

CONIFER SAWFLIES, DIPRIONIDAE: KEY TO NORTH AMERICAN
 GENERA, CHECKLIST OF WORLD SPECIES, AND
 NEW SPECIES FROM MEXICO (HYMENOPTERA)

DAVID R. SMITH

Systematic Entomology Laboratory, IIBIII, Agr. Res. Serv., USDA¹

ABSTRACT—A key is given for the identification of the 6 genera of the family Diprionidae found in North America. The 11 world genera and 91 species and subspecies of the family Diprionidae are listed with the general distribution and host plant genera for each. Three new species from Mexico are described: *Monoctenus sadadus*, *Zadiprion howdeni*, and *Zadiprion roteus*. Notes on the occurrence of the genus *Neodiprion* in Mexico and Central America are given.

I. KEY TO NORTH AMERICAN GENERA OF DIPRIONIDAE

This key is provided to aid in the identification of adults of the Diprionidae encountered in North America. The use of the name *Gilpinia* as a genus rather than as a subgenus of *Diprion* is incorporated here. It is a name in wide usage throughout the world except for North America, and the genus is very distinct from *Diprion*, in fact, even more so than from *Neodiprion*. This key is partially adapted from Benson's (1939, 1945) key to the world genera.

1. Anal cell of forewing contracted in middle forming basal and apical anal cells, no anal crossvein (fig. 1); male flagellar segments unipectinate [Monocteninae] 2
- Anal cell of forewing not contracted, anal crossvein present (fig. 2); male with at least 10 basal flagellar segments bipectinate [Diprioninae] 3
2. Supraclypeal area not tuberculate; clypeus emarginate; forewing with veins M and Rs + M meeting before fusing with Sc + R ... *Augomonoctenus*
- Supraclypeal area tuberculate; clypeus subtruncate; forewing with vein M meeting Sc + R basad to point where Rs + M meets Sc + R ... *Monoctenus*
3. Cenchri small, nearly two times farther apart than breadth of one; metascutellum large, at least as long as breadth of a cenchrus (fig. 3) *Diprion*
- Cenchri large, close together, distance between them less than the breadth of a cenchrus; metascutellum small, shorter than breadth of a cenchrus (fig. 4, 5) 4
4. Anal cell of hindwing with petiole much longer than cell width; abdominal terga densely sculptured; mesoscutellum blunt in front (fig. 4) ... *Gilpinia*
- Anal cell of hindwing with petiole scarcely longer than cell width; abdominal terga usually polished, sometimes with fine microsculpture; mesoscutellum acute in front (fig. 5) 5
5. Female pulvillar pad of hindbasitarsus shorter than apical breadth of

¹ Mail address: c/o U.S. National Museum, Washington, D.C. 20560.

basitarsus; hindtibial spurs normal, inner one longer than half apical breadth of tibia (fig. 6); male antenna with all but last segment biramose

----- *Neodiprion*

- Female pulvillar pad of hindbasitarsus longer than apical breadth of basitarsus; hind apical tibial spurs subclavate, not longer than half apical breadth of tibia (fig. 7); male antenna with 5 apical segment uniramose ..

----- *Zadiprion*

II. CHECKLIST OF WORLD GENERA AND SPECIES

This list of valid taxa with general distribution and known host plant genera of the larvae should prove a useful tool for workers on the group. No such list has ever been published. Currently, there are 11 genera and 91 valid species or subspecies recognized in the world.

MONOCTENINAE

Monoctenus Dahlbom

- M. decoratus* Takeuchi. Japan. On *Cryptomeria*.
M. fulvus (Norton). Eastern United States and Canada. On *Juniperus*.
M. itoi Okutani. Japan. On *Chamaecyparis*.
M. juniperi (Linnaeus). Europe. On *Juniperus*.
M. melliceps (Cresson). Eastern United States and Canada.
M. nipponicus Takeuchi. Japan. On *Juniperus*.
M. obscuratus (Hartig). Europe. On *Juniperus*.
M. sadadus Smith. Mexico. On *Juniperus*?
M. subconstrictus (Thomson). Sweden.
M. suffusus (Cresson). Eastern United States and Canada. On *Juniperus*, *Thuja*.

Augomonoctenus Rohwer

- A. libocedrii* Rohwer. United States: Oregon, California. In developing cones of *Libocedrus*.
A. pilosus Middlekauff. United States: California.

Rhipidoctenus Benson

- R. ciuderellae* Benson. Morocco.

DIPRIONINAE

Diprion Schrank

- D. butovitschi* Hedqvist. Sweden.
D. fukudai Togashi. Japan. On *Pinus*, *Larix*.
D. nipponicus Rohwer. Japan. On *Pinus*, *Larix*.
D. pini (Linnaeus). Europe, north Africa. On *Pinus*, *Picea*, *Abies*.
D. rufiventris (Zirngiebl). Albania.
D. similis (Hartig). Europe to Siberia; introduced into eastern United States and Canada. On *Pinus*.

Prionomicton Benson

- P. gaullei* (Konow). Algeria.

Nesodiprion Rohwer

- N. biremis* (Konow). China, Thailand. On *Pinus*.
N. japonicus (Marlatt). Japan, Okinawa, Formosa. On *Pinus*.

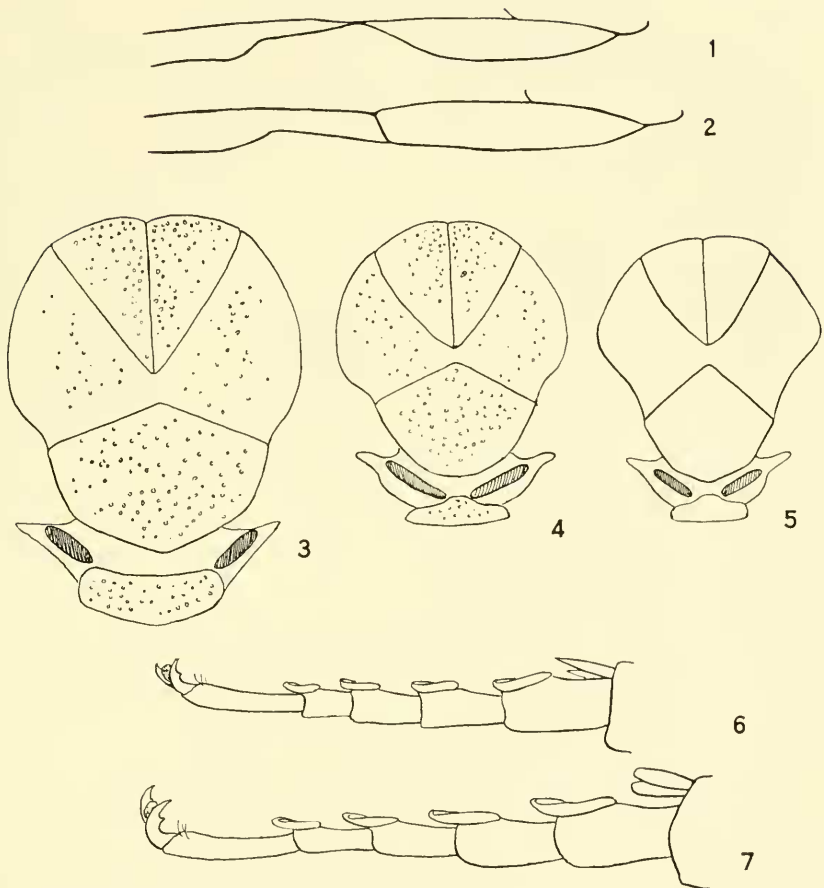


Fig. 1. Anal area of forewing of *Monoctenus* sp. 2, anal area of forewing of *Neodiprion* sp. 3, mesonotum and metanotum of *Diprion* sp. 4, mesonotum and metanotum of *Gilpinia* sp. 5, mesonotum and metanotum of *Neodiprion* sp. 6, hindtarsus of *Neodiprion* sp. 7, hindtarsus of *Zadiprion* sp.

Microdiprion Enslin

M. fuscipennis (Forsius). Northern Europe.

M. hakusanus Togashi. Japan.

M. pallipes (Fallén). Europe to Siberia. On *Pinus*, *Picea*.

Macrodiprion Enslin

M. nemoralis (Enslin). Europe to Siberia. On *Pinus*.

Zadiprion Rohwer

Z. howdeni Smith. Mexico.

Z. rohweri (Middleton). Southwestern United States. On *Pinus*.

Z. roteus Smith. Mexico.

Z. townsendi (Cockerell). Southwestern United States. On *Pinus*.

Z. vallicola (Rohwer). Mexico. On *Pinus*.

Gilpinia Benson

G. abieticola (Dalla Torre). Europe to Siberia, Japan. On *Picea*.

G. amamiana Okutani. Okinawa.

G. daisetuzana Takeuchi. Japan.

G. disa Smith. China.

G. distincta Takeuchi. Japan.

G. excisa Gussakovskii. Germany.

G. fenica (Forsius). Finland. On *Picea*.

G. frutetorum (Fabricius). Europe to Siberia; introduced into eastern United States and Canada. On *Pinus*, *Picea*.

G. ghanii Smith. Pakistan. On *Picea*.

G. hakonensis (Matsumura). Japan.

G. hercyniae (Hartig). Europe to Siberia, Japan, Korea; Introduced into eastern United States and Canada. On *Picea*.

G. iudica (Cameron). Pakistan, north India. On *Cedrus*.

G. koreana (Takagi). Siberia, Korea. On *Larix*.

G. laricis (Jurine). Europe. On *Pinus*.

G. marshalli (Forsius). China, Thailand. On *Pinus*.

G. nigra Okutani. Japan. On *Picea* (?).

G. pallida (Klug). Europe. On *Pinus*.

G. pindrowi Benson. Pakistan. On *Pinus*.

G. polytoma (Hartig). Europe to Siberia, Pakistan. On *Picea*.

G. sachalinensis Takeuchi. Japan.

G. socia (Klug). Europe. On *Pinus*.

G. tohi Takenchi. Japan. On *Picea*.

G. verticalis Gussakovskii. Eastern Europe. On *Pinus*.

G. virens (Klug). Europe to Siberia. On *Pinus*.

Neodiprion Rohwer

N. abbotii (Leach). Eastern United States and Canada. On *Pinus*.

N. abietis (Harris). Canada and United States, transcontinental. On *Abies*, *Picea*, *Tsuga*.

N. burkei Middleton. Western United States. On *Pinus*.

N. compar (Leach). Eastern United States and Canada. On *Pinus*.

N. delconi Ross. United States: Washington. On *Abies*.

N. demoides Ross. United States: California. On *Pinus*.

N. dubiosus Schedl. Eastern Canada, northeastern United States. On *Pinus*.

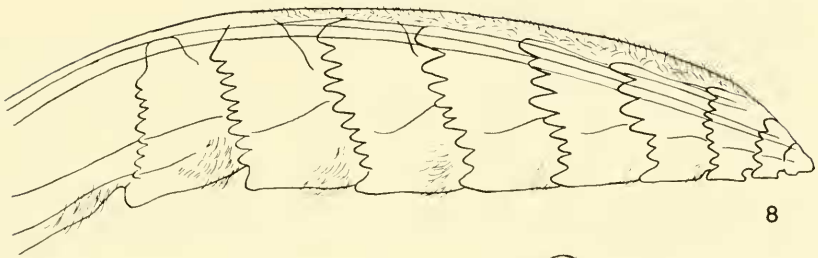
N. edulicola Ross. Southwestern United States. On *Pinus*.

N. excitans Rohwer. Eastern United States, British Honduras, El Salvador. On *Pinus*.

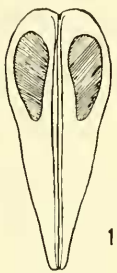
N. fulviceps (Cresson). Western Canada, United States, Mexico. On *Pinus*.

→

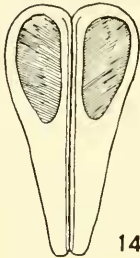
Fig. 8. Lancet of *Monoctenus sadadus*. 9, harpe and parapenis of *M. sadadus*. 10, penis valve of *M. sadadus*. 11, lancet of *Zadiprion howdeni*. 12, lancet of *Zadiprion roteus*. 13, sheath of *Z. howdeni*, posterior view. 14, sheath of *Z. roteus*, posterior view.



8



13



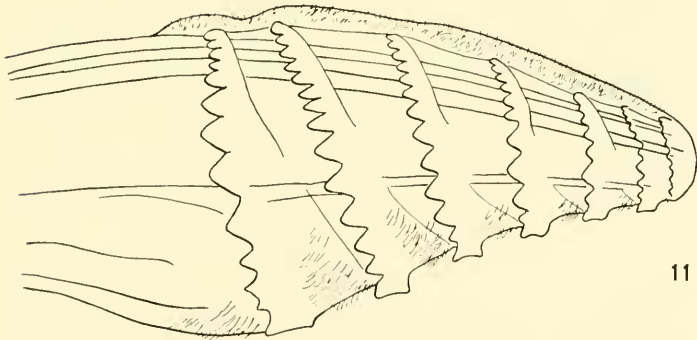
14



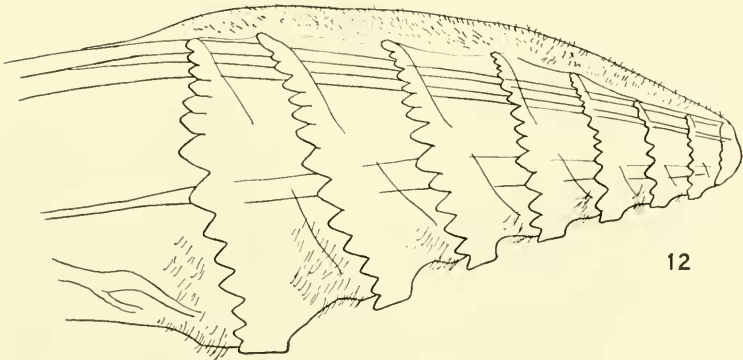
9



10



11



12

- N. gillettei* (Rohwer). Western United States, Mexico. On *Pinus*.
N. hetricki Ross. Eastern United States. On *Pinus*.
N. insularis (Cresson). Cuba.
N. lecontei (Fitch). Eastern Canada and United States. On *Pinus*.
N. maurus Rohwer. Eastern Canada, northeastern United States. On *Pinus*.
N. merkei Ross. Southeastern United States. On *Pinus*.
N. mundus Rohwer. Western United States. On *Pinus*.
N. nanulus contortae Ross. Western United States and Canada. On *Pinus*.
N. nanulus nanulus Schedl. Eastern United States and Canada. On *Pinus*.
N. nigroscutum Middleton. Eastern Canada, northeastern United States. On *Pinus*.
N. pinetum (Norton). Eastern Canada and United States. On *Pinus*.
N. pinusrigidae (Norton). Northeastern United States. On *Pinus*.
N. pratti banksianae Rohwer. Eastern Canada, northeastern United States. On *Pinus*.
N. pratti paradoxicus. Ross. Southeastern Canada, northeastern United States. On *Pinus*.
N. pratti pratti (Dyar). East central United States. On *Pinus*.
N. rugifrons Middleton. Eastern Canada, northeastern United States. On *Pinus*.
N. scutellatus Rohwer. Western United States, Canada (?). On *Pseudotsuga*.
N. sertifer (Geoffroy). Europe to Siberia, Japan, Korea; introduced into eastern United States and Canada. On *Pinus*.
N. swainei Middleton. Eastern Canada, northeastern United States. On *Pinus*.
N. taedae linearis Ross. Southcentral United States. On *Pinus*.
N. taedae taedae Ross. East central United States. On *Pinus*.
N. tsugae Middleton. Western United States and Canada. On *Tsuga*, *Picea*, *Abies*.
N. ventralis Ross. United States: Colorado. On *Pinus*.
N. virginianus Rohwer. Eastern United States. On *Pinus*.
N. warreni Ross. Southeastern United States. On *Pinus*.
N. werneri Ross. United States: Arizona.

III. NEW SPECIES FROM MEXICO

The Diprionidae in Mexico are not well known even though there must be a fairly rich fauna due to the extensive coniferous forests in the country. Following are descriptions of several new species and notes on others that are found in Mexico and Central America.

Monoctenus sadadus Smith, new species

Female: Length, 5.8 mm. Antenna black. Head mostly red with mouthparts, clypeus, supra-clypeal area, and large supra-antennal spot including ocelli with extensions to lateral side of each antenna black. Thorax black with pronotum, tegula, and mesonotum except for scutellum red. Legs black, extreme apex of front femur, inner surface of front tibia, and extreme apex of each middle and hind femur whitish. Abdomen black. Wings darkly, uniformly black infuscated; veins black.

Antenna short, less than head width, with 15 to 16 segments; third segment simple, twice length of fourth segment, segments beyond third broader than long,

excluding ramus of each; rami of segments 5 to 12 each longer than length of their respective segment; rami of central segments longest. Supraclypeal area tuberculate. Entire insect smooth and strongly shining, with short, scattered white pubescence. Sheath simple, in lateral view triangular in shape. Lancet as in fig. 8.

Male: Length, 5.1 mm. Entirely black with only apex of front femur, most of front tibia, and extreme apices of each middle and hind femora whitish to brown. Wings darkly infuscated as in female. Antenna with segments unipectinate, rami long, those on central segments nearly equal to length of antenna. Other characters as for female. Genitalia as in figs. 9, 10.

Holotype: Female, labeled "3 mi. W. El Salto, Dgo., Mex., 9000', June 19, 1964, J. F. McAlpine," "ex juniper?" In the Canadian National Collection, Ottawa.

Paratypes: MEXICO: same data as for holotype (1 ♂); same data as for holotype except 3 mi. E. El Salto, 8400', June 21, 1964, W. R. M. Mason (1 ♀) lacking host label; Orizaba, 6-98 (1 ♀). In the Canadian National Collection and U.S. National Museum.

Discussion: The paratype from Orizaba has the antennae missing, the head with less black on the clypeus, supraclypeal, and supra-antennal areas, and has a pale lateral stripe on each side of the abdomen; otherwise it is identical to the other specimens.

This is the first record of this genus from south of the United States. Several species are found in eastern North America as far south and west as Kansas and Oklahoma. This Mexican species is separated from those of eastern United States by the sharply contrasting red and black coloration and the less projecting serrulae of the lancet.

The species name is an arbitrary combination of letters and is to be treated as a noun.

Zadiprion Rohwer

Both of the following new species are separated from the 3 species I treated in my revision (Smith, 1971) by lacking a first annulus on the lancet. They are closest to *vallicola* Rohwer, but *vallicola* has 2 or 3 large teeth on the first annulus. The following key will separate adult females of the 5 species of *Zadiprion*.

- | | |
|--------------------------------------------------------------------------------------|------------------------------|
| 1. First annulus of lancet present, with two or more large teeth | 2 |
| — First annulus of lancet absent (fig. 11, 12) | 4 |
| 2. First annulus with only 2 or 3 large teeth | <i>vallicola</i> (Rohwer) |
| — First annulus with 9 or more teeth | 3 |
| 3. First annulus in shape of inverted U | <i>rohweri</i> (Middleton) |
| — First annulus straight | <i>townsendi</i> (Cockerell) |
| 4. Head, thorax, and legs mostly reddish brown; lancet with 8 annuli (fig. 12) | <i>roteus</i> , n. sp. |
| — Head, thorax, and legs yellowish; lancet with 7 annuli (fig. 11) | <i>howdeni</i> , n. sp. |

Zadiprion howdeni Smith, new species

Female: Length, 9.0 mm. Antenna yellowish brown with apical 5 to 8 segments infuscated to black. Head yellowish brown with small black line on each malar space, small black spot lateral to each antennal socket, and narrow black margin around each ocellus. Thorax yellowish brown with narrow black lines on anterior margin of pronotum, anterior and posterior margins of mesepisternum, posterior margin of cervical sclerites; narrow mesal black line on mesoprescutum widening to a black spot at posterior, sutures of mesoscutellum black, and posttergite black. Legs yellowish brown, only extreme base of each coxa black. Ground color of abdomen yellowish brown to whitish with terga 2 to 4 entirely black and anterior margin of remaining terga and all sterna black, the black margin decreasing in width toward apex of abdomen. Wings uniformly yellowish infuscated; veins orange-brown.

Antenna long, about $1\frac{1}{2}$ times head width; with 24 segments; third segment twice length of fourth segment; segments beyond third, excluding ramus, each slightly broader than long; ramus of each segment shorter than length of its respective segment. Head and thorax rugulose to punctate, the sculpture heavier on mesopleuron and mesoscutellum than elsewhere; moderately shining. Dense, short, yellowish pubescence covering head and thorax. Dorsum of abdomen dull, with fine surface sculpture. Scopa of sheath short and thick, not protruding, with oval scopal pads (fig. 13). Lancet short, triangular, with 7 annuli; first annulus absent; second and third annuli converging toward dorsum; third to seventh annuli parallel; serrula of second annulus broad and truncate; serrulae of third to sixth annuli broad and concave at their apices; serrulae of second and third annuli separated by low, straight margin (fig. 11).

Male: Unknown.

Holotype: Female, labeled "5 mi. W. San Cristobal L. C., Chis., Mex., V-10-1969, H. F. Howden." This locality is in the state of Chiapas. In the Canadian National Collection, Ottawa.

Paratype: One female, same data as for holotype. Deposited with holotype.

Discussion: This species is separated by the lack of the first annulus of the lancet, the lancet having only 7 annuli, and the mostly yellowish head, thorax and legs. The species is named for the collector, H. F. Howden.

Zadiprion roteus Smith, new species

Female: Length, 10.2 mm. Antenna reddish brown, apical 5 to 7 segments infuscated to black. Ground color of head reddish brown; labrum, clypeus, supraclypeal area, para-antennal fields and outer orbits to top of eye yellow. Ground color of thorax reddish brown; paraptera, round spot on mesepisternum, line on each lateral margin of mesoprescutum, and brown transverse band on mesoscutellum yellow; area surrounding yellow spot on mesepisternum, posterior third of mesoprescutum, lateral margin of each lateral lobe, sutures separating mesoscutellum, and post-tergum black. Legs entirely reddish brown. Ground color of abdomen yellow to white; most of terga 2 to 4 black, remaining terga and all sterna with narrow black band on posterior margins; apical segment reddish brown. Wings uniformly yellowish infuscated; veins reddish brown.

Antenna about $1\frac{1}{4}$ times head width, 24 segmented; third segment $1\frac{1}{2}$ times length of fourth segment, segments beyond third, excluding ramus, each broader than long; ramus of each segment shorter than length of respective segment. Head and thorax rugulose to punctate, sculpture heavier on mesepisternum and mesoscutellum; moderately shining. Dense short, whitish pubescence covering head and thorax. Scopa of sheath short, thick, not protruding, scopal pads oval (fig. 14). Lancet short, triangular, with 8 annuli; first annulus absent; second and third annuli converging toward dorsum; third to eighth annuli subparallel; serrula of second annulus broad and truncate; remaining serrulae truncate at their apices; serrulae of second and third annuli separated by low rounded margin (fig. 12).

Male: Unknown.

Holotype: Female, labeled "Jacala, Hdlg., Mex., VIII-20-1960, H. Howden, at light." In the Canadian National Collection, Ottawa.

Paratype: Female with same data as for holotype. Deposited with holotype.

Discussion: The reddish brown coloration of this species resembles *vallicola*, but *vallicola* has several large teeth on the first annulus whereas this species lacks the first annulus. The reddish brown coloration of the head, thorax, and legs, and the presence of 8 annuli on the lancet will separate this species from *howdeni*.

The species name is an arbitrary combination of letters and is to be treated as a noun.

Neodiprion Rohwer

I have seen adults of several species of *Neodiprion* from Mexico and Central America, but, unfortunately, very few specimens. All the specimens I have seen from Mexico belong in the Sertifer Group as defined by Ross (1955), the group most predominant in the western United States. Another species from El Salvador and British Honduras, however, belongs in the Lecontei Group, a group most predominant in the eastern United States.

Neodiprion fulviceps (Cresson). I have seen specimens from Veracruz, Hidalgo, and Chiapas which must be referred to this complex at present.

Neodiprion gillettei (Rohwer). A series reared from pines in the State of Michoacan is identical to this species which is known to feed on pines in the southwestern United States.

Neodiprion excitans Rohwer. This species, found in eastern North America west to Texas, is also found on pines in British Honduras, El Salvador, and Nicaragua (?). The Nicaragua record is based on larvae and therefore is not certain. Other than *N. insularis* (Cresson) which is found in Cuba, *excitans* is the only species of the Lecontei Group I have seen from south of the United States.

REFERENCES

- Benson, R. B. 1939. On the genera of the Diprionidae (Hymenoptera Symphyta). Bull. Entomol. Res. 30:339-342.
- . 1945. Further note on the classification of the Diprionidae (Hymenoptera, Symphyta). Bull. Entomol. Res. 36:163-164.
- Ross, H. H. 1955. The taxonomy and evolution of the sawfly genus Neodiprion. Forest Science. 1:196-209.
- Smith, D. R. 1971. The genus Zadiiprion Rohwer (Hymenoptera: Diprionidae). Proc. Entomol. Soc. Wash. 73:187-197.

THE CORRECT NAME FOR A COMMON NORTH AMERICAN
TRYPOXYLON WASP (HYMENOPTERA, SPHECIDAE)

Richards (1934, Trans. R. Entomol. Soc. London 82:244) listed *Trypoxylon lactitarse* Saussure, 1867, as a possible senior synonym of *T. spinosum* Cameron, 1889. Recently I borrowed Saussure's unique male type of *lactitarse* through the courtesy of Dr. C. Besuchet, Muséum d'Histoire Naturelle, Geneva, and discovered that it is conspecific with the common eastern North American wasp currently known as *Trypoxylon (Trypargilum) striatum* Provancher, 1888. Because Saussure's name is older, the species must now be known as *lactitarse*. The holotype of *lactitarse* came from Orizaba, Mexico. The species ranges from eastern North America to southern South America.

Externally the type of *lactitarse* agrees in clypeal and thoracic details with males of *striatum* collected in the United States. The genitalia of the type were compared with those of males of *striatum* and there was basic agreement. However, the apex of the volsella, the form of the aedeagal head, and the degree of development of the angulation of the gonostyle near the middle of the inner margin vary independently from specimen to specimen.

Richards (p. 247) also suggested that *T. luteitarse* Saussure, 1867, was a senior synonym of *striatum* (as *cinereum*). Apparently Saussure (1867, Reise der Oesterreich. Fregatte Novara, Hymenoptera, p. 82) described *luteitarse* from one female. Dr. Besuchet says that nine possible types are under this name in Saussure's collection. Six of these, all labeled Cordova, were lent for study. One female is apparently *clavatum* Say. Two other females and three males are *lactitarse*. None appear to be type material because they do not agree with the propodeal figure given by Saussure (fig. 47b). This figure and Saussure's description of *luteitarse* suggest the species Richards, p. 224, called *fuscipenne* Fabricius or a relative. Perhaps one of the three specimens not lent by Dr. Besuchet will prove to agree with the original description.

A. S. MENKE, *Systematic Entomology Laboratory, IBIII, Agr. Res. Ser., USDA, c/o U.S. National, Washington, D.C. 20560.*