SOME COMMON SAWFLY LARVAE ATTACKING CONIFERS IN NORTHEASTERN NORTH AMERICA

Thesis for the Degree of M. S.

MICHIGAN STATE COLLEGE

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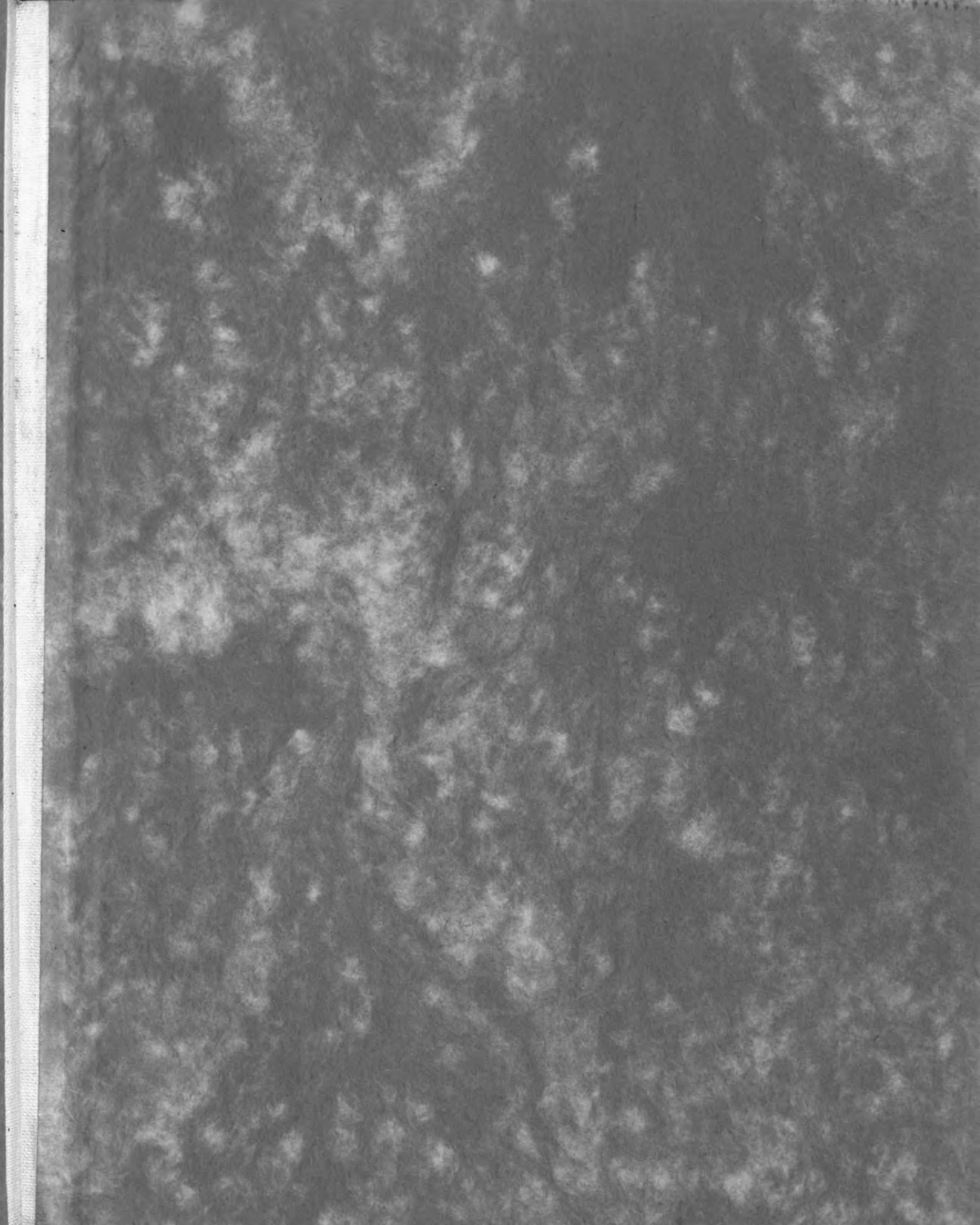
1939



SOME COMMON SAWFLY LARVAE ATTACKING CONIFERS IN NORTHEASTERN NORTH AMERICA

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THESIS

Submitted in partial fulfilment of the requirements
for the degree of Master of Science in the
Graduate School, Michigan State College

Department of Entomology

June, 1939

ACKNOWLEDGMENT

The writer wishes to thank Professor Ray Hutson and Associate Professor Miss E. I. McDaniel for guidance during the course of the work, and for the help and encouragement they have given at all times.

Thanks are also owing to Dr. J. H. Peck of the Division of Entomology, Department of Agriculture, Canada, for notes on the literature of the various species, and to Dr. A. W. A. Brown, also of the Division, for data on distribution and parasites.

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INTRODUCTION

During recent years people in steadily increasing numbers have become interested in forest insects. Part of this interest has no doubt been aroused by the published accounts of new infestations, and by statistics of the economic losses caused by the various outbreaks. It has been sustained, especially in the case of those concerned with the lumber industry, by the growing value of forest products, and the consequently greater need of providing the forest with protection from its insect enemies.

Because of the ravages and spread of species recently introduced, sawflies have shared largely in the public interest. The need for additional information about sawflies has been felt by many laymen, but the means of satisfying this need have been found unsatisfactory to non-entomologists, because of the technical manner in which the work has been written.

The object of this thesis is to make the knowledge of at least a limited group of sawfly larvae- i.e. those attacking conifers in northeastern North America- more readily available by putting it in a less technical form, so that it may be of value, not only to those trained in entomology, but also to the numerous foresters, lumbermen, and other non-specialists who may be interested in sawflies. The use of technical terms has therefore been cut to a minimum, everyday language being substituted wherever possible. Terms which could not be easily eliminated have been illustrated. (Fig. 1).

To further simplify the work, a watercolor illustration was made for each species, showing the typical coloration. Considerable difficulty was experienced in obtaining the exact shades in some cases. The colors of the living larvae vary somewhat with individuals within the same species, so that the actual shade of a particular larva may differ from that of the color plate, but not enough to prevent identification of the species.

Because individual conception of color varies so widely, it was thought advisable to have a set standard to which the various colors used in describing the larvae could be referred. A color dictionary* was employed for this purpose, the letters in brackets following the mention of the color and the name of the shade, where given, being taken from it. The references to the color dictionary are intended to provide a check on the colors of the illustrations, but it should not be necessary to consult the dictionary for ordinary purposes.

* Maerz and Paul, A Dictionary of Color (New York: McGraw, 1930).

GENERAL DISCUSSION

MORPHOLOGY: The morphology of sawfly larvae has been investigated by various authors, notably Mac Gillivray (5) and Yuasa (6). While no attempt is made here to go into the subject as fully as they have done, it was considered advisable to discuss some of the more obvious morphological features of the larvae studied, in order to make the work more complete.

The general form of the larvae in this group is caterpillar-like, the head globose, the body long and cylindrical, tapering but slightly to the posterior. Division into head, thorax and abdomen is well marked, the posterior limit of the thorax being between the well-developed legs of the metathorax and the spiracles of the first abdominal segment. Each segment of the thorax and abdomen is divided by transverse grooves, into narrow, ring-like parts known as "annulets". The annulets are most distinct dorsally, becoming less well defined towards the ventral portion.

HEAD: The head is hard, shiny, globose. The front is somewhat flattened in most species. There is a single ocellus on either side, which is situated in the center of a circular area of dark brown or black, known as an "ocularium". (Fig. 1). In species having light-colored heads, the ocularium is very conspicuous and is frequently mistaken for the eye; in species with black heads it is visible just after a moult, before the remainder of the head has lost its creamy white appearance.

THORAX: (Fig. 1). The three divisions of the thorax, pro-, meso-, and meta-thorax, are clearly differentiated and each bears a pair of five-jointed legs, those of the prothorax being considerably smaller than the meso- and meta-thoracic pairs. The diameter of the thorax is usually greater than that of the rest of the body, and the annulets on it are generally wider.

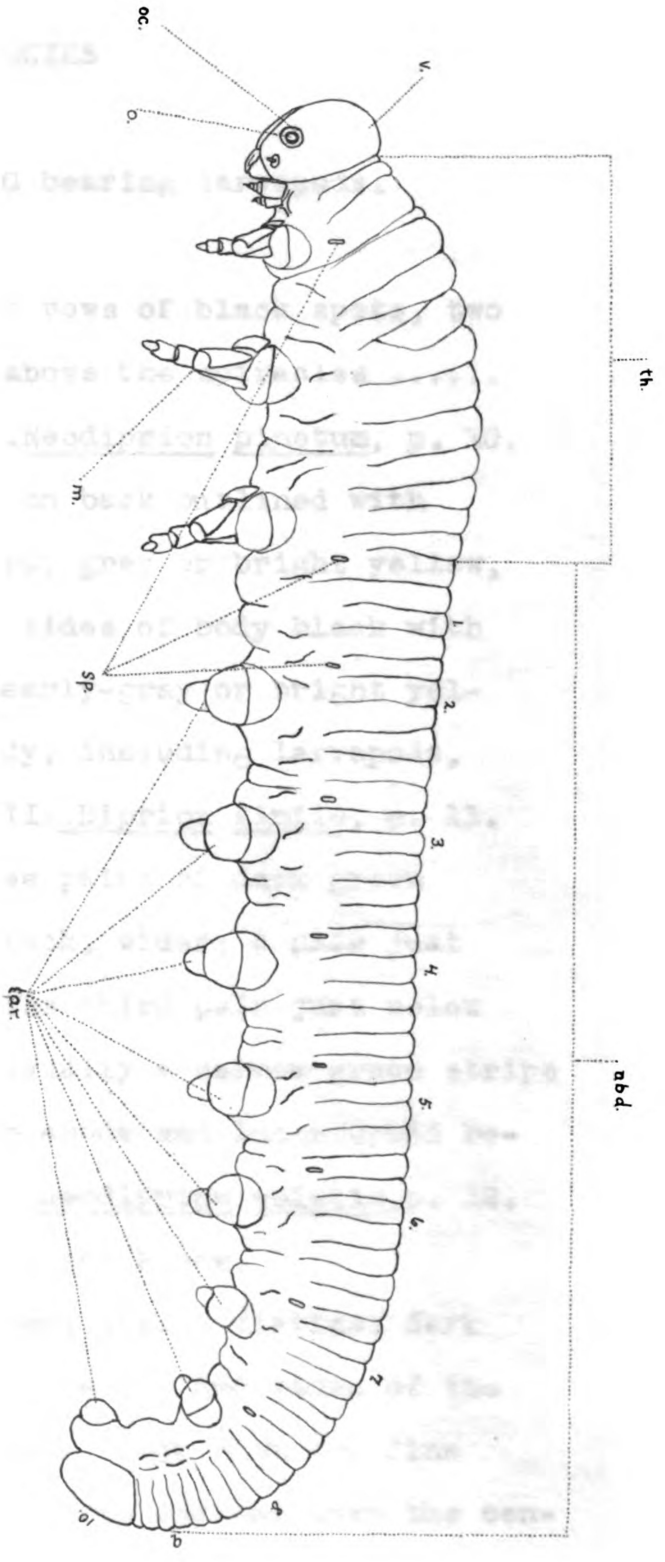
ABDOMEN: The abdomen is composed of ten segments (Fig. 1), with the larvapods on either segments 2-7 and 10 or 2-8 and 10. Each larvapod is composed of two parts, a larger, basal segment attached to the body, with a narrower segment attached to it. Together they form a fleshy protuberance capable of motion and serving as a leg.

SPIRACLES: There are nine spiracles; one situated above the base of the leg on the prothorax, usually larger than the rest, the remainder in a row along the side of the body just below the center, on segments 1-8, placed near the anterior margin of each segment. The body wall of the larva is often raised in larger folds around each spiracle, making these more easily visible.

METHODS

The colored illustrations were constructed from notes and sketches made from the living larvae. Alcoholic specimens were used later to check the sketches and to make more exact detail possible. No attempt was made, however, to show the exact annulation or the setal pattern. The lengths given in the descriptions are merely approximate, and are intended to give some comparison between the average sizes of the various species. They were taken from living specimens. The colors were in all cases determined from living larvae.

Figure 1.



th.	thorax	lar.	larvapods
m.	mesothoracic leg	v.	vertex
sp.	spiracles	oc.	ocularium
abd.	abdomen	o.	ocellus
1.2.3.4.	abdominal segments		

Fig 1. Diagram to illustrate terms used in text.

KEY TO SPECIES

A. Abdominal segments 2-8 and 10 bearing larvapods.

(a) Head black, shining.

(1) Body light gray, with four rows of black spots, two along the back, two just above the spiracles ....Pl. I....Neodiprion pinetum, p. 10.

(2) Body variegated, annulets on back outlined with black, enclosed areas pearly gray or bright yellow, according to the pattern; sides of body black with numerous circular areas pearly-gray or bright yellow. Lower portion of body, including larvapods, gray ..... Pl. II..Diprion simile, p. 11.

(3) Body dull green, with three pairs of dark green stripes: one pair on the back, wider; a pair just above the spiracles; and the third pair just below the spiracles. There is usually a narrow green stripe along the bases of the larvapods and interrupted between them .....Pl.III..Neodiprion abietis,p. 12.

(a.a.) Head varying in color, but not black.

(1) Head yellow-brown, the front with a distinct dark brown triangular marking; the top and sides of the head without brown markings. Body with two fine closely approximated dark green stripes down the center of the back ....Pl. IV. Diprion frutetorum, p. 14.

(2) Head dull brown, the front with a dark-brown triangular marking similar to that of the above species, but less distinct. Top and sides of the head with brown markings. Body lacking the fine stripes down the center of the back .... Pl. V. Diprion polytomum .. p. 15.

(3) Body yellow, four rows of black spots, two along the back, smaller; two above the spiracles, large and nearly square .... Pl. VI. Neodiprion lecontei. p. 17.

(4) Body dull yellow with three longitudinal brown stripes, one down the center of the back; the other two along the sides just above the spiracles .....Pl.VII. Monoctenus juniperinus.p. 19.

(5) Body yellow, the last abdominal segment with two large black spots on the top. No other markings.. .....Pl. VIII. Neodiprion swainei. p.20.

(6) Body yellow with two sooty-black stripes, one on either side of the back and extending down over the upper portion of the side. The area above the spiracles has either, (1) a row of large nearly square black spots, or (2) a black stripe which is wider above each spiracle than in between them ....Pl. IX. Neodiprion dubiosus. p. 21.

A.A. Abdominal segments 2-7 and 10 bearing larvapods.

(a) Head black.

(b) Body gray-green, without spots or stripes, uniformly darker above the spiracles than below them. Host, Larch. .....Pl. X. Pristiphora erichsonii. p. 23.

(b.b.) Body with two fine, closely approximated stripes down the center of the back ....Pikonema alaskensis (melanic).

(a.a.) Head not black.

(1) Head light green, a black spot above the eye and extending upwards towards the top of the head ....Pl. XI. Pikonema dimmockii. p. 24.

(2) Head light yellow-brown; body light green. Host, Larch. .....Pl. XII. Anoplonyx laricis. p. 26.

(3) Head reddish-brown; body with two fine closely approximated dark stripes down the center of the back. Host, Spruce .....Pl. XIII. Pikonema alaskensis. p.28.

1. Neodiprion pinetum Norton
(Black-headed Pine Sawfly)

General Appearance: Gray with black spots. Head and thoracic legs black. Length approximately 20 mm. Plate I.
Markings: Body gray near (3)(p. 63, Pl. 20, B, 1). Four longitudinal rows of black spots, two rows on the back, two above the spiracles on the sides. Spots on the back tapering posteriorly, longer than wide; spots above the spiracles nearly square. A large black area on the upper surface of the last abdominal segment.
Variations: The rows of black spots on the back are missing in occasional specimens of mature larvae. Earlier larval stages often have black spots on the thorax only.
Time of Occurrence: Larval stage occurs in late July and August.
Host: White pine. Reported also on jack pine.
Distribution: Scattered points throughout range of host.
Parasites: Lamachus virginianus
Mesochorus sp.
Euthelaira sp.
Spathimeigenia aurifrons
Phorocera (noctuiformis)

Syncnomy:

Lophyrus Norton, E. Transactions American Entomological Society. 2: 328. 1869.

Lophyrus — Packard, A.S. Report U. S. Entomological Commission. 5:759. 1890.

" — Dalla Torre, C.G. Catalogus Hymenopterorum. 1:297. 1894.

Neodiprion — Rohwer, S.A. Proceedings Entomological Society of Washington. 20:87. 1918. (= Lophyrus abboti most American authors).

2. Diprion simile Hartig
(Introduced Pine Sawfly)

General Appearance: Variegated, black, yellow and gray. Head black. Abdominal segments 2-8 and 10 with larvapods. Length, approximately 24 mm. Plate II.

Markings: Annulets on the back outlined with black, with the enclosed areas yellow or gray. On the sides, body black with numerous nearly circular areas yellow,(3) (p. 41, Pl.9, L,2) or gray. Larvapods and lower portion gray. Conspicuous folds below and behind each spiracle, bright yellow.

Variations: Earlier larval stages have the head black, body dull yellowish-green.

Host: Scots pine; mugho pine.

Distribution: Scattered points in southern Ontario and United

States.

Parasites: Monodontamerus dentipes Boh.

References:

Britton, W. E. — Report State Entomologist, Connecticut, 15: 118. Pls. VII, VIII. 1916.

Britton, W. E. and Zappe, M. P. — Connecticut Agricultural Experiment Station Bulletin. 203: 273-290. 1917.

Enslin, E. — Die Tenthredinoidea Mitteleuropas, Deutsche Entomologische Zeitschrift. : 540-565. 1912-17.

Middleton, W. — U. S. Department Agriculture Bulletin 1182, Washington, D.C. 1923.

3. Neodiprion abietis Harris
(Black-headed Fir Sawfly)

General Appearance: Dull olive-green; head black; abdominal segments 2-8 and 10 with larvapods; length about 20 mm. Plate III.

Markings: Two wide longitudinal stripes on the back, green (3) (p. 67, Pl. 22, K,2) "Lincoln green". A stripe just above and another just below the spiracles, dark green (3) (p. 71, Pl. 24, H, 1). A dark green stripe along the foot insertions

same color as the other stripes on the side. Body between stripes light green (3) (p. 67, Pl. 23,K,2). Color of larva-pods and ventral portion gray-green, (3) (p. 63,Pl. 20, B, 1).

Variations: Stripe below spiracles occasionally absent; other stripes frequently lighter in color.

Time of Occurrence: Larval stage between May and July.

Host: Spruce; balsam fir; white pine; jack pine; red pine.

Distribution: Ontario and Quebec, north to James Bay and as far west as Lake Winnipegosis, Manitoba.

Synonomy:

Lophyrus	abietis	Harris, T.W. Report Insects of Massachusetts. : 376, 1841.
"	"	Fitch, A. Noxious Insects of New York. (4) 63: 283. 1857.
"	"	Norton, E. Transactions American Entomological Society. 2:325. 1869.
"	"	Riley, C.V. Annual Report Insects of Missouri. 9: 29. 1877.
"	"	Packard, A.S. Insects Injurious to Forest and Shade Trees. U.S. Entomological Commission Bulletin 7. 236: 265, 1881.
"	"	Provancher, L. Additions and Corrections Faune Hym. de Quebec. :19, 1886.

Lophyrus abietis	Packard, A.S. Report U.S. Entomological Commission. 5: 757. 1890.
" "	Dalla Torre, C.G. Catalogus Hymenopterorum. 1: 293, 1894.
Neodiprion abietis	Bird. 60th Report Ontario Entomological Society. :76. 1929.

4. Diprion frutetorum Hartig
(Nursery Pine Sawfly)

General Appearance: Green, body yellow with dark green stripes; head yellowish-brown; length, approximately 17 mm. Plate IV.

Markings: Head with a triangular dark-brown marking on the front. Body with two longitudinal stripes down the center of the back, narrow and dark green; a broad stripe above the spiracles, and an interrupted stripe along the foot insertions also dark green.

Host: Jack pine; red pine; Scots pine.

Synonomy:

Lophyrus (Diprion) frutetorum (Foler) Lotr.	Dalla Torre, C.G. Catalogus Hymenopterorum. 1: 293, 1894.
	Rohwer, S.A. Proceedings U.S.

National Museum. 39: 103, 1911.
(? = D. variegatus Hartig)

5. Diprion polytomum Hartig
(European Spruce Sawfly)

General Appearance: Light green, with green and white stripes; head brown; abdominal segments 2-8 and 10 with larvapods; length approximately 21 mm. Plate V.

Markings: Three pair stripes, green,(3) (p. 65,Pl. 21, K, 6), two on the back, two above the spiracles, broad; two along the foot insertions, narrow and interrupted. Three narrow white stripes, one along the center of the back, the others above the spiracles. A narrow, irregular dark green longitudinal line just above the spiracles, and forming lower edge of the broad stripe above the spiracles. Body below spiracles light yellowish-green,(3) (p. 59,Pl. 18, K,2). Ground color of head brown,(3) (p. 51,Pl. 14, L, 8) "syrup brown"; a brown triangle on the front, and an inverted U-shaped brown line on each side of the head, from behind the eyes to the top of the head. Top of head irregularly flecked with darker brown; color of markings on head near (3),(p. 52, Pl. 15,C,9) "pine-cone".

Variations: The white stripes are characteristic of the fourth

and fifth stages. In the final or fully mature stage the narrow dark green stripe above the spiracles is the only marking. Above this stripe, in the sixth stage, the body is uniformly darker green; below it, light yellow-green. In the stages previous to the fourth and fifth, the white lines are absent, the green stripes well differentiated, the spaces between them being light yellow-green.

Time of Occurrence: Larval stage occurs from June until late September.

Host: Spruce. Larvae show a decided preference for older foliage.

Distribution: Heaviest concentration occurs in Gaspe Peninsula. Also in all of New Brunswick; northern Quebec from a point opposite Anticosti Island to just over the boundary into northern Ontario. Scattered infestations occur between Georgian Bay and Lake Ontario. Also in northeastern United States north of a line drawn from New York City to Rochester, N.Y., with the heaviest concentration in northern Maine.

Parasites: Micriplectron fuscipennis Zett. (European)
Bessa selecta
Spathimeigenia aurifrons
Aptesis indistincta Prov.
Phorocera lamata A & W
Stylocryptus subclavatus Say.

Reference: Annual Report Forest. Insect Survey, Department of Agriculture, Canada.

6. Neodiprion lecontei Fitch

(Red-headed Pine Sawfly)

General Appearance: Yellow with black spots; head reddish-brown; abdominal segments 2-8 and 10 with larvapods; length approximately 25 mm. Plate VI.

Markings: Four longitudinal rows of black spots, two on the back, the spots longer than broad and tapering posteriorly; two above the spiracles with the spots larger and nearly square. Two large black spots on the top of the last abdominal segment, separated by a very narrow yellow line, of the same shade as the general body color. Ground color of body near (3) (p. 41, Pl. 9, K, 3). Color of head fairly uniform, near (3) (p. 47, Pl. 12, K, 10). "Chinese Gold".

Variations: Ground color of mature larvae varies from the typical bright yellow to dull grayish or greenish yellow. The spots vary from dark, velvety-black to dull brownish black. The typical long, tapering form of the dorsal spots may give way in some cases to small, round, dot-like spots. An additional row of black spots may occur, each spot being just above and in front of the first segment of each larvapod, and in a similar position in regard to the meso- and meta-thoracic legs. In the earliest larval stages the rows of black spots are missing or very faint, appearing first on the thorax. The spots above the spiracles are usually first to appear.

Time of Occurrence: Larvae occur in greatest numbers in the latter part of July and August.

Host: Red pine; Scots pine; jack pine.

Parasites: Spathimeigenia aurifrons

Lamanchus lophyri

" contortionis

Perilampus hyalinus

Phorocera hamata A & W

Mesoleuis sp.

Holocremus sp.

Exenterus sp.

Phorocera claripennis

Spathimeigenia spinigera

Phorocera (near macra) sp.

Admontia hylotomae Coq.

Masicera (near exilis) sp.

Synonomy:

Lophyrus lecontei		Fitch, A. Report Noxious Insects (4) 58: 273. 1859.
"	"	Norton, E. Transactions American Entomological Society. 2: 329. 1869.
"	"	Riley, C.V. Report Insects of Missouri. 9: 33, 1877.
"	"	Packard, A.S. Report U.S. Entomological Commission. 5: 758. 1890.
"	"	Dalla Torre, C.G. Catalogus Hymenopterorum. 1: 295. 1894.

Neodiprion lecontei		Rohwer, S.A. Proceedings Entomological Society of Washington. 20: 84, 1918.
"	"	Middleton, W. Journal of Agricultural Research. 20: 941, 1921.
"	"	Ross, H. H. Illinois Biological Monographs. (15) 2: 58, 1937.

7. Monoctenus juniperinus Mac Gillivray
(Juniper Sawfly)

General Appearance: Dull yellow, with brown stripes; head yellowish-brown; abdominal segments 2-8 and 10 with larvapods. Length approximately 16 mm. Plate VII.

Markings: Three longitudinal brown stripes, one along the center of the back, and the other two just above each row of spiracles. Color of stripes near (3) (p. 55, Pl. 16, J, 7). Ground color of body dull yellow, close to (3) (p. 51, Pl. 14, I, 2). Body above spiracles more brownish, darker than ventral half. Head uniformly yellow-brown, near (3) (p. 49, Pl. 13, L, 10).

Host: Cedar; juniper.

Time of Occurrence: Larval stage occurs during July and August.

Distribution: A few scattered points in Ontario, Quebec and New York state.

Reference:

Mac Gillivray, A.D. Canadian Entomologist. 26: 328, 1894.

8. Neodiprion swainei Middleton
(Swaine's Jack Pine Sawfly)

General Appearance: Yellow, without markings except for large black areas on the upper surface of the last abdominal segment; head reddish-brown; abdominal segments 2-8 and 10 with larvapods; length approximately 20 mm. Plate VIII.

Markings: Body uniform yellow, no spots or stripes except as stated above, shade of yellow near (3) (p. 49, Pl. 13, K, 1). Last abdominal segment with two large black spots, one on either side of the narrow middle area. Thoracic legs black. Color of head close to (3) (p. 51, Pl. 14, D, 12).

Variations: Color of body varies from bright yellow to a duller yellowish-green. Earlier stages resemble mature larvae.

Host: Jack pine; red pine.

Distribution: Scattered areas in Ontario, Quebec, and New Brunswick.

Parasites: Perilampus hyalinus (as primary)
Spathimeigenia aurifrons

References:

Middleton, W. Proceedings Entomological Society of Washington. 33: 171. P.Q. 1931.

Dunn, G. W. 61st Annual Report Ontario Entomological Society 1936.

9. Neodiprion dubiosus Schedl.
(Red-headed Jack Pine Sawfly)

General Appearance: Yellow with wide black stripes; head reddish-brown; abdominal segments 2-8 and 10 with larvapods; length approximately 20 mm. Plate IX.

Markings: Two wide stripes on the back, dull greenish-black and separated by a central area of yellow, same shade as general body color (3) (p. 59, Pl. 18, G, 1). Top of last abdominal segment with a large nearly circular black spot. Area just above spiracles with either (1) a black stripe, slightly darker and enlarged above each spiracle, or (2) a row of large nearly square black spots. Also, a narrow stripe along the foot

insertions, black, and interrupted faintly between them. Larvapods and lower portion dull yellow-white, near (3) (p. 61, Pl. 19, C, 1). Head uniformly reddish-brown, near (3) (p. 47, Pl. 12 K, 10) "Chinese Gold".

Variations: Earlier larval stages lack the black stripes and the black spot on the last abdominal segment. In later stages the black stripes along the back and on the last segment are visible, but quite faint.

Time of Occurrence: Larval stage occurs in July and August.

Host: Jack pine; red pine.

Distribution: A few scattered points in northern Ontario and Quebec, Muskoka, Sault Ste Marie, Orangeville, Gananoque, and Berthierville.

Parasites: Spathimeigenia aurifrons

Reference: Annual Report Forest. Insect Survey, Department of Agriculture, Canada. 1938.

10. Pristiphora erichsonii Hartig
(Larch Sawfly)

General Appearance: Gray-green; head black; abdominal segments 2-7 and 10 with larvapods; length approximately 20 mm. Plate X.

Markings: Body above spiracles is dull gray-green (3) (p. 85, Pl. 31, A,4) except upper part of prothorax, which is dull whitish-green; lower half of body lighter greenish-white, near (3) (p. 65, Pl. 21, D, 2); head solid black, shining, covered with a minute network of shallow cracks. Earlier stages resemble mature larvae.

Variations: Color of upper half of body varies from a light greenish-gray to a very dark gray-green approaching black.

Time of Occurrence: Larval stage occurs from late May to mid-August. Apparently just one generation per year.

Host: Larch

Distribution: Bessa selecta (native)
Mesoleius tenthredinis (introduced)

Synonomy:

Nematus erichsonii	Hartig, T. Die familien der Blattwespen und Holzwespen. Joseephy, Berlin, : 187, 1837.
" "	Hagen, H.A. Canadian Entomologist. 13: 37, 1881.

Nematus erichsonii		Fletcher, J. Canadian Entomologist. 16: 215, 1884.
Lygaeonematus	"	Konow, F. W. Deutsch Entomologische Zeitschrift XXXIV. :247, 1890.
Nematus erichsonii		Dalla Torre, C.G. Catalogus Hymenopterorum. 1: 221, 1894.
Lygaeonematus	"	Marlatt, C.L. U.S. Department of Agriculture Technical Bulletin. 3: 111, 1896.
"	"	Mac Gillivray, A.D. Hymenoptera of Connecticut. :115, 1916.
Pristiphora	"	Ross, H.H. Illinois Biological Monographs (15) 2: 154.

11. Pikonema dimmockii Cresson
(Green-headed Spruce Sawfly)

General Appearance: Light green with white stripes; head green, shining; abdominal segments 2-7 and 10 with larvapods; length approximately 19 mm. Plate XI.

Markings: A wide white longitudinal stripe on the side along the center of the body. Area immediately below white stripe slightly darker than elsewhere. No other conspicuous markings

on the body. General body color light green, near (3) (p. 67, Pl. 22, E, 9). Head shiny green, near (3) (p. 67, Pl. 22, K, 4); a black marking just above the eye, and extending upwards towards the top of the head. The black mark above the eye is constant throughout individuals of this species, although varying somewhat in size and distinctness. The two segments of the thoracic legs close to the body are green, the other segments light yellowish-brown.

Time of Occurrence: Larval stage occurs from June until early August.

Host: Spruce

Distribution: Wherever spruce occurs, but rarely found in large numbers.

Parasites: Euromemnus sp.
Holocremnus sp.
Mesochorus sp.

Synonomy:

Nematus dimmockii	Cresson, E. T. Transactions American Entomological Society. 8: 6, 1880.
" ocreatus	Harrington, W.H. Canadian Entomologist. 21 (5) : 95.
Pachynematus "	Marlatt, C.L. U.S. Department of Agriculture Entomological Technical Bulletin. 3: 94.

Pachynematus ocreatus	Mac Gillivray, A.D. Hymenoptera of Connecticut. :120, 1916.
Pikonema dimmockii	Ross, H.H. Illinois Biological Monographs. 15 (2) :86, 1937.
" "	Ross, H.H. Proceedings Entomological Society of Washington. 40: 17, 1938. (= Nematus ocreatus Hartig)

12. Anoplonyx laricis Marlatt
(Marlatt's Larch Sawfly)

General Appearance: Light green; head brown; abdominal segments 2-7 and 10 with larvapods; length approximately 11 mm. Plate XII.

Markings: Body with two pair of stripes, one pair on the back, the other above the spiracles. Stripes darker green than remainder of body, near (3) (p. 71, Pl. 24, H, 10), they may be quite faint, especially those on the back. General body color light green (3) (p. 63, Pl. 20, B, 7). Head yellow brown, near

(3) (p. 49, Pl. 13, L, 8) "Sumac brown".

Variations: The stripes above the spiracles may be nearly black in some cases, and are apparently darker in larvae occurring later in the summer. The general body color is often decidedly blue-green. Earlier larval stages resemble the mature larvae.

Time of Occurrence: The larval stage occurs from June to July and into September. The numbers seem to decrease for a time in August.

Host: Larch

Distribution: Throughout range of host.

Synonomy:

Hemichroa	Marlatt, C.L. Canadian Entomologist. 28: 251, 1896.
Marlattia	Ashmead, W. H. Canadian Entomologist. 30: 387, 1898.
"	Rohwer, S.A. U. S. Department of Agriculture Entomological Technical Bulletin. 20: 108, 1911.
"	Mac Gillivray, A.D. Hymenoptera of Connecticut. : 105, 1916.
Anoplonyx	Ross, H.H. Illinois Biological Monographs. 15 (2): 82.

13. Pikonema alaskensis Rohwer
(Yellow-headed Spruce Sawfly)

General Appearance: Yellow with green stripes; head reddish-brown, typically; abdominal segments 2-7 and 10 with larvapods; length approximately 20 mm. Plate XIII.

Markings: Two fine, closely approximated lines down the center of the back, green; a wide green stripe above the spiracles; a row of green markings along the bases of the larvapods. Stripes and lines green, near (3) (p. 65, Pl. 23, L, 5). "cedar green". Color of body between stripes and lower portion greenish-yellow, near (3) (p. 59, Pl. 18, J, 1). Head reddish-brown, near (3) (p. 45, Pl. 12, K, 11).

Variations: In some specimens, head black, shining; stripes black; body between stripes and lower portion dirty-white except for the tips of the larvapods which have a yellowish tinge. General appearance of such individuals is preponderantly black. Less commonly, specimens have body shiny-green between the black stripes. The head in these varies from shiny-black to partially black and muddy-brown. The two narrow lines down the center of the back are constant throughout the species.

Time of Occurrence: From early June until mid-September.

Host: Spruce.

Distribution: Various points in Muskoka, eastern and northern Ontario, New Brunswick, Quebec, Manitoba, Saskatchewan, Northwest Territories and Alaska.

Parasites: Holocremnus sp.

Euronemus sp.

Monoblastus sp.

Mesoleuis sp.

Bessa selecta

Mesochorus sp.

Synonomy:

Nematus ocreatus	Harrington, W. H. Canadian Entomologist. XXI. :95. 1889.
" "	Harrington, W. H. Marlatt, C. L. U. S. Department of Agriculture Entomological Technical Bulletin. 3: 95. 1896.
Pachynematus piceae	Rohwer, S.A. Proceedings U. S. National Museum. 41: 387. 1912.
Pikonema alaskensis	Ross, H.H. Proceedings Entomological Society of Washington. 40: 19, 1937.

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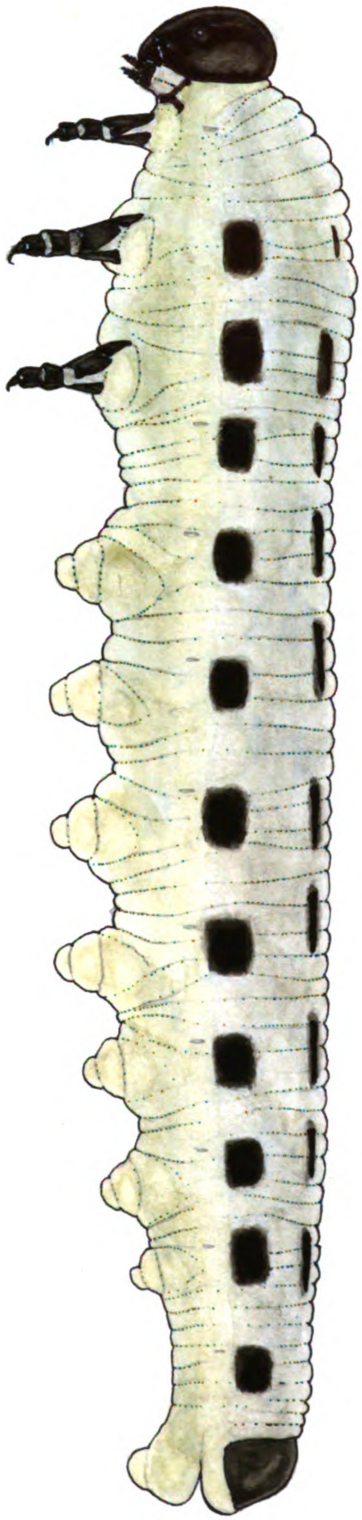
2. Greene, C.T. 1921. Dipterous parasites of sawflies. Proceedings Entomological Society of Washington. 23 (2) 41-43.

3. Maerz, A. and Paul, M.R. 1930. A Dictionary of Color. McGraw-Hill, New York: London.

4. Ross, H.H. 1937. A Generic Classification of the Nearctic Sawflies. Illinois Biological Monographs. 15 (2) 173 pp. 17 Pls.

5. Mac Gillivray, A.D. 1913. The Immature Stages of the Tenthredinoidea. Extract from Annual Report Entomological Society of Ontario. 75 pp. 1 Pl.

6. Yuasa, H. 1922. A Classification of the Larvae of the Tenthredinoidea. Illinois Biological Monographs. 17 (4) 172 pp. 14 Pls.



Pl. 1.

PLATE II

Diprion simile Hartig

Pl

PLATE III

Neodiprion abietis Harris

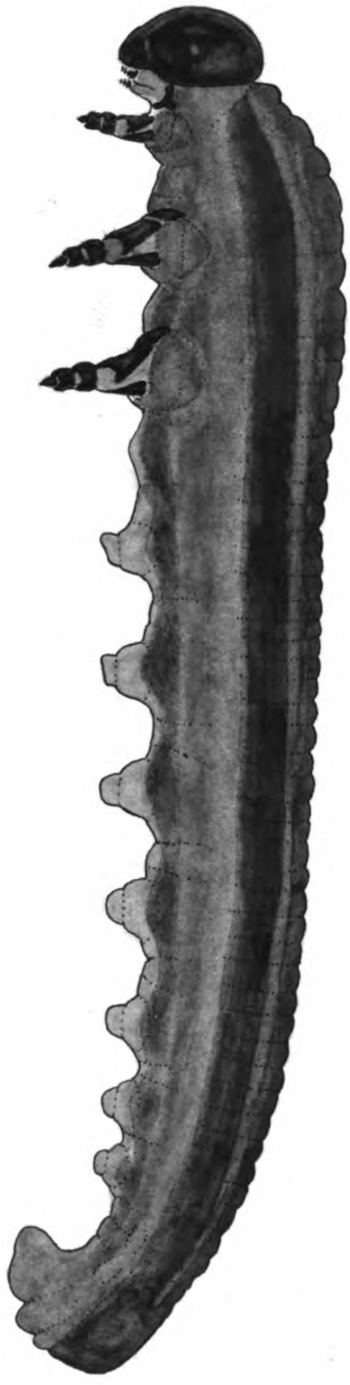


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PLATE IV

Diprion frutetorum Hartig

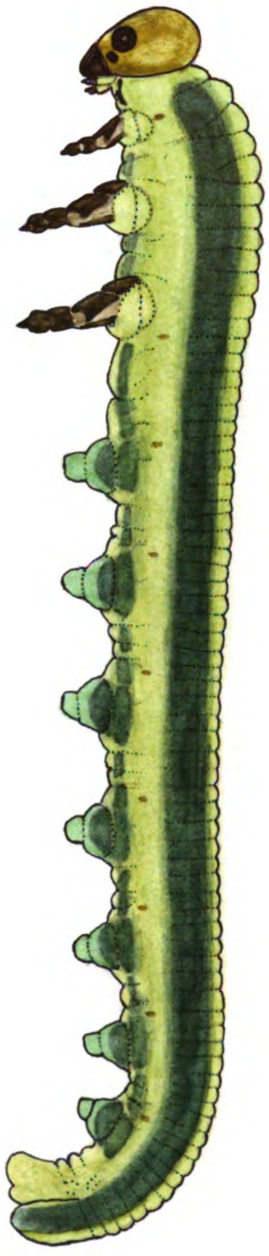

Plate IV

PLATE V

Diprion polytomum Hartig

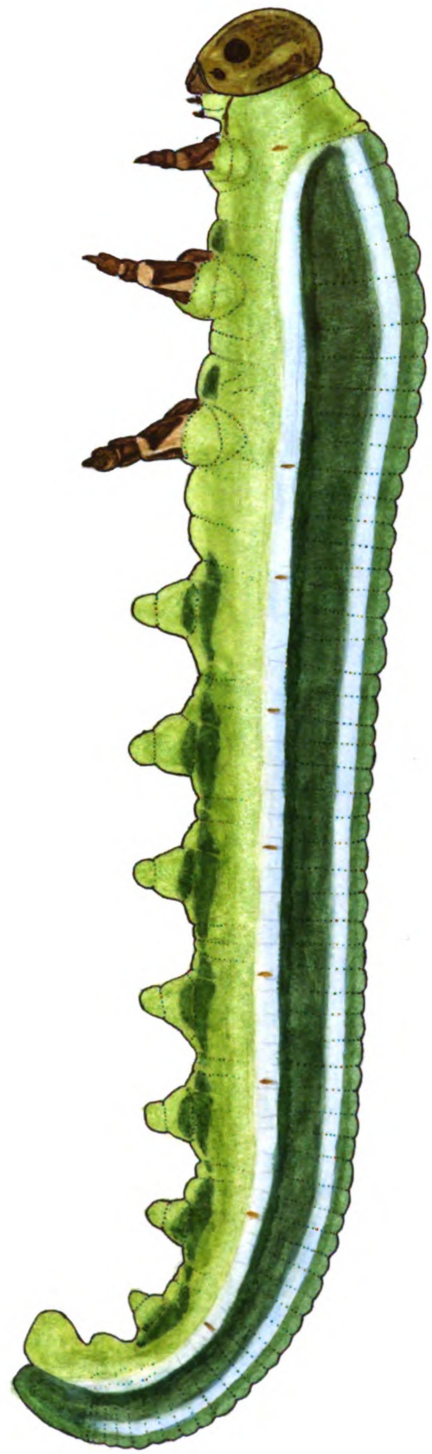

Plate V

PLATE VI

Neodiprion lecontei Fitch

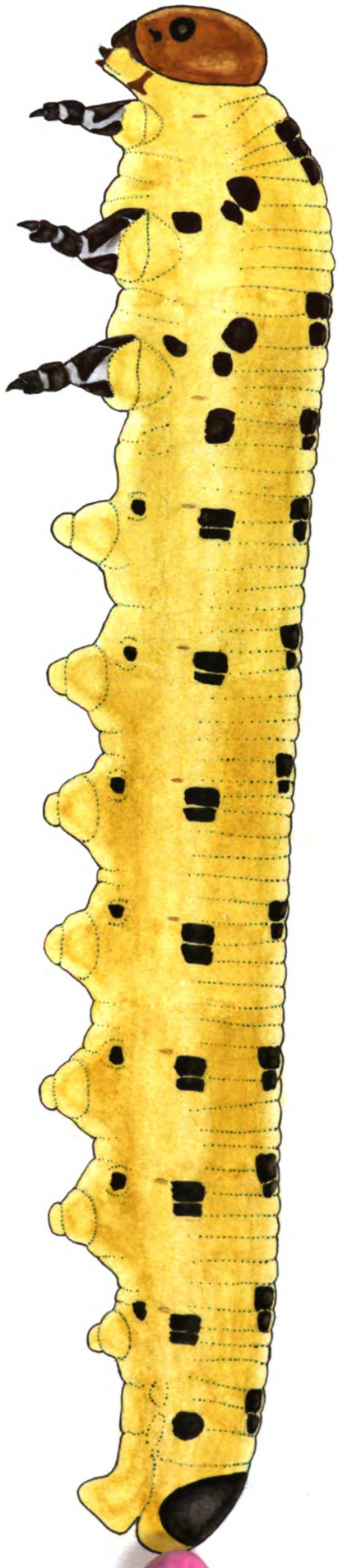

Plate VI

PLATE VII

Monoctenus juniperinus Mac Gillivray

Plate VII

PLATE VIII

Neodiprion swainei Middleton

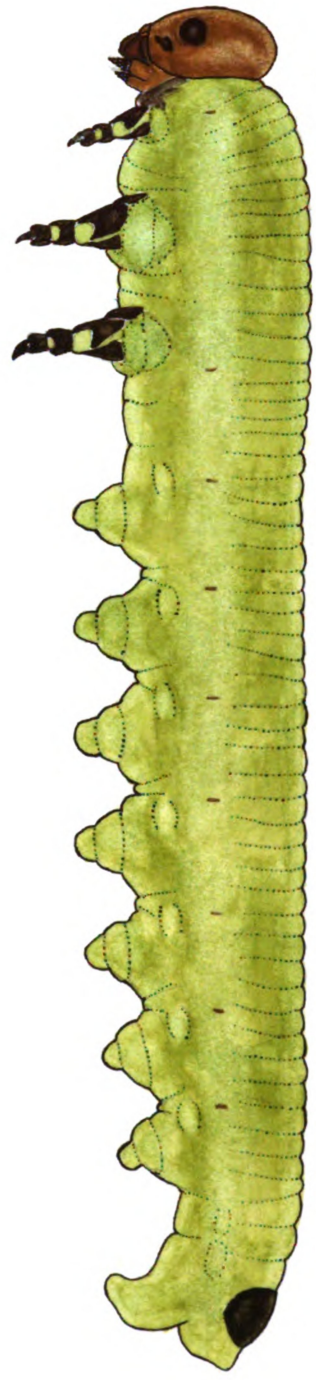

Plate VI

PLATE IX

Neodiprion dubiosus Schedl

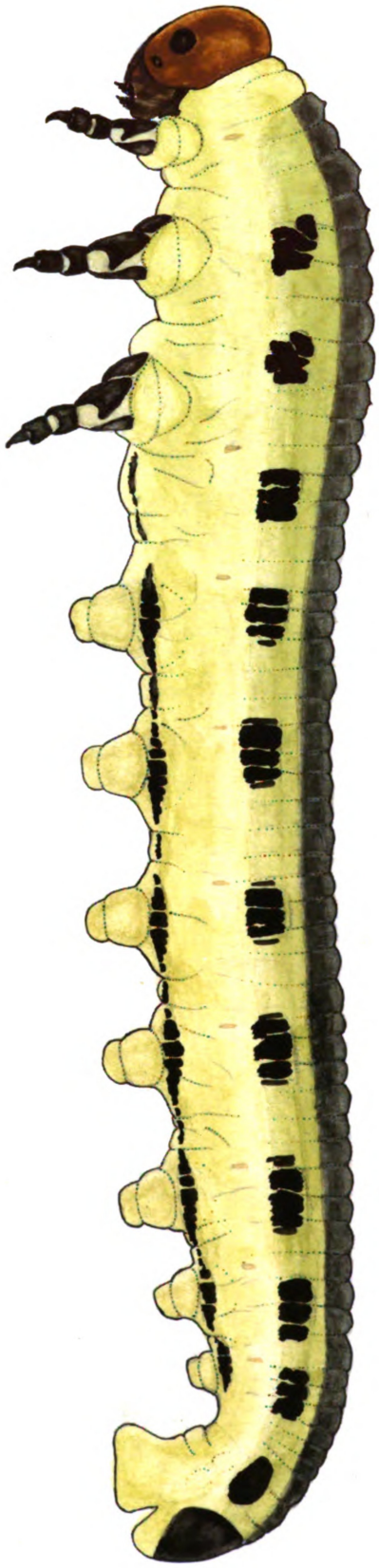

Plate IX

PLATE X

Pristiphora erichsonii Hartig

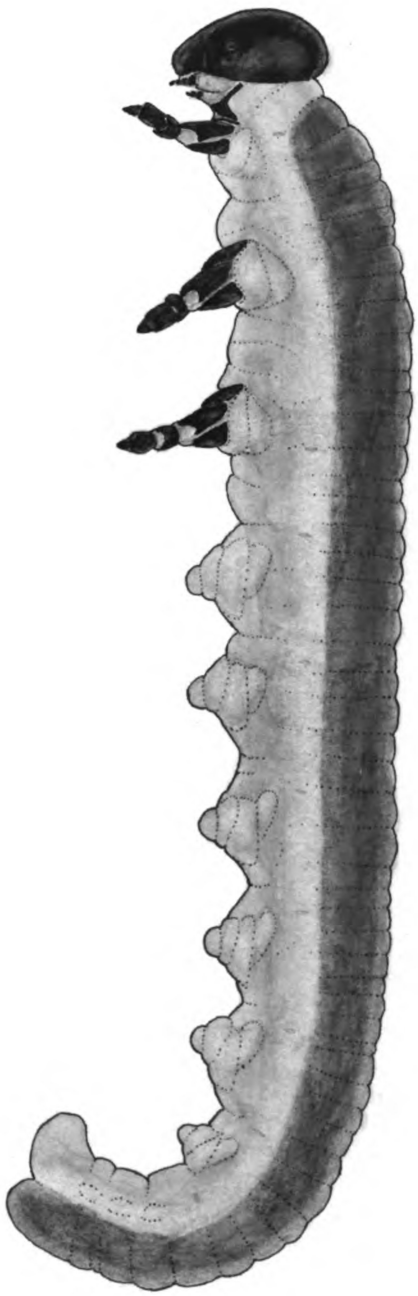

Plate x

PLATE XI

Pikonema dimmockii Cresson

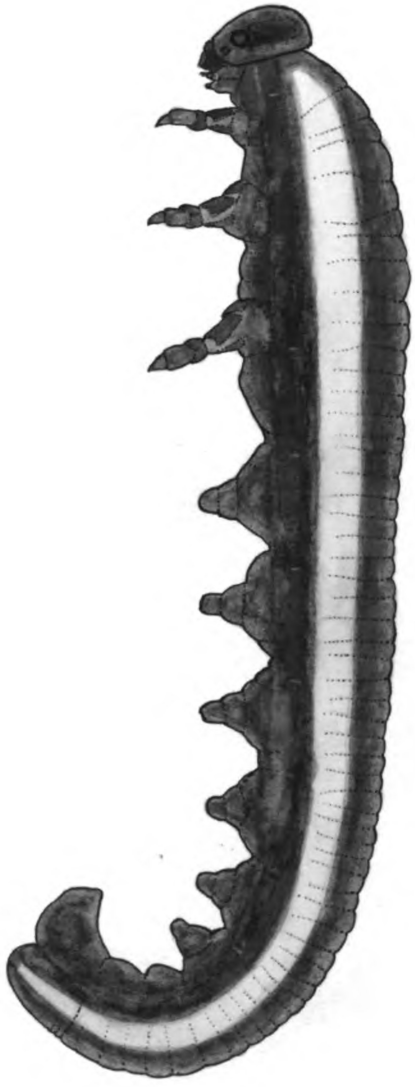

Plate XI

PLATE XII

Anoplonyx laricis Marlatt

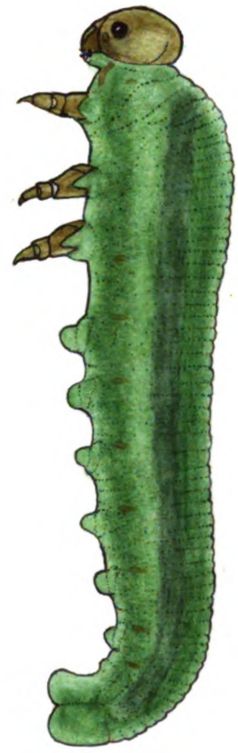

Plate XII

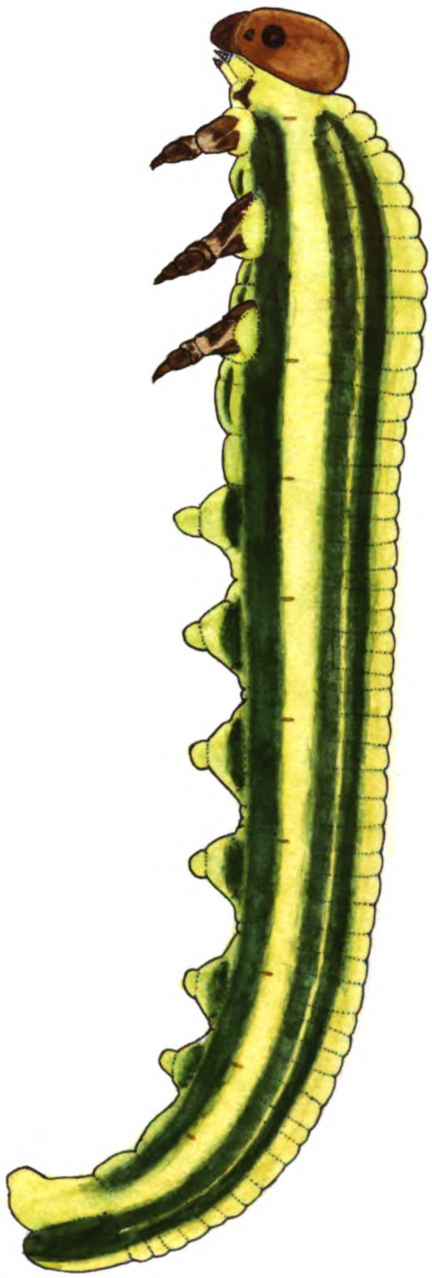

Plate XIII

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