



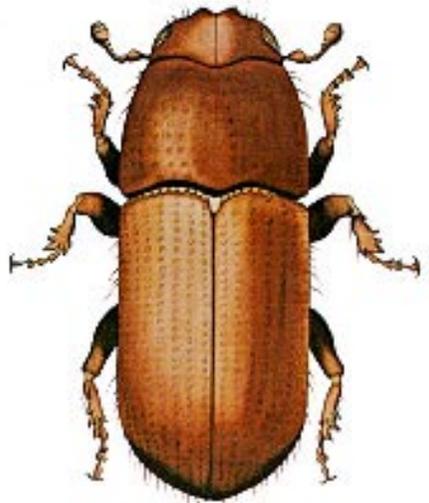
United States
Department of
Agriculture

Combined Forest Pest
Research and
Development Program

Agriculture Handbook
No. 563

Southern Pine Beetle Handbook

How to Identify Common Insect Associates of the Southern Pine Beetle



Contents

Introduction	3	Diptera	22
Using this Handbook	3	Stratiomyiidae	22
Hemiptera	4	<i>Zabrachia</i>	22
Anthracoridae	4	Dolichopodidae	23
<i>Lyctocoris</i>	4	<i>Medetera</i>	23
Scoloposcelis	4	Sciaridae	24
Aradidae	5	Lonchaeidae	25
<i>Aradus</i>	5	<i>Lonchaea</i>	25
Coleoptera	6	Hymenoptera	26
Histeridae	6	Formicidae	26
<i>Platysoma</i>	6	<i>Creमतogaster</i>	26
<i>Plegaderus</i>	6	Braconidae	26
Trogositidae	8	<i>Cenocoelius</i>	26
<i>Temnochila</i>	8	<i>Coeloides</i>	26
<i>Tenebroides</i>	8	<i>Atanycolus</i>	26
Staphylinidae	9	<i>Dendrosoter</i>	28
<i>Leptacinus</i>	9	<i>Meteorus</i>	28
Cleridae	10	<i>Spathius</i>	28
<i>Thanasimus</i>	10	Pteromalidae	29
Cucujidae	11	<i>Dinotiscus</i>	29
<i>Silvanus</i>	11	<i>Roptrocercus</i>	30
Colydiidae	12	<i>Heydenia</i>	30
<i>Aulonium</i>	12	Eurytomidae	31
<i>Colydium</i>	12	<i>Eurytoma</i>	31
<i>Lasconotus</i>	12	Platygastridae	32
Tenebrionidae	14	<i>Platygaster</i>	32
<i>Corticeus</i>	14	<i>Leptacis</i>	32
Curculionidae	15	Acknowledgments	33
<i>Cossonus</i>	15	Selected References	33
Cerambycidae	16		
<i>Monochamus</i>	16		
<i>Neacanthocinus</i>	16		
Platypodidae	18		
<i>Platypus</i>	18		
Scolytidae	19		
<i>Xyleborus</i>	19		
<i>Dendroctonus</i>	19		
<i>Ips</i>	20		
<i>Pityophthorus</i>	21		
<i>Crypturgus</i>	21		
<i>Gnathotrichus</i>	21		

How to Identify Common Insect Associates of the Southern Pine Beetle

**by Richard A. Goyer,¹ Gerald J
Lenhard,¹ T. Evan Nebeker,²
and Linda D. Jarrard²**

¹Department of Entomology, Louisiana
State University, Baton Rouge.

²Department of Entomology, Mississippi
State University, Mississippi State.

Introduction

Heavy timber damage by the southern pine beetle (*Dendroctonus frontalis* Zimmermann) (SPB) and recent intensive research have resulted in the need to identify this subcortical insect and its insect associates. Associates include insects reported to be predaceous or parasitic as well as those merely using the same habitat. No extensive reference collections exist that can be shared by researchers, technicians, students, and others concerned with such identification. We developed this handbook to present some of the more commonly found insect associates of the SPB.

This guide by no means represents all the insects associated with SPB. Our selection was based on a survey of entomologists and others experienced with SPB research: they indicated which insect associates of the beetle would be most representative and helpful in their work. Of course, we made the final selections and our biases are reflected herein. It is our belief, however, that the 48 species, or species groups, covered in the handbook comprise the important insect associates of the SPB encountered in the southeastern United States.

Using this Handbook

To use the handbook, turn to the first page listing specimens in the insect order. Then, compare the unknown species with the descriptions and photographs or drawings given. Although the photographs depict natural color, preserved specimens--especially those in alcohol--may not have exactly the same color as those in the pictures. All sizes given are average length.

The brief written descriptions are not intended to be taxonomically complete, but to pinpoint the features most useful in distinguishing a species or species group. Where minute characteristics are required to distinguish species, or where taxonomic problems exist, the genus alone is listed. Some prior training in entomology is assumed.

Hemiptera

Anthocoridae



- *Lyctocoris* Hahn (fig. 1 A); and *Scoloposcelis mississippiensis* (Drake and Harris) (figs. 1B, 2): *S. mississippiensis* (2.8-3.5 mm) has spines on the front femora, which *Lyctocoris* (3.8-5.0 mm) does not have (figs. 1A, 1B).

Figure 2

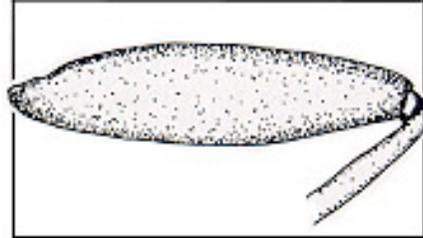


Figure 1A

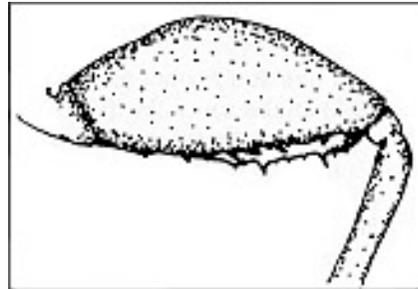


Figure 1B

Aradidae



Figure 3

- *Aradus* F. (fig. 3): The most noticeable features of *Aradus* sp. (3.4-4.0 mm) are its dorsoventrally flattened appearance, its small head and thorax in relation to abdominal size, and its pebbly appearance. Antenna are four-segmented.

Coleoptera

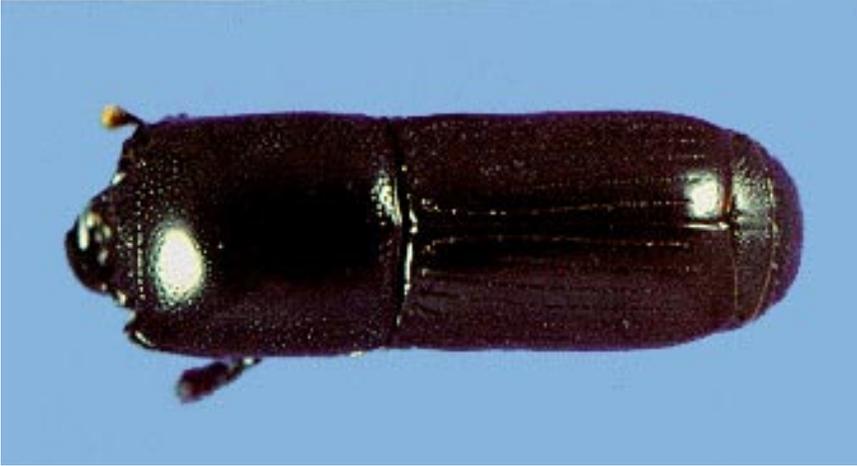


Figure 5

Histeridae: The histerids are black, shiny, hard-bodied beetles with short elytra. The posterior abdominal segments are exposed dorsally beyond the elytra.

- *Platysoma (Cylistix) cylindrica* (Paykull) (figs. 4A, 5): *P. cylindrica* (4.3 mm) has a spiny front tibia and a pointed prosternum (fig 4A).
- *P. (Cylistix) attenuate* (LeConte (figs. 4A, 6): *P. attenuata* is similar to *P. cylindrica* but is smaller (3.1 mm) than *P. cylindrica*. Also, *P. attenuata* appears thinner when viewed dorsally (fig. 6).

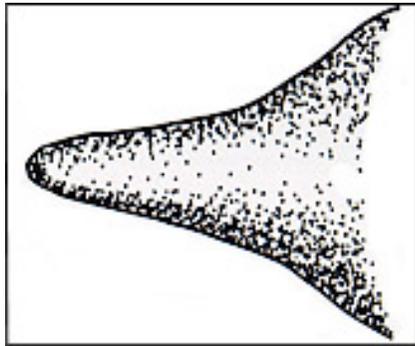


Figure 4A

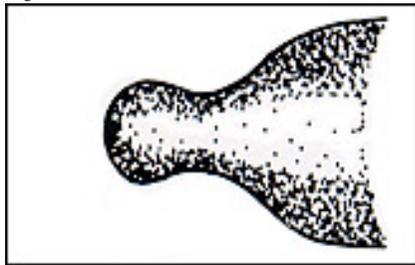


Figure 4B

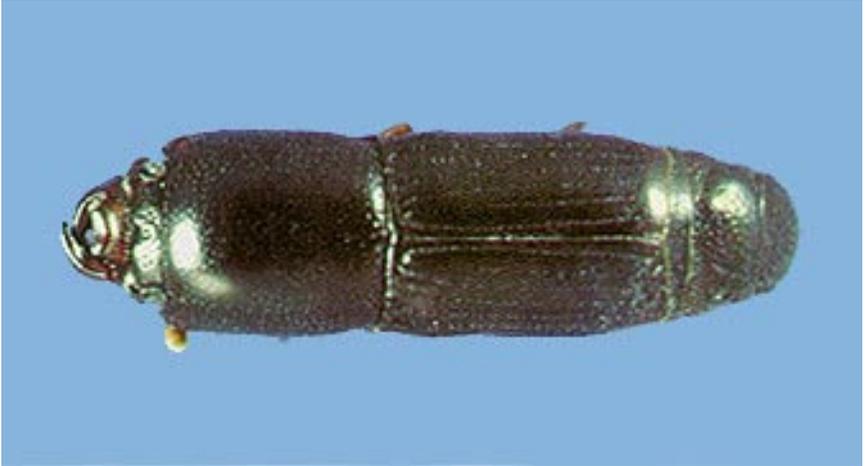


Figure 6



Figure 7



Figure 8

- *P. parallelum* Say (figs. 4B, 7): *P. parallelum* (2.7-3.6 mm) can be distinguished from these first two species because it has a rounded prosternum (fig. 4B). In addition, its pronotum is short relative to the length of the elytra (fig. 7), and it lacks deep pits on the metasternal plate.
- *Plegaderus* Erichson (fig. 8): *Plegaderus* is a tiny (1.5 mm), oval, shiny, black beetle. *Plegaderus* has short elytra and is punctate with a smooth band on the prothorax.

Trogositidae: Trogositids (formerly, Ostromidae) have large heads and pronota and a narrow union between the pronotum and elytra. They appear somewhat flattened dorsoventrally.

Temnochila virescens (F.) (figs. 10, adult; 9, larva): This predator is large and elongate. Its size (10 mm) and its brilliant metallic green color make it easily recognizable. Larvae are white, have dark heads, well-developed thoracic legs, and two darkened anal projections (urogomphi). They have fused thoracic shields on the second segment.

- *Tenebroides collaris* (Sturm) (fig. 11): *T. collaris* can be distinguished from *T. marginatus* (fig. 11) because it is larger (7.2 mm) and has dark brown to black elytra and a reddish brown head. Each species has a punctate head and margined elytra
- *T. marginatus* (Palisot de Beauvois) (fig. 12): *T. marginatus* (5.2 mm) is more uniformly medium brown on the pronotum and elytra than *T. collaris*.

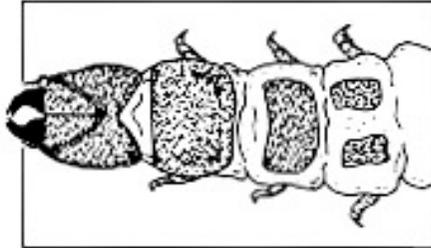


Figure 9

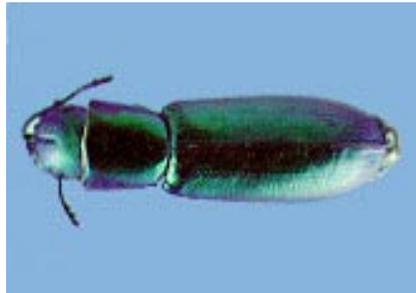


Figure 10



Figure 11



Figure 12

Staphylinidae



Figure 13

- *Nudobius luridipennis* (Casey) (fig. 13): *N. luridipennis* (7.5-8.2 mm), like other staphylinids, are slender and elongate with very short elytra (usually only as long as the elytra are wide). The antennae are beadlike and medium length. It should be noted that there are other species of staphylinids associated with the SPB that, although quite common, are yet undescribed.

Cleridae



Figure 14

- *Thanasimus dubius* (F.) (figs. 14, 15, 16): The checkered beetle, *T. dubius* (7.5-9.0 mm), has easily distinguishable black elytra with white angulate crossbars. The head, thorax, and base of the elytra are red. The larvae are pink when alive (white if preserved), do not have fused thoracic shields, but are otherwise similar to *T. virescens* larvae (see fig. 10).



Figure 15

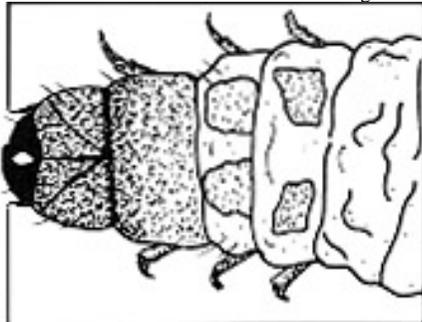


Figure 16

Cucujidae



Figure 17

- *Silvanus bidentatus* (F.) (fig. 17):
Silvanus spp. (3.5-3.9 mm) like other cucujids, are extremely flat, densely punctate, amber brown, and have an elongate prothorax and head. The antennae are beadlike and medium length. There are two teeth on the front angle of the pronotum.

Colydiidae

- *Aulonium* Erichson (figs. 18, 19): Both species presented here are elongate, pale brown, and 3.5-5.0 mm long. They have relatively short, clubbed antennae. *Aulonium* spp. are separated from other SPB insect associates by the strong ridges running nearly the length of the pronotum.
- *A. ferrugineum* Zimmermann, has distinguishing projections on the anterior pronotum, which extend beyond the anterior corners (fig. 18A).
- *A. tuberculatum* LeConte males (fig. 18B) have distinct pronotal tubercles that are absent in the females (fig. 18C).
- *Colydium lineola* Say (fig. 20): *C. lineola* (3.5-5.5 mm) has a ridged pronotum, but the elytra are much more elongate and cylindrical than those of other colydiids found with the southern pine beetle.
- *Lasconotus* Erichson (fig. 21) *Lasconotus* spp. also have a ridged pronotum, but all are considerably smaller (2.8 mm than *Aulonium* spp. They are reddish brown, with rough, striated elytra, and clubbed antennae.

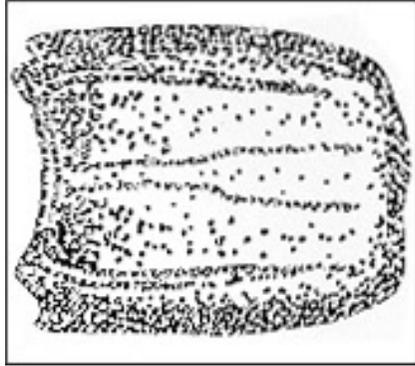


Figure 18A

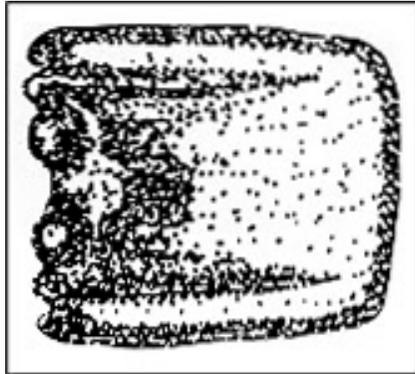


Figure 18B

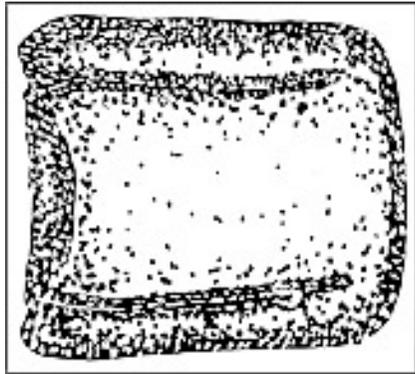


Figure 18C

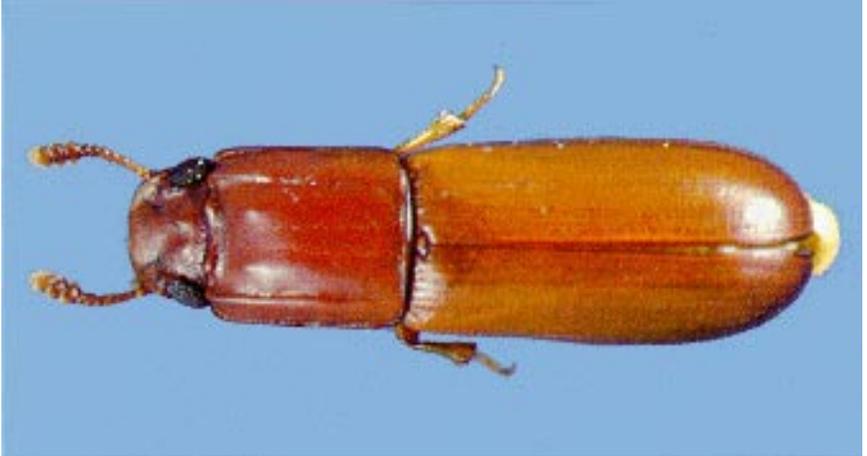


Figure 19

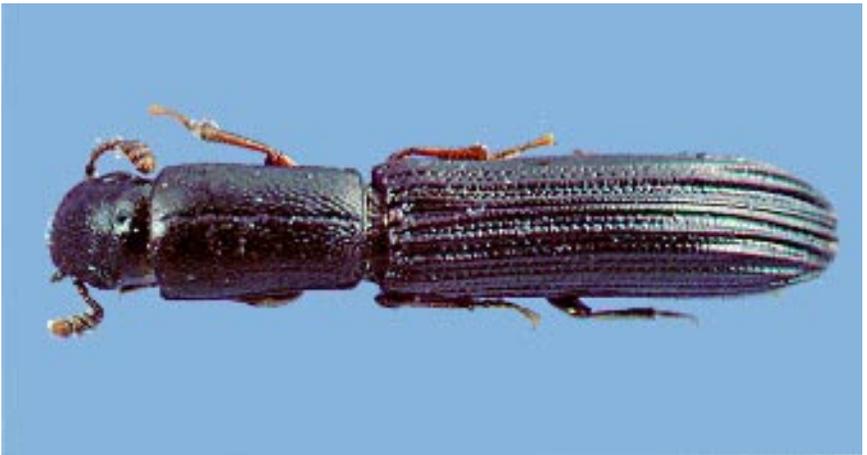


Figure 20



Figure 21

Tenebrionidae

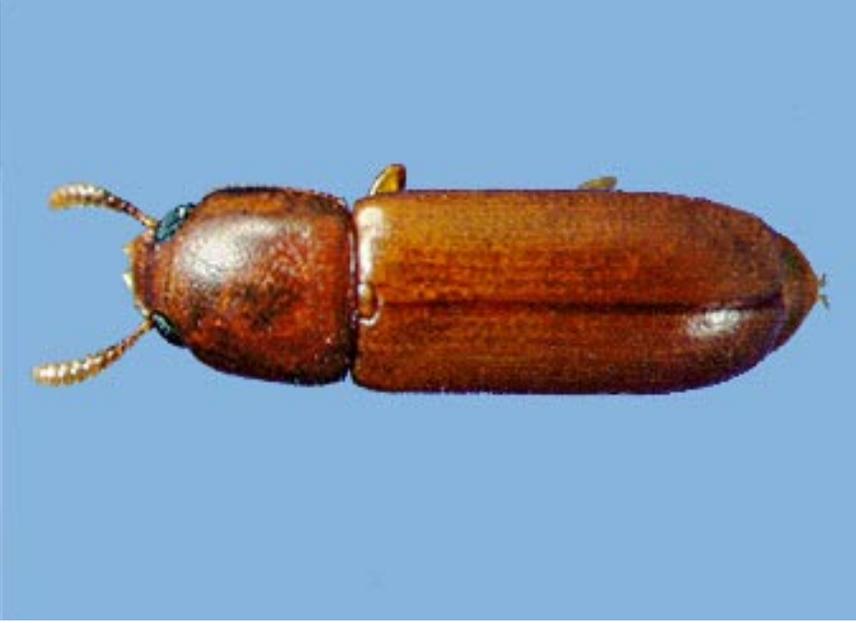


Figure 22

- *Corticeus* Pillar and Mitterpacher (figs. 22, adult; 23, larva): Adult *Corticeus* spp. (3.0-3.4 mm) have an elongate, cylindrical shape, 11-segmented antennae, and amber-brown color (fig. 22). Larvae are laterally striped with alternating light and dark bands on the dorsum of each segment (fig. 23).



Figure 23

Curculionidae



Figure 24

- *Cossonus corticola* Say (fig. 24):
The weevil most frequently encountered in association with SPB galleries is *C. corticola* (4.0-5.0 mm). When the insect is viewed laterally, the stubby snout is the most representative feature. The body is black, cylindrical, and elongate with a punctate and striated elytra. There is a deep groove between and above the eyes.

Cerambycidae: Cerambycids are the largest insect associates of the SPB. They characteristically have very long antennae, often longer than the body. All cerambycid larvae are cylindrical, fleshy white, and legless (fig. 25). They taper gradually from anterior to posterior, and are not C-shaped. They have darkened, strong, well-developed mandibles. Cerambycids taper less abruptly than buprestid larvae, and do not possess an inverted “V” on the large first segment as do the buprestids (fig. 26).

- *Monochamus* Serville (fig. 27): *Monochamus* spp., or pine sawyers, are 17.5-30.0 mm long as adults, and are mottled gray and brown. The thorax has a stout spine on either side. The male antennae are 2 1/2 times body length; female antennae are 1 1/2 times body length.
- *Neacanthocinus obsoletus* (Olivier) (fig. 28): *N. obsoletus* adults are smaller (7.0-14.0 mm) than other sawyers and have black patterns on a primarily gray elytra. The elytra is distinctly punctate nearly to the apex. Lateral tubercles are present on the pronotum, and the legs are successively longer from front to rear.



Figure 25

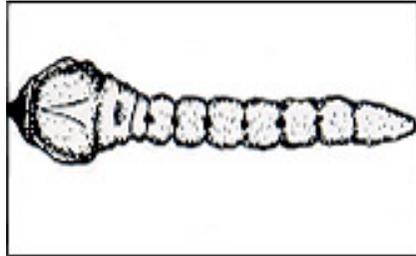


Figure 26



Figure 28



Figure 27

Platypodidae



Figure 29



Figure 30

Platypus compositus Say (figs. 29, male, 30, female): Males have two stout spines on the end of the elytra. Females lack the spines, but like the males, have a very

elongate metathorax. Thus, the hind legs appear to rise from the abdomen. The abdomen is very short relative to overall body length. The tip of the elytra are squared off in the middle. Average length for each sex is 5.0 mm.

Scolytidae

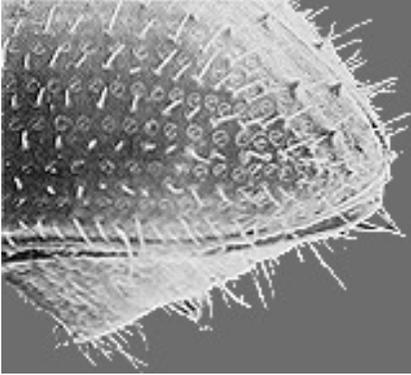


Figure 31



Figure 32



Figure 33



Figure 34

- *Xyleborus* Eichhoff (figs. 31, 32): *Xyleborus* spp. are small (2.0-3.0 mm) and oblong. When viewed from above, the prothorax conceals the head. Like *Ips* spp., some *Xyleborus* have irregular teeth or spines on the posterior of the elytra. These insects, however, have a more shallow declivity than *Ips* and no shelf at the base of the elytra (fig. 31). *Xyleborus* has a bellshaped pronotum that is wider than the anterior portion of the elytra.
- *Dendroctonus frontalis* Zimmermann (fig. 33): *D. frontalis*, the SPB (2.2-4.0 mm), should be easily recognized by the users of this guide. The head is visible from above, with the elevation on either side of the medial frontal groove more pronounced in the male; the female has a ridge on the anterior margin of the pronotum.
- *D. terebrans* (Olivier) (fig. 34): Its size (5.0-8.0 mm) makes the black turpentine beetle easily recognizable. It has club-shaped antennae and no declivity at the posterior of the elytra, with the pronotum widening posteriorly.

- *Ips* De Geer: The pine engravers or *Ips* spp., have spines lining a declivity on the posterior portion of the elytra. Unlike *Xyleborus* spp., the engravers have a distinct shelf, or ridge, at the base of the deep declivity. They are larger than other scolytids having a declivity lined with spines.

- *I. avulsus* (Eichhoff) (fig. 35): Elytral declivity is moderately excavated, with four teeth on each side; the second and third teeth are connected at their base. The apical margin is slightly elevated. Length is 2.1-2.8 mm.

- *I. grandicollis* (Eichhoff) (fig. 36): Five teeth line the margin of the declivity on each elytra. The center tooth is most prominent. The apical margin is strongly elevated. Length is 3.0-3.8 mm.

- *I. calligraphus* (Germar) (fig. 37): There are six teeth on the margin of the declivity. The third tooth is stout and curved downward at the tip. The apical margin is acutely elevated. Length is 4.0-6.0 mm.



Figure 35



Figure 36



Figure 37



Figure 38



Figure 39



Figure 40

- *Pityophthorus* Eichhoff (fig. 38): The female of this small (1.6 mm) scolytid has long golden hairs on the front of the head; male hairs are shorter and less numerous. The head is covered by the pronotum. There are numerous elevations (asperities) on the pronotum. Antennae are clubbed.
- *Crypturgus aleutaceus* Schwarz (fig. 39): This is the smallest (0.9 mm) insect associate of the SPB. Head is visible from above, and the antennae have three segments, the third much larger than the others.
- *Gnathotrichus materiarius* (Fitch) (fig. 40): The prothorax summits well before the middle of this small scolytid (3.0 mm). It is dark brown and has slightly pale elytra. The head is not visible from above. Antennae are clubbed.

Diptera

Stratiomyidae

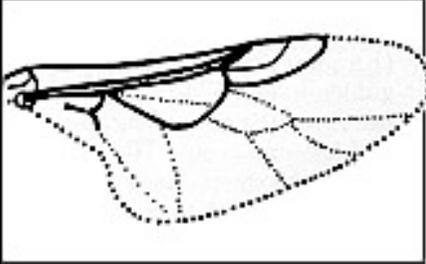


Figure 41A

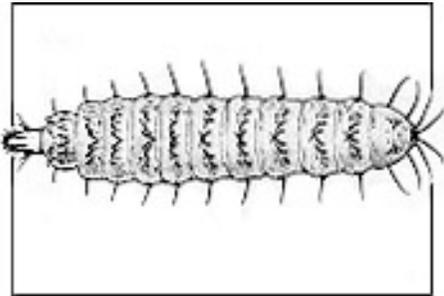


Figure 41B



Figure 42

- *Zabrachia polita* Coquillet (figs 41, 42): *Zabrachia* (2.4-2.6 mm) has a round cell in the middle of the wing (fig. 41A). The antennae have three segments with an apical arista. The body is black with a tiny, pointed abdomen. The thorax has no long spines and the eyes are large and gold. The larva (fig. 41B) has armored skin and many long bristles.

Dolichopodidae



Figure 44



Figure 45

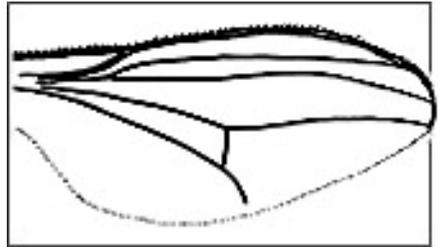


Figure 43A

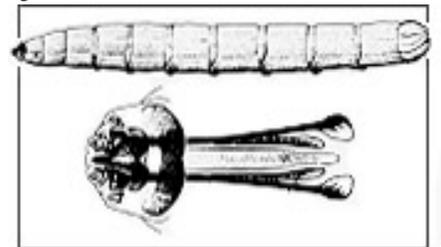


Figure 43B

- *Medetera* Fisher van Waldheim (figs. 43, 44, 45): *Medetera* (2.8-3.4 mm) has a distinguishing wing venation (fig. 43A); there are no round cells in the middle of the wing and only one cross vein. The antennae have three segments with an apical arista. *Medetera* when alive has red eyes and a green body; when dead it is gray. The male genitalia is quite conspicuous. The larvae (fig. 43B) have an incomplete head capsule and soft skin.

- Sciaridae: Sciarids (figs. 46, 47) are small (1.4-1.7 mm), delicate flies and are usually gray to black. Antennae are long and many-segmented. Eyes are dark and the abdomen pointed. Wings (fig. 46A) have no cells or cross veins in the middle, but each wing has a distinctly forked vein. The larva (fig. 46B) has a complete head capsule and soft skin.

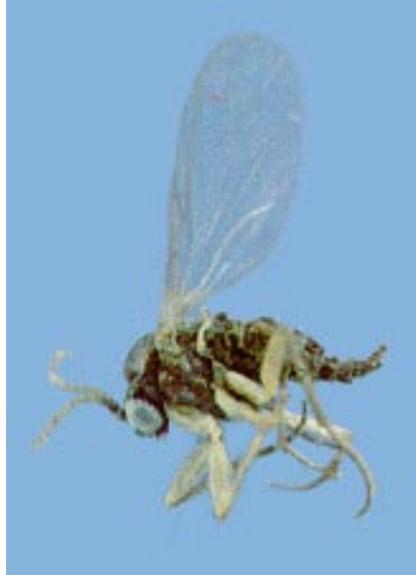


Figure 47

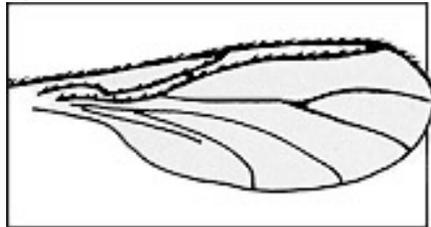


Figure 46A

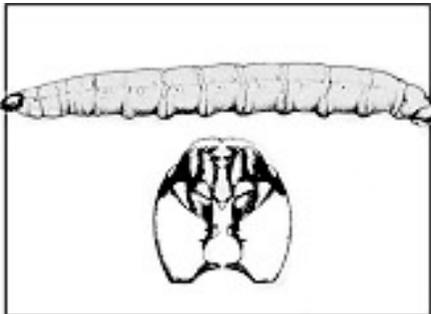


Figure 46B

Lonchaeidae



Figure 49

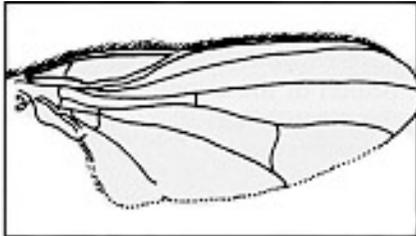


Figure 48A

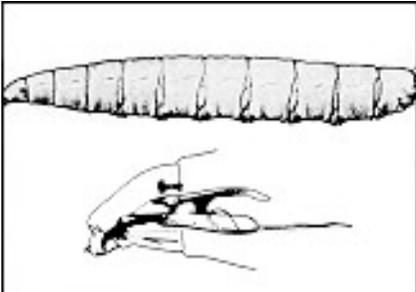


Figure 48B

- *Lonchaea* Fallen (figs. 48, 49):
Lonchaea (3.4-4.2 mm) is a black, heavy-bodied fly with a pointed abdomen and red-brown eyes. The antennae have three segments with a subapical arista; the third segment is much more elongate than that of other flies discussed here. The wing (fig. 48A) is similar to that of *Medetera* but has a small cross vein nearer the apical cross vein. The larva (fig. 48B) has soft skin and internal mouthparts.

Hymenoptera

Formicidae



Figure 50

- *Crematogaster ashmeadi* Mayer (fig. 50): *C. ashmeadi*, like all ants found with SPB, are usually wingless. They are small (2.1-2.6 mm) brown insects with extremely narrow waists (gaster) and triangular abdomens. There are two spines on the propodeum.

Braconidae

- *Cenocoelius nigrisoma* (Rohwer) (fig. 51): The male of *C. nigrisoma* is 5.0 mm long; the female is 6.0 mm long. Both sexes have a red head and shiny black body. The thorax is deeply pitted and rough. The abdomen is narrow and attached high on the thorax (dorsally).
- *Coeloides pissodis* (Ashmead) (fig. 52): *C. pissodis* is smaller (3.8-4.6 mm) than *Cenocoelius nigrisoma* and has a smooth red head and an orange abdomen. The thorax is hairy and shiny. There are broad furrows at the base of the abdomen and petiole. The pedicel of the antennae is twice as long as the first flagellar segment.
- *Atanycolus comosifrons* Shenefelt (fig. 53): Females are 9.0-11.0 mm long with an ovipositor 13.0-16.0 mm long; males are 9.0 mm long. The face is densely covered with silver hairs. The pedicel of the antennae is about five times longer than the first flagellar segment.



Figure 52

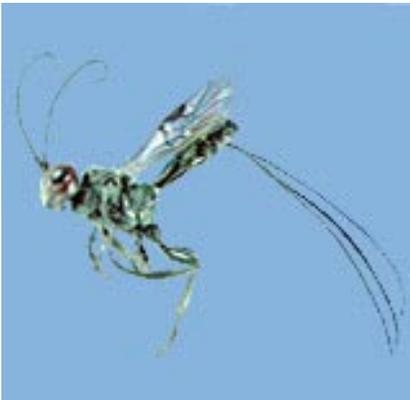


Figure 51



Figure 53



Figure 56

- *Dendrosoter sulcatus* Muesebeck (fig. 54): *D. sulcatus* has a deep cleft above the eyes, with swollen areas (tubercles) on each side. The wings are dusky with a white band extending across them. The adults are 2.8-3.5 mm, dark brown, and the apical half of the abdomen is darker than the basal half.
- *Meteorus hypophloei* Cushman (fig. 55): *M. hypophloei* (2.8-3.8 mm) has a thick head, a stout thorax (about 2 1/2 times as long as wide), and coarsely sculptured hind coxae. The females have a slender, slightly decurved ovipositor. Wings are clear.
- *Spathius pallidus* Ashmead (fig 56): The adult *S. pallidus* is 3.5 mm long and light brown. The head has striations, and the wings appear patterned. The petiole is striated and has lateral processes. The first abdominal segment is almost as long as the remainder of the abdomen.



Figure 54



Figure 55



Figure 58



Figure 57

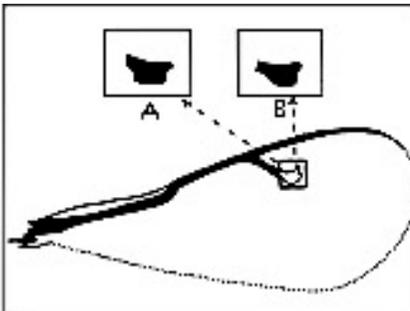


Figure 59

Pteromalidae: The pteromalids are minute, metallic-bronze insects with greatly reduced wing venation and triangular-shaped abdomens.

- *Dinotiscus dendroctoni* (Ashmead) (figs. 57, male; 58, female; 59A): The sexes of *D. dendroctoni* differ markedly. Both sexes are metallic greenblack with clear wings having greatly reduced venation. Also, the thorax is densely punctate. Females (3.8 mm) have long, pointed abdomens. Males (2.7 mm) appear similar to males of *Roptrocerus* (fig. 59), but have a distinctly rectangular stigma in the forewing (fig. 59A).



Figure 61



figure 60



Figure 62

- *Roptrocerus* Ratzeburg (figs. 59B, 60, male; 61, female): Both sexes of *Roptrocerus* have a finely punctate thorax. They are usually smaller than *D. dendroctoni*; females are 3.0 mm, males 1.8 mm long. Males and females have a rounded stigma in the forewing (fig. 59B). Their wings have short hairs.
- *Heydenia unica* Cook and Davis (fig. 62): *H. unica* adults (2.8-4.2 mm) are usually reddish brown and have large front femora. There is a spot on the forewing. The pronotum is bell-shaped, and gives it a “necklike” appearance.



Figure 63

Eurytomidae: Female eurytomids are similar in abdominal shape to the pteromalids, but they are usually black and have a more coarsely punctate thorax. The antennae have dense, light-colored hairs.

- *Eurytoma tomici* Ashmead (figs. 63, male; 64, female): These are shiny black wasps 3.5-4.0 mm. They have a squarish pronotum, large pits on the thorax, and a triangular abdomen. The males have asymmetric, elbowed antennae. Female eurytomids are similar in abdominal shape to the pteromalids, but they are usually black and have a more coarsely punctate thorax. The antennae have dense, light-colored hairs.



Figure 64

Platygasteridae: Platygasterids are minute (1.0-1.3 mm) shiny black wasps with reduced wing venation much like chalcids. The antennae have 10 segments, and are attached very low on the face, next to the clypeus.

- *Platygaster* Latreille (fig. 65): *Platygaster* spp. (1.3 mm) have clear wings without a fringe of hairs on the hind margin of the forewing, a trait which distinguishes them from *Leptacis* spp. (fig. 65). The scutellum is rounded off at the rear margin.

- *Leptacis* Foerster (fig. 66): *Leptacis* spp. are similar to *Platygaster* spp., except for the somewhat dusky wings with a fringe of hairs. Length is 1.0 mm. They have a backward projectile spine on the scutellum.



Figure 65



Figure 66

Acknowledgments

Thanks are extended to Dr. H. J. Teskey, Biosystematics Research Institute, Agriculture Canada, Ottawa, for allowing us to reproduce his figures of Diptera larvae. Special gratitude is due to Dr. C. W. Berisford, Department of Entomology, University of Georgia Athens, and Dr. F. M. Stephen, Department of Entomology, University of Arkansas, Fayetteville, for review and suggestions. Also, we appreciate the suggestions made by Drs. F. Hain, North Carolina State University, Raleigh; G. Moore U.S.F.S., Research Triangle Park, North Carolina; J. Moser, U.S.F.S., Pineville, Louisiana; J. Richerson, Texas A&M University, College Station; and R. Wilkinson, University of Florida, Gainesville. Funding was supplied in part by the Mississippi Agricultural and Forestry Experiment Station and the Louisiana Agricultural Experiment Station.

Selected Reference

- Leng, C. W., A. J. Mutchler, and R. E. Blackwelder.** 1920. Catalogue of Coleoptera of America, North of Mexico. John D. Sherman, Mount Vernon. NY.
- Moser, J. C., R. C. Thatcher, and L. S. Pickard.** 1971. Relative abundance of southern pine beetle associates in East Texas. *Ann. Entomol. Soc. Am.* 64:72-77.
- Muesebeck, C. F. W., et al.** 1951. Hymenoptera of America north of Mexico. *Synoptic Catalog. U.S. Dep. Agric., Monogr. 2.* U.S. Dep. Agric., Washington, D C.
- Overgaard, N. A.** 1968. Insects associated with the southern pine beetle in Texas, Louisiana, and Mississippi. *J. Econ. Entomol.* 61:1 107-1201.
- Stone, A., et al.** 1965. A catalog of the Diptera of America north of Mexico. *Agric. Handbk. No. 276.* U.S. Dep. Agric., Agric. Res. Serv., Washington, D.C.
- Teskey, H. J.** 1976. Diptera larvae associated with trees in North America. *Memoirs Entomol. Soc. Canada.* No. 100.