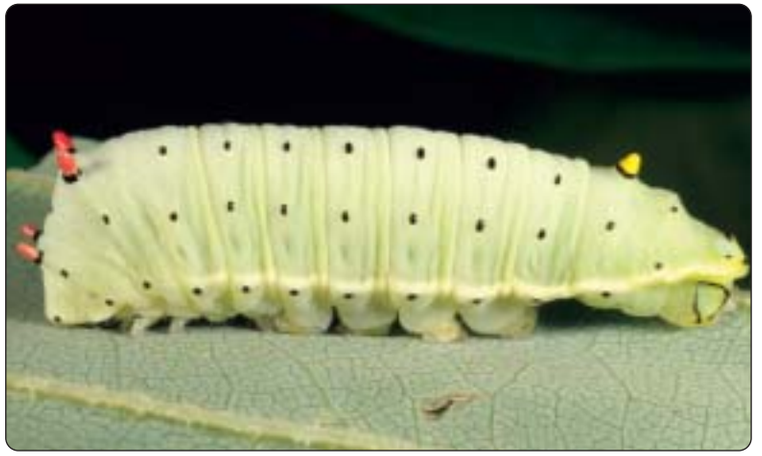
TULIP-TREE MOTH

Callosamia angulifera



RECOGNITION *Much like preceding but paler or waxier in color with pale stripe running below spiracles on A1–A10 and black dots on abdomen lacking contrasting pale rings*. Yellow abdominal tubercle over A8 short, less than twice as high as broad. Larva to 6cm. Sweetbay Silkmoth (*Callosamia securifera*) similar in appearance but a specialist on sweet bay. Its yellow abdominal tubercle over A8 is nearly three times as long as wide and the red knobs over thorax are cylindrical (*see* page 246).

OCCURRENCE Woodlands and forests from Michigan, southern Ontario, and Massachusetts to northern Florida and Mississippi. One principal generation northward; two broods in South with mature caterpillars from early June onward.

COMMON FOODPLANTS Tulip tree.

REMARKS The larva spins its cocoon within a leaf, but unlike the Promethea Moth the petiole is not secured to the shoot, so the cocoon drops to the ground with leaf fall. The Promethea and Tulip-tree Silkmoths evidently occupy different parts of a forest. The Promethea is a creature of the understory, both as a caterpillar and adult. In contrast, it is not easy to locate Tulip-tree caterpillars because many are high above the ground. The main courtship and mating flight occurs at dusk and lasts for only 15 minutes or so (Dale Schweitzer, pers. comm.). The next time you are in a forest with an abundance of tulip trees, train your eyes upward as the light is fading from the evening sky—if the season is right you will see the males coursing about. To quote Dale Schweitzer, "You could see the males at dusk so easily where I grew up in Pennsylvania, they made the Eastern Tiger Swallowtails (*Papilio glaucus*) using the same trees seem rare by comparison."

CECROPIA MOTH

Hyalophora cecropia

RECOGNITION Frosted green with *shiny yellow, orange, and blue knobs over top and sides of body*. Dorsal knobs on T2, T3, and A1 somewhat globular and set with black spinules. Paired knobs on A2–A7 more cylindrical, yellow; knob over A8 unpaired and rounded. Larva to 10cm. Caterpillars of larch-feeding Columbia Silkmoth (*Hyalophora columbia*) have yellow-white to yellow-pink instead of bright yellow knobs over dorsum of abdomen and knobs along sides tend to be more white than blue (as in Cecropia) and are set in black bases (*see* page 246).

OCCURRENCE Urban and suburban yards and lots, orchards, fencerows, woodlands, and forests from Canada south to Florida and central Texas. One generation with mature caterpillars from late June through August over most of range.

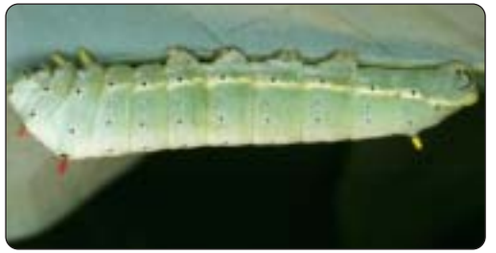
COMMON FOODPLANTS Frequently apple, ash, box elder, cherry, lilac, poplar, sassafras, and willow, but many other woody plants are used as well, including birch, elm, larch, and maple.

REMARKS Yet another silkmoth that seems to be declining. It is one of many native species suffering from parasitism by a tachinid fly (*Compsilura concinnata*) that was introduced to control the Gypsy Moth. Parasitism rates by *Compsilura* reached 82% in one cohort of 1,400 Cecropia caterpillars placed out in a Massachusetts forest (Boettner *et al*. 2000). Compact, spindle-shaped cocoons are spun on exposed branches and twigs where the larva has little adjacent structure at the time the cocoon is made. In grass at the base of the foodplant—where there is opportunity to attach silk at many contact points—the cocoon is often loose and baglike and considerably larger. For a wintertime outing, try finding "bag cocoons" by running your fingers through grass growing at bases of young isolated cherry and apple trees growing along fencerows and roadsides.

GIANT SILKWORM MOTHS

SWEETBAY SILKMOTH *Callosamia securifera*

Southeastern Virginia to Florida west to Louisiana. Two generations northward and three along Gulf with mature caterpillars from May onward. Sweetbay, but accepting other magnolias and tulip tree.



CALLETA SILKMOTH *Eupackardia calleta*

Southern and western Texas. One principal generation with mature caterpillars in late fall, and smaller spring brood with caterpillars in March and April. Purple sage (*Leucophyllum*) and ash; easily reared on privet.

COLUMBIA SILKMOTH *Hyalophora columbia*

Central Manitoba to Nova Scotia south to Maine and Great Lakes States. One generation with mature caterpillars in late summer. Principally larch, but also alder, birch, and cherry.

FORBES' SILKMOTH *Rothschildia lebeau forbesi*

Extreme southern Texas. Present year-round, but with two principal generations with mature caterpillars from April to June then again in fall and early winter months. Ash, peach, prickly ash, willow, and others.

HORNWORMS (SPHINX OR HAWK MOTHS) – SPHINGIDAE

Sphinx caterpillars are favorites among those who enjoy looking for and raising caterpillars. The East has some 70 species, although many of these will be encountered only in southern Florida and Texas. Our largest hawk moth, the Giant Sphinx (*Cocytius antaeus*), has caterpillars that may exceed 15cm in length. The long-tongued adults of hornworms are important in the tropics, especially in seasonally dry forests where nearly 10% of the trees may be pollinated by these strong flyers. Sphingids possess the most acute color vision of any animals, discriminating floral colors at light intensities that would appear pitch black to the human eye. Tuttle's (2006) book on the hawk moths of North America is richly illustrated with larval images and contains an abundance of life history information.

RECOGNITION

The caterpillars are large, cylindrical, and usually possess a middorsal horn, eyespot, or hardened button over A8. Setae are absent or inconspicuous, except above the prolegs. Each segment is annulated with 6–8 shallow creases. The anal prolegs are laterally flattened (for tightly engaging leaves, petioles, and twigs). The crochets of two lengths are arranged in series paralleling the body axis. Many (e.g., *Manduca*, *Sphinx*, and *Xylophanes*) come in both a green and brown form—the latter is especially apt to turn up in late-instar captive individuals.

LIFE HISTORY NOTES

The large, smooth, spherical eggs are usually laid on a lower leaf surface. Young sphingid caterpillars start feeding in the middle of the blade, leaving telltale holes in the leaf. Their large, elongate fecal pellets, with six deep grooves, often reveal their whereabouts. Many thrash violently from side to side when disturbed; these same species always seem willing to regurgitate a sticky green fluid as well. Some aggressively nip at their attackers. At least two of our species, Abbot's Sphinx (*Sphecodina abbottii*) and Walnut Sphinx (*Amorpha juglandis*), make sounds when harassed. Most of our hawk moths overwinter as pupae below ground in an earthen cell, but a few spin a cocoon in leaf litter or along the trunk of their foodplant (e.g. *Isoparce* and *Madoryx*).

COLLECTING AND REARING TIPS

The eggs can be found with reasonable frequency. Check especially the underside of terminal leaves. Many hornworms sever the petiole of leaves upon which they have fed and drop these to the ground; a series of two or three adjacent clipped petioles is often a hint that a hornworm is nearby. The most obvious sign of a nearby caterpillar is the accumulation of their enormous feculae. Although caterpillars may be discovered by day, flashlight searches at night are both productive and interesting. Hornworms are easily reared if provided with fresh foliage and ventilated containers. Many fail to pump up their wings properly upon emergence, especially when reared in moist or smallish containers. Mist the pupae periodically and provide rough surfaces for the emerging adults to ascend. Additional notes on finding and caring for larvae are included in the various species accounts.

TOBACCO HORNWORM
(CAROLINA SPHINX) *Manduca sexta*

RECOGNITION Green or brown with *seven oblique white lines that pass above abdominal spiracles*. Anal plate edged with yellow. *Horn orange, pink, or red.* Larva to 9cm. Tomato Hornworm (*Manduca quinquemaculata*) green or less commonly dark brown with *eight* white lines below each spiracle that join those descending from above to form a set of chevrons along side of abdomen (extra set of lines on A8) (*see* opposite); anal plate edged with white; horn usually black or blue or combination of these, sometimes green.

OCCURRENCE Gardens, fields, and waste places from southern Canada to Florida and Texas. One generation northward; evidently two or three in Missouri with mature caterpillars from June onward; nearly year-round in Deep South.

COMMON FOODPLANTS Ground cherry, horse-nettle, nightshade, tobacco, tomato, and other members of nightshade family (Solanaceae).

REMARKS While Covell (1984) and others use the common names Tobacco Hornworm to refer to this species and Tomato Hornworn for *M. quinquemaculata*, I wish it were not so, because it is this sphinx that I invariably find on my tomatoes. In addition to leaves, it also consumes (green) fruits, flowers, and terminal shoots. Caterpillars are attacked by a braconid wasp (*Cotesia congregata*) that lays dozens of eggs within each larva. When fully mature each wasp larva tunnels to the outside of the caterpillar's body and spins a whitish cocoon. The host caterpillar is doomed, consigned to a slow death that may not follow for weeks. To protect your tomatoes allow the wasps to hatch from their cocoons and repeat the process. If you want to protect your caterpillars, sleeve them or bring them indoors and hope that they have not yet been discovered by a female *Cotesia*.

PINK-SPOTTED HAWK MOTH *Agrius cingulatus*

Canada south to Florida and Texas (and Argentina), but only as a fall migrant northward. At least two generations across much of South with mature caterpillars from June into November. Especially sweet potato and morning glory.

RUSTIC SPHINX *Manduca rustica*

Resident in Gulf States, but straying northward to Missouri, Ohio River Valley, and Maine. Present through much of growing season in Deep South. Bignonia, fringe-tree, jasmine, knockaway, matgrass, and others. Note extremely granulated horn.

TOMATO HORNWORM (Five-spotted Hawk Moth)
Manduca quinquemaculata

Canada south to Florida and Texas, but sporadic northward. One principal generation over much of East with mature caterpillars from July to November; year-round in Deep South. Especially ground cherry, potato, tobacco, tomato, and other members of nightshade family (Solanaceae). Both green (above) and brown forms (below) occur.

FOUR-HORNED SPHINX (ELM SPHINX)

Ceratomia amyntor

RECOGNITION Brown or green with *spinulose horns projecting from the second and third thoracic segments*. Scalelike plates run down middorsal line. Much of body bearing white-tipped granules. Larva to 9cm.

OCCURRENCE Bottomlands, watercourses, woodlands, and forest edges from southern Canada to Florida and Texas. One generation northward; two or more in South with mature caterpillars from late June to November; three or more generations along Gulf.

COMMON FOODPLANTS Principally basswood and elm, also birch; reports from cherry probably erroneous.

REMARKS A spectacular insect that can be found by searching branches of basswood and elm along woodland edges. While at rest, and even more so when alarmed, the larva rears back and draws the head beneath the thorax (a typical hornworm response). Look for the caterpillar on the undersides of leaves or shoots—likely its anal prolegs will be firmly clamped onto the midrib near the leaf base.

CATALPA SPHINX

Ceratomia catalpae

RECOGNITION Our only common sphinx with larvae that are *gregarious* through the middle instars. Variable pattern ranging from mostly yellow to almost black. Generally more dark coloration found over dorsum. Sides often marked with vertical black lines or spots. Below spiracles body pale or with broad dark stripe that runs length of body. *Horn comparatively long, straight, and black. Head and spiracles black*. Larva to 7.5cm. Some color forms resembling White-lined Sphinx (*Hyles lineata*) (*see* page 275), but easily distinguished by its black head, its longer straighter horn, and specialized diet.

OCCURRENCE Urban areas, parks, yards, woodlands, and forests from extreme southern Canada to Florida and Texas (but rare northward and currently absent from New England). Two or three generations over much of range with mature caterpillars from late June to November.

COMMON FOODPLANTS Catalpa.

REMARKS This boom and bust species is occasionally common enough to defoliate catalpa trees. Females raft the eggs, sometimes laying several hundred in a single cluster. The larvae are gregarious into the third instar; small clusters of caterpillars remain together into the fourth instar. Like many other sphingids, the Catalpa Sphinx is a "barfer" and thrasher. When molested, the larva regurgitates a somewhat viscous green fluid from the foregut and thrashes violently, which, among other things, serves to spread its regurgitant over a potential predator. Catalpa Sphinx caterpillars have been grown and sold commercially as bait in Florida and elsewhere. Evidently they work especially well for largemouth bass. The adult proboscis is short—the adult is not capable of feeding, and as a consequence, provides no pollination services for its host foodplant.

WAVED SPHINX

Ceratomia undulosa

RECOGNITION *Yellow-green above and sea green below spiracles*, sometimes with rust and brown patterning; infrequently with reddened and browned forms. *Head with broad lateral band from vertex to antenna*. Sides of body with seven oblique lines, each mostly limited to single segments (i.e., anterior portion not extending onto preceding segment); last line broad, about same width as line on head. *Convex anal plate and anal prolegs with conspicuous, raised black spotting*. Horn often with pinkish cast. Larva to 8.5cm. Other ash-feeding hornworms are diagnosed below.

OCCURRENCE Bottomlands, watercourses, fields, woodlands, forest edges, including urban environments from Canada to Florida and Texas. One seasonally extended generation northward with mature caterpillars from late June to October; two or more generations in South.

COMMON FOODPLANTS Members of olive family: ash, fringe tree, and lilac; also reported from hawthorn and oak, apparently erroneous.

REMARKS The Waved Sphinx is the most commonly encountered of the six hornworms that occur on ash (*Fraxinus*) in the East. The yellow-green caterpillar of the Ash Sphinx (*Manduca jasminearum*) also has seven oblique lines, but the last one of these is edged with red and dark green. Caterpillar of the Great Ash Sphinx (*Sphinx chersis*) can be readily distinguished by examining the anal plate, which is flatter, longer, and lacks the conspicuous black dotting (*see* page 256). The Canadian Sphinx (*Sphinx canadensis*) inhabits bottomlands dominated by its preferred foodplant, black ash (*Fraxinus nigra*). It is frequently mottled with brown and again lacks the convex, black-dotted anal plate of the Waved Sphinx. Blue-white caterpillar of Franck's Sphinx (*Sphinx franckii*) possesses an unusual addorsal line of raised granules that extends forward from the horn. The Fawn Sphinx (*Sphinx kalmiae*) is treated elsewhere (*see* page 259).

TRUMPET VINE SPHINX (PLEBEIAN SPHINX)

Paratraea plebeja

RECOGNITION Two or more forms: commonly yellow-green above and sea green below; brown form variegated, usually with darkened area above each of the seven oblique lateral lines. Lines long; that on A6 extending back to above spiracle on A7. *Head and body dusted with white granules, those over subdorsum of T2 largest and in some forms connected by subdorsal stripe*. Horn blue, green, sometimes with black above or entirely black. Larva to 6.5cm.

OCCURRENCE Yards, woodlands, and forest edges; Nebraska to southeastern New York to Florida and Texas. At least two generations in New Jersey with mature caterpillars from July to October; nearly year-round with many generations in parts of Deep South.

COMMON FOODPLANTS Trumpet vine and Florida yellow-trumpet (*Tacoma stans*); also reported from lilac and passionflower.

REMARKS This caterpillar was sent by Dale Schweitzer, whom I asked to search the trumpet-creeper vines enveloping his fence. After he searched unsuccessfully for caterpillars by day and night with a flashlight, I encouraged Dale to lay a white bed sheet beneath his vine to catch the droppings of any caterpillars that might be present—three hornworms arrived by mail shortly thereafter. The Trumpet Vine Sphinx is a pollinator of the rare Rocky Shoals spider and Cahaba lilies. Hawk moths are important pollinators, especially in tropical ecosystems. As a general rule any large white flower with a deep corolla is a "sphingid plant." Many have a wonderful aroma. In addition to white flowers, sphinx moths are commonly seen visiting butterfly bush, milkweeds, mimosa tree, and phlox in our region.

PINE SPHINX
Lapara coniferarum

RECOGNITION *Lime green with cream addorsal, supraspiracular, spiracular, and subspiracular stripes.* Subspiracular stripe thickest, running along lower edge of black spiracles. Often with dull red splotches over dorsum, about spiracles, and above prolegs. *Head triangular*; face reddish brown with yellow edging (inset). *Horn absent*. Larva to 5cm. Perhaps indistinguishable as a caterpillar from Northern Pine Sphinx (*Lapara bombycoides*) (*see* Remarks).

OCCURRENCE Pine plantations, barrens, and woodlands from southern Maine south to Florida and Mississippi; widespread in South, including mountains, but mostly coastal and larger pine barrens north of southern New Jersey. One generation in North with mature caterpillars in August and September; at least two generations in South Carolina with mature caterpillars from June onward; multiple generations along Gulf Coast.

COMMON FOODPLANTS Pine, especially loblolly and longleaf in South, and hard pines such as pitch and Virginia northward. Evidently shunning white pine.

REMARKS The Northern Pine Sphinx is common in Canada, the Northeast, and the Appalachians. The Pine Sphinx replaces it southward along the Atlantic Coastal Plain. The two overlap from southern Maine to southern New Jersey and southward in the mountains. In New England, the Pine Sphinx occurs only in a few inland pitch pine barrens and is mostly a Coastal Plain element associated with pitch pine. The Northern Pine Sphinx is widespread across the region and is more frequently associated with white pine.

GIANT SPHINX *Cocytius antaeus*

Southern Florida (and tropical America), straying northward. Pond apple.

PAWPAW SPHINX *Dolba hyloeus*

Wisconsin to Ontario and Maine south to Florida and Texas. One generation northward with mature caterpillars from July to September; several generations along Gulf. Especially inkberry and other deciduous hollies as well as pawpaw.

STREAKED SPHINX *Protambulyx strigilis*

Central and southern Florida. Present year-round. Brazilian pepper.

BALD CYPRESS SPHINX *Isoparce cupressi*

Coastal North Carolina south to Florida and west to Texas. At least two generations with caterpillars from April onward. Bald cypress. Normally green; blue-violet hue in individual figured here possibly indicates its prepupal status.

GREAT ASH SPHINX

Sphinx chersis

RECOGNITION Large greenish or pinkish caterpillar with seven oblique abdominal lines that may be upwardly edged with pink. *Waxy green over abdominal segments* and occasionally T3; lime green below spiracles and over T1–T2 or T3. *Oblique lines long*, continued forward onto preceding segment and rearward to above spiracle on trailing segment. Anal plate more or less flattened and edged with yellow. *Spiracles elongate, central black area ringed with white*. Horn blue or pink. Larva to 10cm. Waved Sphinx (*Ceratomia undulosa*), which shares many of the same foodplants, has an upwardly convex anal plate marked with numerous, raised black dots, black-dotted anal prolegs, and spiracles that are orange anteriorly and posteriorly with a white center. In addition, each of its oblique lines ends abruptly at the back edge of the preceding segment (*see* page 252).

OCCURRENCE Fencerows, woodlands, and forests from Canada south to central Florida and Texas, becoming increasingly rare southward. One generation in North; two or more in South with mature caterpillars from May to November.

COMMON FOODPLANTS Ash, lilac, privet, and other plants in olive family (Oleaceae).

REMARKS Twice I have found caterpillars of this species perched on a leaf-blade underside on small trees. Over much of its range, the Great Ash Sphinx is less common on ash than the Waved Sphinx (*Ceratomia undulosa*). Ben Williams, who has been light-trapping in Connecticut for nearly 40 years, reports that the Great Ash Sphinx is much less common than it was only two decades ago. Another Sphinx in which he has witnessed an appreciable decline is the Wild Cherry Sphinx (*Sphinx drupiferarum*).

HERMIT SPHINX

Sphinx eremitus

RECOGNITION The "black knight" of caterpillars: deep chocolate brown with *large black "eye" over T2 and T3*. Some forms mottled with green. T2 strongly humped. Oblique striping only vaguely evident along sides of abdomen. Minute pale circlets generously scattered over abdominal segments. Spiracle sometimes surrounded by blackened ring. Larva to 7cm. Early and middle instars light green, sometimes with brown dorsal splotches, and T2 produced upward into horn (upper left image).

OCCURRENCE Gardens, fields, and wet meadows from Manitoba to Nova Scotia south to North Carolina (mountains) and Arkansas. One generation northward with mature caterpillars from July to September; two broods in Missouri with mature caterpillars from June onward.

COMMON FOODPLANTS Basil, bee-balm, bugleweed, mints, sage, and others in mint family (Lamiaceae).

REMARKS The best place to start your search for this caterpillar is the garden. The Hermit Sphinx is more likely to be found as a caterpillar than as an adult, in part because adults seem to be only weakly attracted to light. If you see a Hermit Sphinx at light it is likely a female; evidently males fly too early in the evening to be appreciably influenced by lights. To find this sphinx, go out at dusk and watch for nectaring adults at phlox and milkweed blossoms. It keeps good company: at the same flowers you may see adults of the Galium Sphinx (*Hyles gallii*), Fawn Sphinx (*Sphinx kalmiae*), Pawpaw Sphinx (*Dolba hyloeus*), and others. While most sphingids have cylindrical fecal pellets with six furrows, like those of the Saturniidae, the droppings of the Hermit and related *Sphinx* are among the most irregular of all Lepidoptera.

APPLE SPHINX

Sphinx gordius

RECOGNITION Green to blue-green or rarely purple-brown; usually with *numerous minute black circlets over thorax and beneath spiracles*. Oblique lateral lines often edged with magenta or black above; some forms also with yellow edging below. Head broadly triangular; front framed with yellow-green band which may be outwardly edged with black. Spiracles orange. Horn usually green with black lateral line, sometimes mostly black—look for some green on underside near base. Larva to 7.5cm.

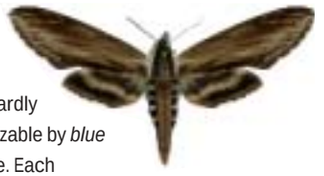
OCCURRENCE Heathlands, savannahs, flatwoods, and other woodlands southward; more generalized northward. Central and eastern Canada south to central Florida and Texas, becoming increasingly rare southward (but *see* Remarks). Evidently a single generation in New Jersey with mature caterpillars from May to September; two generations in the Carolinas.

COMMON FOODPLANTS Apple, ash, blueberry, gale, huckleberry, larch, leatherleaf, maleberry, rose, spirea, spruce, sweet fern, willow, and other woody species.

REMARKS The Apple Sphinx may represent a complex of two closely related species. For the purposes of this guide, I ignore the name *Sphinx poecila* (Poecila Sphinx), which purportedly replaces the Apple Sphinx from Pennsylvania, Great Lakes States, and New England northward. In the northern portion of its range, the Apple or Poecila Sphinx is one of the most commonly encountered sphingids. Sweet fern and gale are favored foodplants in sandy areas—most stands in the Northeast and southern Canada will yield larvae. While both sexes may be taken at light, a more sporting alternative is to seek the adults while they are nectaring at flowers at dusk. Pick an evening and park yourself in the back garden, or even better in a large milkweed patch—even if you do not see the Apple Sphinx you are sure to be joined by many other hungry moths.

FAWN SPHINX

Sphinx kalmiae



RECOGNITION *Beautiful blue- or yellow-green caterpillar with seven oblique, abdominal lines narrowly edged with black above and usually yellow below*. Head boldly marked with black line that is inwardly bounded with yellow-green. Most individuals recognizable by *blue horn that bears minute black spines*. Spiracles orange. Each midabdominal proleg has shiny yellow band between black crescents. Larva to 8cm.

OCCURRENCE Woodlands, forests, also commonly yards and nurseries from Manitoba to Newfoundland south to northern Florida and Louisiana, becoming uncommon southward. One generation northward with mature caterpillars in August and September; at least two generations southward with mature caterpillars from June onward.

COMMON FOODPLANTS Ash, fringe-tree, lilac, privet, and other plants in olive family (Oleaceae).

REMARKS The widely used name of Laurel Sphinx seems inappropriate given its reliance on plants in the olive family—the common name offered here is merely a suggestion. Caterpillars feed from the underside of shoots, severing the petiole of each leaf upon which it has fed. The most efficient way to locate larvae is to search for clipped leaves under ornamental lilac plants. The inset shows the first 18 *Cotesia congregata* (Family Braconidae) wasp larvae to issue from this Laurel Sphinx caterpillar. Another 175 appeared before the day's end. The caterpillar may live for another two to three weeks before finally succumbing to the damage that has been done to its internal organs.

WILD CHERRY SPHINX *Sphinx drupiferarum*

Transcontinental in Canada south in East to Georgia and north Texas. One generation with mature caterpillars mostly in July and August in Connecticut; two or more broods in South. Principally apple, cherry, peach, and plum (all Rosaceae)

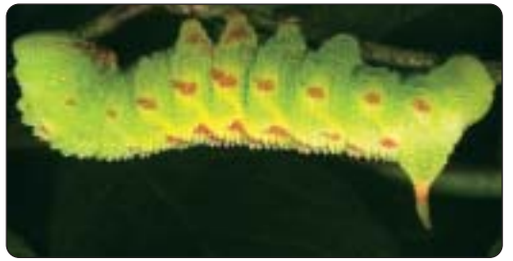
CLEMEN'S SPHINX *Sphinx luscitiosa*

Alberta to Nova Scotia south to New Jersey (historic), Great Lakes States, and Nebraska. One generation northward with mature caterpillars in August and September. Principally poplar and willow.

ONE-EYED SPHINX *Smerinthus cerisyi*

British Columbia to Newfoundland south in East to Georgia, Arkansas, Tennessee, and Missouri. One generation with mature caterpillars from July through September. Principally poplar and willow.

HUCKLEBERRY SPHINX *Paonias astylus*



Missouri to Maine south to Florida and Mississippi. One generation northward, nearly year-round along Gulf where mature caterpillars occur from April onward. Principally andromeda and blueberry.

TWIN-SPOTTED SPHINX
Smerinthus jamaicensis

RECOGNITION Green, yellow-green, or, most commonly, *blue-green* with abundant white granules over head and abdomen. Sometimes with wine-red subdorsal or spiracular spots (inset above). Head broadly triangular; *flattened front framed with cream or yellow*. Thoracic segments with subdorsal line. *Horn with at least flush of blue along sides or top*. Last oblique line descending from horn, ending above proleg on A6. Spiracles with *white center ringed with orange or black*. Integumental granules especially pronounced in earlier instars. Larva to 6cm. Caterpillar of One-eyed Sphinx (*Smerinthus cerisyi*) quite variable: some pale-yellow, green, or blue-green; usually recognizable by a *subdorsal stripe that runs from T1–A7*, although it is quite weakly developed in some forms; *head stripe wide*; horn yellow, pink, and/or blue (*see* opposite). Eastern populations of One-eyed Sphinx typically with smaller granules over head and anal plate than those of the Twin-spotted and related *Paonias* species. Caterpillar of Blinded Sphinx (*Paonias excaecatus*) with oblique line that runs forward from base of horn ending near anterior margin of A7, while that of Twin-spotted Sphinx extends to area above proleg on A6. Horn of Blinded Sphinx (and other *Paonias*) lacks blue.

OCCURRENCE Wet meadows, watercourses, swamps, woodlands, and forests from Canada to central Florida and Texas. Single generation northward with mature caterpillars in August and September; two generations in southern New Jersey; five or more generations in Louisiana.

COMMON FOODPLANTS Aspen, poplar, and willow preferred (*see* Remarks).

REMARKS Caterpillars often adopt a serpentlike posture with the front end held upward. Other recorded foodplants, e.g., apple, ash, birch, cherry and elm, require confirmation.

BLINDED SPHINX

Paonias excaecatus

RECOGNITION Bright green with *granulated integument*; some forms with wine-red spots along subdorsum, surrounding spiracle, and/or below level of spiracles. *Front of head flattened, rimmed with thin* pale line that may be outwardly edged with green or red. *Dorsum of thoracic profile roughened, almost serrate* in some postures; *subdorsal stripe on thorax usually present, although vague. Horn green (no blue), issuing from conical extension of A8*, tending to be straighter, longer, and directed upward at higher angle (about 45°) than that of Twin-spotted Sphinx (*Smerinthus jamaicensis*) (*see* page 261). White spiracles with outer black ring. Larva to 7.5cm. Caterpillars of the Huckleberry Sphinx (*Paonias astylus*) (*see* page 260) are similar but the integumental granules are smaller; the relatively short horn stands more erect and issues from an even more swollen cone-shaped base; the head is not as flattened; and the lateral lines on the head are less well developed.

OCCURRENCE Fields, woodlands, and forests. Transcontinental in Canada south in East to Florida and Texas (and Arizona in Rockies). Evidently one extended generation northward with mature caterpillars from July onward; three generations in Missouri; several generations in parts of Deep South where mature caterpillars occur from May onward.

COMMON FOODPLANTS American hornbeam, apple, basswood, beech, birch, cherry, chestnut, elm, hawthorn, hop hornbeam, oak, poplar, rose, serviceberry, spirea, willow, and undoubtedly many other woody plants.

REMARKS Recently molted caterpillars are conspicuously granulose, especially down each side of the head and over the thorax. This sphinx is highly variable and somewhat difficult to recognize, especially in the earlier instars (lower right image), but the characters given above will work for most individuals. This is the most commonly encountered sphingid caterpillar in many Northeastern hardwood forests.

SMALL-EYED SPHINX

Paonias myops

RECOGNITION Bright green, frequently with reddish splotches, somewhat pudgy, body widest about A5. Some individuals with subdorsal reddish spots on A2 and A7; others with red spots along subdorsum, about spiracle, and below spiracles. Subdorsal line on thorax absent. No lateral line on head. *Horn short, greenish, minutely spinulose*, often directed backward, i.e., angle with body axis at apex of horn less than 45º. Larva to 5.5cm.

OCCURRENCE Fields and woodlands. Transcontinental in Canada south in East to Florida and Texas. One or two generations over much of East with mature caterpillars from late May onward; three broods in Missouri; essentially year-round in Gulf States.

COMMON FOODPLANTS Cherry, hawthorn, and serviceberry; other reported foodplants (birch, grape, poplar, willow, etc.) are rarely used or erroneous.

REMARKS Caterpillars are cryptic in habit, feeding mostly at night and excising damaged leaves at their bases. They often avoid the newest leaves, preferring blades back from the shoot apex. One wonders to what extent the red spots in *Paonias* caterpillars are inducible, and if so, are the spots more apt to occur on individuals feeding in the autumn, when such coloration would be particularly adaptive? Both sexes of all our "eyed" sphinxes (*Paonias* and *Smerinthus*) are attracted to light.

WALNUT SPHINX

Amorpha juglandis (= *Laothoe juglandis*)

RECOGNITION Green with *sharply produced head* and comparatively long, straight roughened caudal horn. Some individuals marked with reddish subdorsal patches forward of the oblique lines. Body *conspicuously dotted with white granules arranged in regularly spaced rings*. Head edged with white. Seventh oblique abdominal line thickened—circa three times wider than those that precede it—beginning above last (A6) proleg and extending to caudal horn. *Anal plate with pair of enlarged granules* (excrescences). Small orange spiracles include minute white spot at either end. Larva to 6cm. Head proportionately more elongated in early and middle instars (inset).

OCCURRENCE Bottomlands, fields, woodlands, and forests from Canada to Florida and Texas. One generation northward with mature caterpillars from July to October; three generations in Missouri; nearly year-round along Gulf.

COMMON FOODPLANTS American hornbeam, butternut, hickory, hop hornbeam, and walnut.

REMARKS The Walnut Sphinx has been previously placed in the genera *Laothoe* and *Cressonia*. When touched, the caterpillar whistles or hisses by forcing air out the spiracles. It is also a thrasher, casting its body violently from side to side when provoked. A good way to see this caterpillar is to go out at night and inspect the lower surfaces of hickory and walnut trees by flashlight—trees where you would be hard pressed to find a single caterpillar by day sometimes yield more than a half-dozen caterpillars at night. The caterpillar often perches over the midrib by day.

BIG POPLAR SPHINX

Pachysphinx modesta

RECOGNITION Large, stout, pale to blue-green, or less commonly brown, sphinx with prominent white granules arranged in lines that ring each segment. *Horn shorter than length of segment that bears it*. Thick white oblique line runs from proleg on A7 to tip of horn. Head with broad pink, yellow, or cream line along side. T2 and T3 each have elevated transverse line of whitened granules that are especially prominent in early instars. Seven oblique lines on abdomen, with those on A2–A4 often more prominent than those fore or aft. Spiracles orange-black with white center. White, cream, or pink ridge running along lower edge of anal proleg. Larva to 9cm.

OCCURRENCE Edges of watercourses, woodlands, and forests. Transcontinental in Canada south in East to Florida and Texas. One generation in Connecticut with mature caterpillars from July to September; up to three in Deep South with caterpillars found from May onward.

COMMON FOODPLANTS Poplar and willow.

REMARKS This caterpillar adopts a question mark posture when at rest: the head is held beneath an elevated thorax, appressed to the forelegs. After a leaf is damaged the caterpillar chews through the petiole, near where it attaches to the shoot, and lets the leaf fall to the ground. In so doing the caterpillar eliminates damaged leaves that might have been used by a bird to locate its position. A good way to start your search for this sphinx and related species is to scan the ground for clipped leaves and/or large feculae.

ELLO SPHINX

Erinnyis ello

RECOGNITION Body coloration highly variable, often bluish green above subdorsal stripe and emerald green below; other forms green, gray, or brown. Common green form: body marked with yellow subdorsal stripe that extends along body from horn to mandible. Stripe of head edged inwardly with dark line. *Dark eyespot, with brown crescent to either side, over dorsum of T3. Horn reduced to a low point, arising from elevated angular hump*. Each red-orange spiracle with white spot above and below. Tan to pinkish thoracic legs banded with black rings; prolegs with bluish spot near base that may be concealed in fold. Larva to 7cm. Alope Sphinx (*Erinnyis alope*) (*see* page 278) very similar in penultimate instar but with long horn; last instar usually brown and mottled with short, thick, down-curved horn; rump not as prominently angulate as in Ello Sphinx. Obscure Sphinx (*E. obscura*) often with dorsal spots on first six abdominal segments; it prefers climbing milkweeds such as *Cynanchum* and *Philibertia*. Dan Janzen's website for the caterpillars of the Guanacaste Conservation Area in Costa Rica (http://janzen.sas.upenn.edu/) provides dozens of images of *Erinnyis* caterpillars and their seemingly endless variety.

OCCURRENCE Hammocks, orchards, and yards. Resident in southern Florida and Texas where it breeds year-round.

COMMON FOODPLANTS Usually on euphorbs such as cassava and poinsettia, also guava, willow bustic, and many other woody species.

REMARKS In the last instar, the horn is reduced to a nub. Occasionally the Ello Sphinx is common enough to be a pest of poinsettia. The eyespot over third thoracic segment is hidden in the resting caterpillar. The pupa, usually located above the ground in leaf litter, is seemingly aposematic—shiny black with orange spots.

SNOWBERRY CLEARWING

Hemaris diffinis

RECOGNITION Blue-green above and yellow-green along sides with *black spots encircling each spiracle* or, less commonly, brown (inset). *Leading edge of thorax yellow, with prominent granules, extended over back of head. Horn long, yellow at base, black from middle to apex*. Each blackened abdominal spiracle bears a minute white spot above and below. Head and body salted with minute white granules. Larva to 4.5cm.

OCCURRENCE Fields, woodlands, and forest edges from northern Canada south to Florida and central Texas. At least two generations over much of East with mature caterpillars from June onward; three generations in Missouri.

COMMON FOODPLANTS Dwarf honeysuckle (*Diervilla*), honeysuckle, and snowberry (all Caprifoliaceae); also *Amsonia* and dogbane (both Apocynaceae).

REMARKS The Snowberry Clearwing is a species of open habitats—isolated honeysuckles in overgrown fields, beneath powerlines, and along fencerows will yield caterpillars. Adults of both the Hummingbird Clearwing (*Hemaris thysbe*) and Snowberry Clearwing resemble large bumblebees. All sphinx moths hover while imbibing nectar, taking it up with their elongate tongues (although many of our species insert their forelegs, perhaps to taste the flower with their feet). By contrast, bumblebees land and crawl inside flowers to gather nectar and pollen.

HUMMINGBIRD CLEARWING

Hemaris thysbe

RECOGNITION Lime green, especially along sides, with *leading edge of thorax yellowish and warted*; some individuals yellow-green or pink. *Yellow subdorsal stripe* extends from T1 to horn. Head and body salted with minute white granules; these sparse on A8 and A9. Spiracles orange with white spot at top and bottom. Horn often bluish, curved. Larva to 5cm. Horn of younger caterpillars reddish, straight, and very long (inset).

OCCURRENCE Woodlands and forest edges. Transcontinental in Canada south in East to Florida and Texas. At least two generations over much of our region with mature caterpillars from May onward; three generations in Missouri; present much of year along Gulf.

COMMON FOODPLANTS Viburnum most frequently, but also honeysuckle and snowberry (all Caprifoliaceae); also reported from cherry, hawthorn, and plum (all Rosaceae), but I have never found caterpillars on these plants.

REMARKS An attractive though rather ordinary caterpillar, given that it transforms into one of the East's most distinctive moths. The adults are avid nectarers, frequenting yards, nurseries, and parks. Buddleia is the overall favorite in my garden. Earlier in the summer phlox and sweet rocket receive visits. I have had good success finding caterpillars by searching viburnums at night by flashlight and also beating. It is not uncommon to find a few caterpillars feeding on a single plant. Clearwings (*Hemaris*) pupate in a weak cocoon spun amongst fallen leaves.

PANDORUS SPHINX

Eumorpha pandorus

RECOGNITION Green, orange, pink, or cinnamon with pale *white to yellow spots enveloping abdominal spiracles on A3–A7* and generous peppering of minute black dots. Head and first two thoracic segments may be withdrawn into greatly swollen T3 (especially when alarmed) (inset). Peculiar thin and coiled horn *of early and middle instars* (upper right image) *replaced by button in last instar*. Larva to 9cm. In Achemon Sphinx (*Eumorpha achemon*) each of the lateral spots on A3–A7 is divided into three parts; often it is more heavily peppered with black dots, especially along the sides of the abdomen.

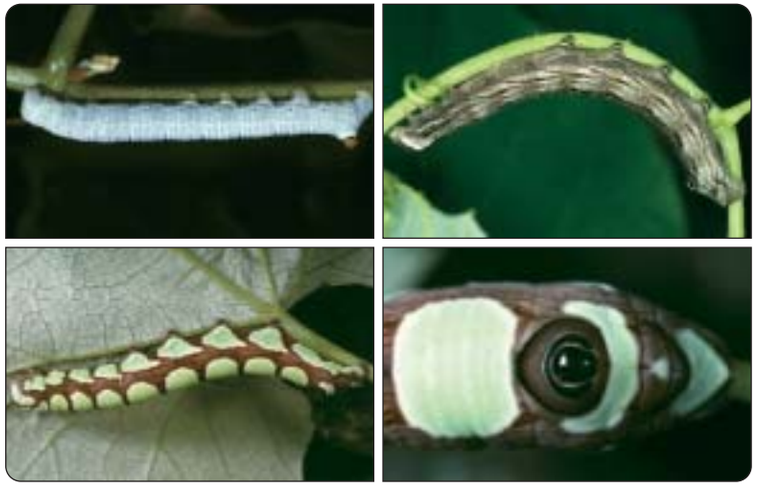
OCCURRENCE Fields, woodlands, and forest edges from Kansas to Nova Scotia south to Florida and Texas. One generation northward; two or three generations in Missouri; three or more broods in Deep South with mature caterpillars from June onward.

COMMON FOODPLANTS Ampelopsis, grape, and Virginia creeper.

REMARKS The Pandorus Sphinx caterpillar is frequently encountered while it is wandering in search of a pupation site. To find caterpillars search the underside of leaves close to the ground, rock walls, or trees upon which its foodplant is sprawling. The Pandorus Sphinx is one of nearly a dozen hornworms known to use grape and related Vitaceae in the East. If conditions allow, throw a sheet on the ground beneath a suitable vine; the presence of hornworms will be revealed by an accumulation of elongate, deeply furrowed, fecal pellets. Flashlight searches by night, always interesting, may also be productive.

ABBOTT'S SPHINX

Sphecodina abbottii



RECOGNITION Last instars come in two color forms. Brown form variegated much like patterns in wood; spotted form with ten pale green saddles over dorsum. *Horn on A8 replaced by raised eyelike button*. Larva to 7.5cm. Middle instars whitish to blue-green with orange raised knob on segment A8 (instead of horn) (upper left image).

OCCURRENCE Fields, woodlands, and forest edges from Minnesota, extreme southern Canada, and Maine south to Florida (rare) and Texas. One generation over much of East with mature caterpillars in June and July; at least two generations along Gulf with caterpillars from May to September.

COMMON FOODPLANTS Ampelopsis, grape, and Virginia creeper.

REMARKS The horn on A8 is lost after the first instar and replaced by a raised orange knob, which in turn is replaced by a convincing false eye in the last instar that closely resembles a vertebrate eye with a black central pupil and encircling iris. Added deception is provided by a "white reflection spot" that makes the eye appear moist and shiny. If the "eye" is poked or pinched, the caterpillar squeaks, reels around, and bites at its attacker. Some believe the spotted form mimics a cluster of green grapes. The brown form resembles grape bark. Adults of this fascinating moth come to light, flowers, and baits of fermented fruit. Males also drink at mud puddles (and soil wetted with urine). The brown adults, at rest, disappear on bark—the abdomen, with its unique arrangement of scale tufts, is raised upwards. The overall effect more closely matches a broken branch than an insect.

LETTERED SPHINX

Deidamia inscripta

RECOGNITION *Yellow-green with subdorsal stripe that runs from horn forward over head to antenna. Yellow oblique lines pass under spiracles on A1–A7*. Head small relative to swollen thorax. White spiracles enclosed in black "parentheses." Horn yellow, often with downward curve. Larva to 5cm. Early instars more yellow than green with very long black horn that may be yellow at its apex.

OCCURRENCE Fields, woodlands, and forest edges from South Dakota to extreme southern Quebec and Massachusetts south to northern Florida and Mississippi. One generation with mature caterpillars from May to June.

COMMON FOODPLANTS Ampelopsis, grape, sourwood, and Virginia creeper.

REMARKS When disturbed the larva releases its grip and arches the head back over the abdomen; the six legs are held up and splayed outward (inset). It is especially quick to regurgitate. In the Appalachian foothills, Lettered Sphinx caterpillars are locally abundant on sourwood (*Oxydendron*), to the point of damaging much of the foliage on smaller trees. On four occasions I have seen remarkably high densities, with as many as 20–100 caterpillars on a single tree. In 2004 the moth defoliated acres of sourwood along the Foothills Parkway east of Cosby, Tennessee. It is odd that what is reported in the literature as a grape-feeder would be so common on an ericaceous tree. One wonders if there is a unique secondary chemical shared by members of the grape family and sourwood. Adults come to lights, mostly early in the evening and again just before dawn.

NESSUS SPHINX
Amphion floridensis

RECOGNITION Last instar *unceremoniously mottled in browns with darkened oblique line passing through each spiracle*. Pale line, sometimes inwardly edged with brown, runs from antenna to crown and continues rearward as subdorsal stripe. Horn short, black, slightly curved, and spinulose. Spiracles with white spot above and below. Body with scattered, pale integumental granules that are especially obvious over anal plate and along sides of head. Larva to 5cm. Middle instars pale green with creamy subdorsal stripe; horn long, straight, and minutely spined (inset).

OCCURRENCE Fields, woodlands, and forest edges from southern Canada to Florida and Texas. One generation northward; three or more generations in South with mature caterpillars from late May through September.

COMMON FOODPLANTS Ampelopsis, grape, and Virginia creeper.

REMARKS The caterpillar of the Nessus Sphinx descends from foliage to rest near the ground by day, a position for which its coloration is well suited. The day-active adults may be seen nectaring at flowers especially in the late afternoon and dusk and just after dawn in hot weather. Like the Abbott's Sphinx, adults visit sap flows, flowers, and bait.

HOG SPHINX (VIRGINIA CREEPER SPHINX)
Darapsa myron

RECOGNITION Yellow- to blue-green, green, or brown with *enlarged T3 and smallish head*. Usually with subdorsal stripe running from horn to antenna; *its lower edge may connect with oblique lines that include spiracles on A1–A7*. Subdorsal stripe weakened over T3 and A1 segments. Often with dorsal red-brown splotches over A2–A7. Horn yellow or with flush of blue, frequently peppered with minute black dots above; anal plate edged with yellow. Labrum yellow. Larva to 5.5cm. Azalea Sphinx (*Darapsa choerilus*) also green or brown; its horn somewhat smaller and evidently lacking black flecking. In my images the subdorsal line is more or less absent forward of A6, as is corresponding line on head that extends to antenna in Hog Sphinx (*see* page 276). Hydrangea Sphinx (*D. versicolor*) green or brown with orange to red horn that is often marked with black above; subdorsal stripe well developed over thorax and head but absent over abdomen; oblique stripes more defined, less apt to gradually diffuse (*see* page 276). Our *Darapsa* usually can be identified by their foodplant associations (*see below* and page 276).

OCCURRENCE Woodlands and forest edges from extreme southern Canada to Florida and Texas. Two generations over much of range with mature caterpillars from June onward; three broods in Missouri; four or more in Louisiana.

COMMON FOODPLANTS Ampelopsis, grape, and Virginia creeper (all Vitaceae).

REMARKS All *Darapsa* have a greatly swollen last thoracic and first abdominal segment into which the head and anterior thoracic segments can be withdrawn. Of the 12 or so Eastern sphingids that feed on grape, I encounter this species most often, especially in July and August. Adults are attracted to lights and sugar baits.