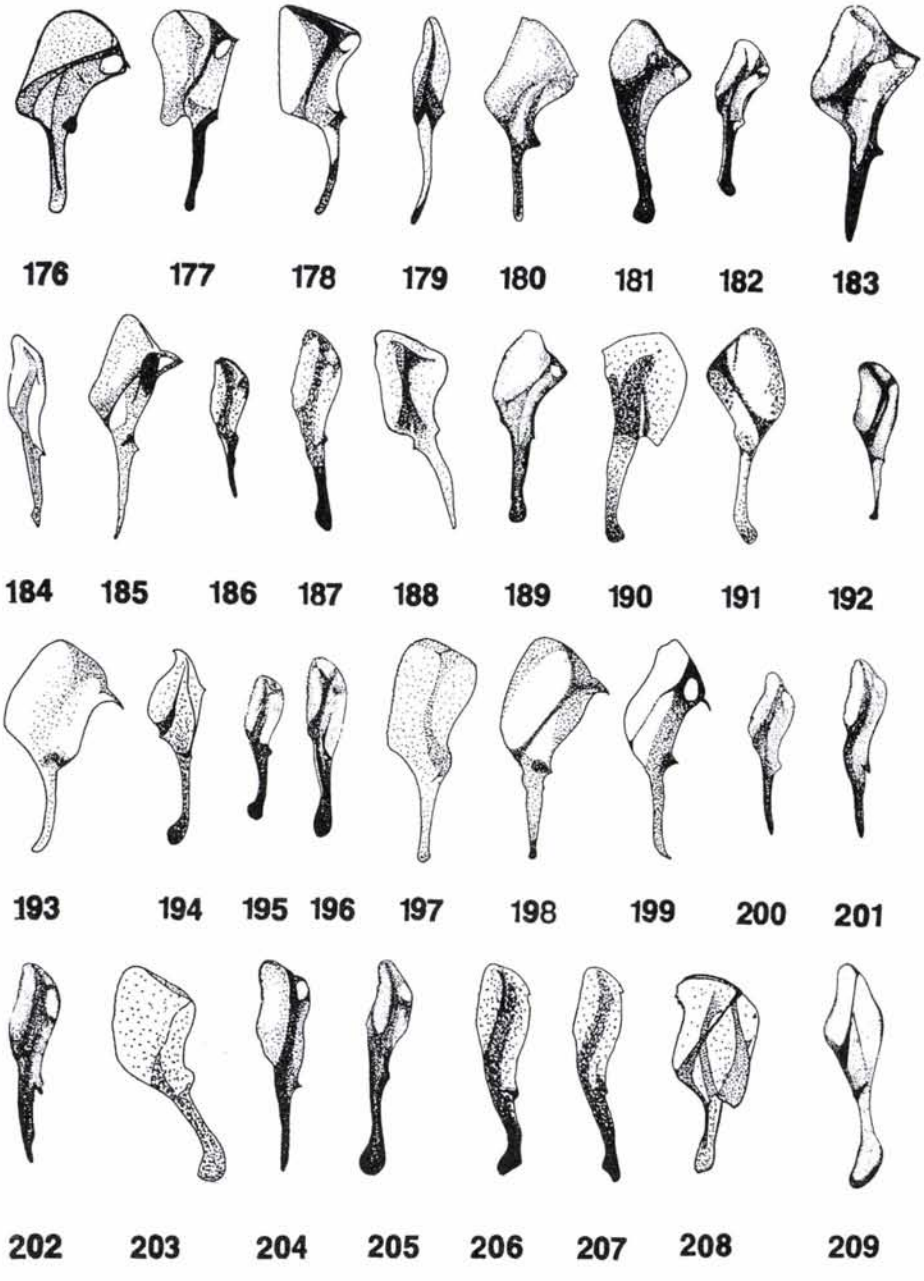
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NOTES

Dolerus lepidus Konow, 1903

Very hard to make difference between the females of *Dolerus lepidus* Konow, 1903 and *Dolerus germanicus* (Fabricius, 1775). The following characters refer to *Dolerus lepidus* Konow, 1903: bright, shining species, red colour with orange red shadow, lobes of the mesonotum frequently coloured with black, mesopleuron entirely black or its upper third red or red spots on the black mesopleuron, sawsheath black with red margin. However, these features may also occur on *Dolerus germanicus* (Fabricius, 1775), therefore, the genitalia preparation (serrulae) is inevitable. *Dolerus lepidus* Konow, 1903 has restricted distribution area (Transcaucasia, Uzbekistan, Tadzhikistan, Turkestan), genitalia study is necessary on those specimens which are collected in these regions and possess the above mentioned features. The males are easily distinguishable by their penis valve. The more extensively red colouration of the mesonotum is a feature of *Dolerus*

Figs 121–209. Penis valve of *Dolerus* — 121: *D. kokujewi* Konow, 122: *D. ciliatus* Konow (after Zhelochovtsev 1988), 123: *D. liogaster* C. G. Thomson (after Lacourt 1988), 124: *D. vernalis* Ermolenko (after Blank, 1993), 125: *D. montivagus* Benson, 126: *D. puncticollis* C. G. Thomson (after Zombori 1982), 127: *D. subalatus* Kerenszky (after Zhelochovtsev 1988), 128: *D. albertii* Muche, 129: *D. hyrcanus* Benson, 130: *D. gonager* (Fabricius) (after Zombori 1982), 131: *D. rufogeniculatus* Zhelochovtsev, 132: *D. albolineolatus* Haris et Blank, 133: *D. sanghaiensis* Haris, 134: *D. tritici* Chu (after Xiao *et al.* 1992), 135: *D. poecilomallosis* Wei, 136: *D. lewisii* Cameron, 137: *D. coreanus* Takeuchi, 138: *D. megapterus* Cameron (after Zombori 1982), 139: *D. asper* Zaddach (after Zombori 1982), 140: *D. docilus* Benson (after Zhelochovtsev 1988), 141: *D. dathei* Muche (after Chevin, 1988), 142: *D. anthracinus* (Klug) (after Zombori 1982), 143: *D. niger* (Linné) (after Zombori 1982), 144: *D. vulneratus* Mocsáry (after Zhelochovtsev 1988), 145: *D. sanguinicollis* (Klug) (after Lacourt 1998), 146: *D. fumosus* Stephens (after Lacourt 1998), 147: *D. alpinus* Benson (after Chevin, 1988), 148: *D. yokohamensis* Rohwer, 149: *D. nitens* Zaddach, 1859 (after Zombori 1982), 150: *D. ibericus* Chevin, 1987, 151: *D. picipes* (Klug) (after Zombori 1982), 152: *D. dentipennis* Wei et Nie, 153: *D. vernus* Zhelochovtsev (after Müller, 1988), 154: *D. nubilus* P. R. Müller, 155: *D. frigidus* Benson (after Müller, 1988), 156: *D. chevini* Lacourt, 157: *D. hibernicus* Lacourt, 158: *D. harwoodi* Benson (after Zombori 1982), 159: *D. truncatus* Lacourt, 160: *D. phalipi* Chevin, 161: *D. salmanticensis* Vigil (after Müller 1996), 162: *D. salmanticensis leonis* Vigil (after Müller 1996), 163: *D. salmanticensis orensis* Vigil (after Müller 1996), 164: *D. aeneus* Hartig (after Zombori 1982), 165: *D. altivolus* Lacourt, 166: *D. varispinus* Hartig (after Lacourt 1988), 167: *D. manticatus* Konow, 168: *D. bensoni* P. R. Müller, 169: D. *novograblenovi* Malaise, 170: D. *nigratus* (O. F. Müller) (after Zombori 1982), 171: *D. haematodes* (Schrank) (after Zombori 1982), 172: *D. nigrominutus* Haris, 173: *D. romanus* Benson, 174: *D. thoracicus* (Fallén) (after Benson, 1954), 175: *D. nonultimus* Zhelochovtsev, 176: *D. shanghaiensis* Wei et Nie, 177: *D. gibbosus* Hartig, 178: *D. ephippiatus* Smith, 179: *D. pachycerus* Hartig, 180: *D. gessneri* Ed. André (after Zombori 1982), 181: *D. bimaculatus* (Geoffroy) (after Zombori 1982), 182: *D. yukonensis* Norton (after Zombori 1982), 183: *D. pratensis* (Linné) (after Zombori 1982), 184: *D. laevigatus* Hellén (after Benson 1965), 185: *D. lucidus* Freymuth, 186: *D. elderi* Kincaid (after Zhelochovtsev 1988), 187: *D. subarcticus* Hellen (after Zhelochovtsev 1988), 188: *D. lepidus* Konow, 189: *D. germanicus* (Fabricius) (after Zombori 1982), 190: *D. pakistanicus* Muche (after Muche 1982), 191: *D. rugosus* Freymuth, 192: *D. scoticus* Cameron, 193: *D. grombczewskii* Jakovlev, 194: *D. kamimurai* Togashi, 195: *D. aericeps* C. G. Thomson (after Zombori 1982), 196: *D. cothurnatus* Lepeletier (after Zombori 1982), 197: *D. armillatus* Konow, 198: *D. japonicus* Kirby, 199: *D. cameroni* Kirby, 200: *D. ferrugatus* Lepeletier (after Zombori 1982), 201: *D. madidus* (Klug) (after Zombori 1982), 202: *D. triplicatus* (Klug) (after Zombori 1982), 203: *D. murcius* Konow (after Vigil 1988), 204: *D. uliginosus* (Klug), 205: *D. anticus* (Klug) (after Zombori 1982), 206: *D. schultessi* Konow (after Vigil 1988), 207: *D. rosti* Konow (after Vigil 1988), 208: *D. sinensis* Wei, 209: *D. hispanicus* Mocsáry

lepidus Konow, 1903 males, while most of the *Dolerus germanicus* (Fabricius, 1775) males have black mesonotum. Sometimes a red colour variation of *Dolerus germanicus* (Fabricius, 1775) also occurs.

Dolerus scoticus Cameron, 1881 rev. n.

This species is considered to be a melanic form of *Dolerus yukonensis* Norton, 1872. However, checking the type and the original description we learned that *Dolerus scoticus* Cameron, 1881 has nothing in common with *Dolerus yukonensis* Norton, 1872. *Dolerus scoticus* Cameron, 1881 has abdomen entirely smooth and shining without any trace of the transverse sculpture which is characteristic for *Dolerus yukonensis* Norton, 1872, additionally the sawsheath pubescence is also completely different. *Dolerus scoticus* Cameron, 1881 is closely related to *Dolerus aericeps* C. G. Thomson, 1871. The type of *Dolerus scoticus* Cameron, 1881 completely agrees with the types of *Dolerus thargitai* Zombori, 1994. Two type specimens of *Dolerus scoticus* Cameron, 1881 are deposited in The Natural History Museum, London, but only one agrees with the original description.

Dolerus thargitai Zombori, 1994 syn. n.

See under *Dolerus scoticus* Cameron, 1881.

Dolerus pseudaeneus Lacourt, 1988 syn. n.

This species differs from *Dolerus aeneus* Hartig, 1837 in the shape of the head and penis valve. These differences are very slight and should be considered only as individual differences. Additionally, I have seen many intermediary forms between *Dolerus pseudaeneus* Lacourt, 1988 and *Dolerus aeneus* Hartig, 1837.

Dolerus pseudojaponicus Haris et Blank, 1996

This species is similar to *Dolerus japoniocus* Kirby, 1882 but *D. pseudojaponicus* Haris et Balnk, 1996 is larger, apical setae of the sawsheath dark, stiff and straight (soft, light and apically curved in *Dolerus japonicus* Kirby, 1882).

Dolerus samarkandicus Haris, 1997

This species is closely related to *Dolerus rufogeniculatus* Zhelochovtsev, 1924. Benson (1967) knew both these species, however, *Dolerus humeralis* Benson, 1967 is identical with *Dolerus rufogeniculatus* Zhelochovtsev, 1924 and the *Dolerus rufogeniculatus* sensu Benson is the new species which received the name *Dolerus samarkandicus* Haris, 1997.

Dolerus asceta Jakovlev, 1891 syn. n.

Dolerus asceta Jakovlev, 1891 is the male of *Dolerus cameroni* Kirby, 1882. This species has male and female which are completely different in colour, shape and pubescence, therefore, the male and female were originally described as different species.

Dolerus lii Wei et Nie, 1997 syn. n.

Wei and Nie (1997) described this species based on a single male. This male has extensively red thorax, exactly like the one of the female of *Dolerus cameroni* Kirby, 1882 while the normal colour variation of the *Dolerus cameroni* Kirby, 1882 male is entirely black. The genitalia of *Dolerus lii* Wei et Nie, 1997, agrees well with the penis valve of *Dolerus cameroni* Kirby, 1882. Among those species which have female coloured with red and male entirely black, the males regularly occur which have colouration similar to that of the females (*Dolerus haematodes* (Schrank, 1781), *Dolerus sanguinicollis* (Klug, 1818)).

Dolerus phalipi Chevin, 1988

Described on a single male. Its penis valve agrees well with the one of *Dolerus salmanticensis* Vigil, 1988. Penis valve of this species shows many inconsiderable individual variations which are described as a distinct species and subspecies.

Dolerus salmanticensis Vigil, 1988

Müller (1996) described two subspecies of this species, however, these descriptions are based only on slight differences in penis valve which are regarded as individual variations.

Dolerus shanghaiensis Wei et Nie, 1997

Junior homonym of *Dolerus shanghaiensis* Haris, 1996. Here we propose to the authors to change the name of their *Dolerus* species.

Dolerus kurahashii Togashi, 1989

Holotype is identical with *Dolerus pakistanicus* Muche, 1982. The male paratype is *Dolerus lepidus* Konow, 1903.

Dolerus nipponicus Haris, 1996 syn. n.

This species is identical with *Dolerus ephippiatus* Smith, 1874.

Dolerus persicus Haris, 1996 syn. n.

This species is identical with *Dolerus hispanicus* Mocsáry, 1881.

Dolerus mirandus Wei et Nie, 1997

This species is closely related to the Nearctic *Loderus acidus* MacGillivray, 1923 and belongs to the genus *Loderus* Konow (1890).

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