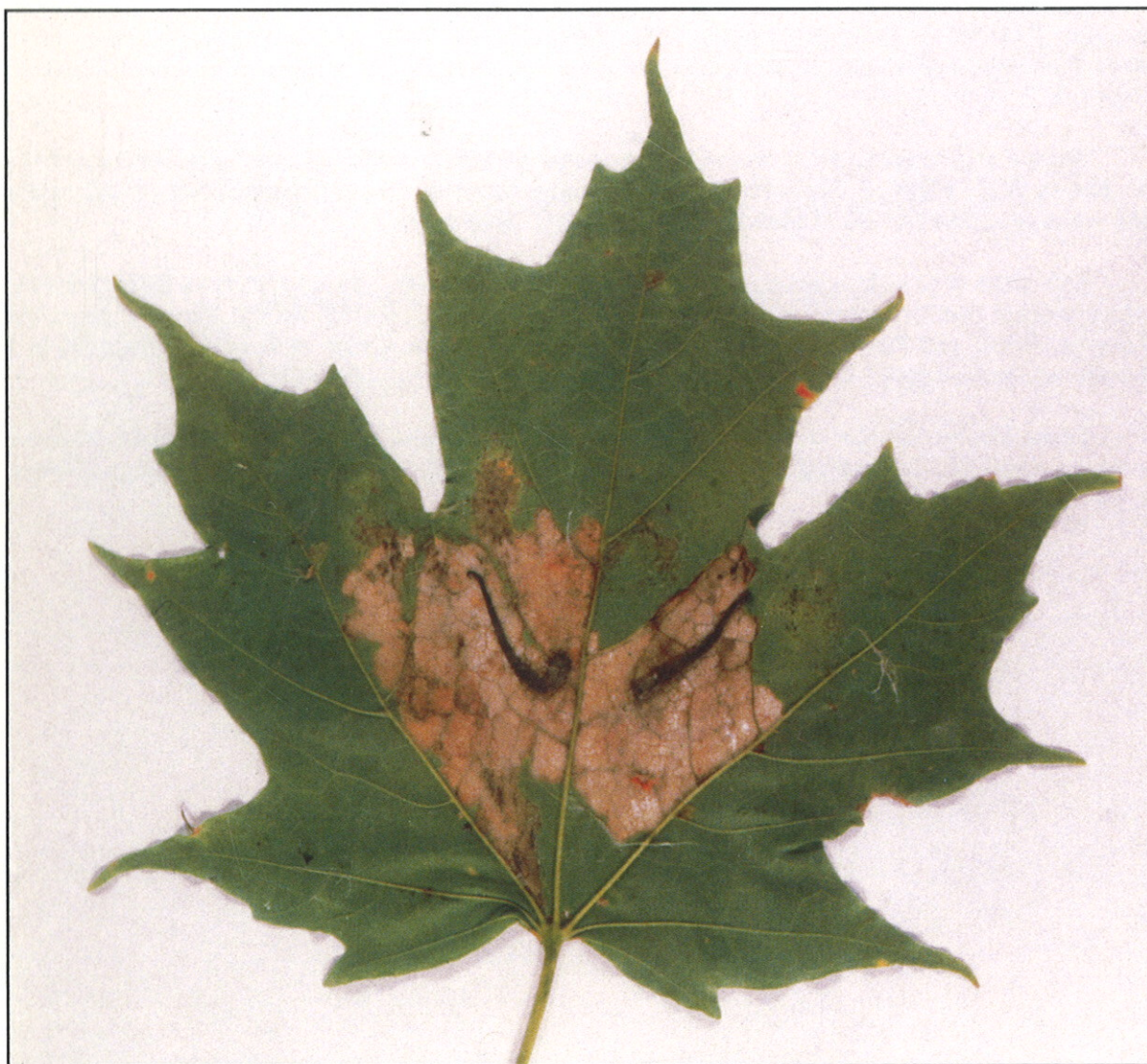


Maple Feeding Tortricidae of the Northeastern United States

Guide to Identification of Adults



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Cover illustration: Larval tube and damage to sugar maple by the maple trumpet skeletonizer (*Catantop acerella*). Collected 26 September 1995 from Jericho Research Forest, Jericho, Chittenden Co., VT.

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Guide to Identification of Adults

by

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INTRODUCTION

Larvae of the family Tortricidae include a number of species that are leafrollers, twig or bud borers, and seed feeders on maple and other hardwood forest trees in the northeastern United States. Significant defoliation of maple by tortricids is largely localized and sporadic and only two or three species are characterized as persistent pests (Godman et al., 1990; Houston et al., 1990). In general, the forest maple-feeding tortricid fauna of the northeastern United States is poorly documented, and the taxonomy of many species remains subject to future taxonomic revision.

The small size of tortricids makes identification of moths problematic for non-specialists, particularly in the absence of well-curated reference collections and adequate diagnostic literature. A number of northeastern institutions have a full range of local species, but the specimens are often from relatively few localities or limited areas. Comprehensive regional reference collections of northeastern forest tortricids and other Lepidoptera are lacking. Future detailed surveys and documentation of Lepidoptera distributions could be highly beneficial to forest managers.

This identification guide provides an outline of maple feeding tortricids to highlight diagnostic features of adult moths. Descriptions comprise a brief statement on the most prominent morphological features of the moth, supplemented by line diagrams and color plates (1-4) for most species. Additional information is provided, where possible, for distribution, biology, and seasonality.

Maple-feeding tortricids were selected for this guide if they occur in New York and New England, and are recorded feeding on one or more of the principal forest maple tree species in the region: sugar maple (*Acer saccharum* Marsh), red maple (*A. rubrum* L.), mountain maple (*Acer spicatum* Lam.), silver maple (*A. saccharinum* L.), and striped maple (*A. pennsylvanicum* L.). Boxelder or Manitoba maple (*A. negundo* L.) is present in the northeast principally in New York and western areas of New England and is not prevalent in forest habitats. Unless boxelder-feeding tortricids also feed on one or more of the northeastern forest maples, they are not included in this guide.

Presentation

External diagnostic features are described and illustrated. Technical terminology for descriptions is minimized. Actual wingspan is indicated by a horizontal line drawn below each line figure. Color plates include a range of tortricid moths that may also be encountered within northeastern sugar maple-hardwood forests to illustrate the range in color and pattern that may be encountered. Voucher specimens for color plates are held at the Entomology Research Laboratory unless otherwise indicated.

Distribution records are based on localities for reference specimens maintained in local and regional collections and are illustrated for New England, New York, Pennsylvania and New Jersey. Specimens examined in reference collections were used to compile distribution maps and northeastern seasonality data. The species

distributions will be more widespread than indicated by current locality data from reference collections, but the specimen records provide confirmation of both distribution and identification which may be critical for less well known species. Voucher specimens are critical to forest management because they add credence to current works.

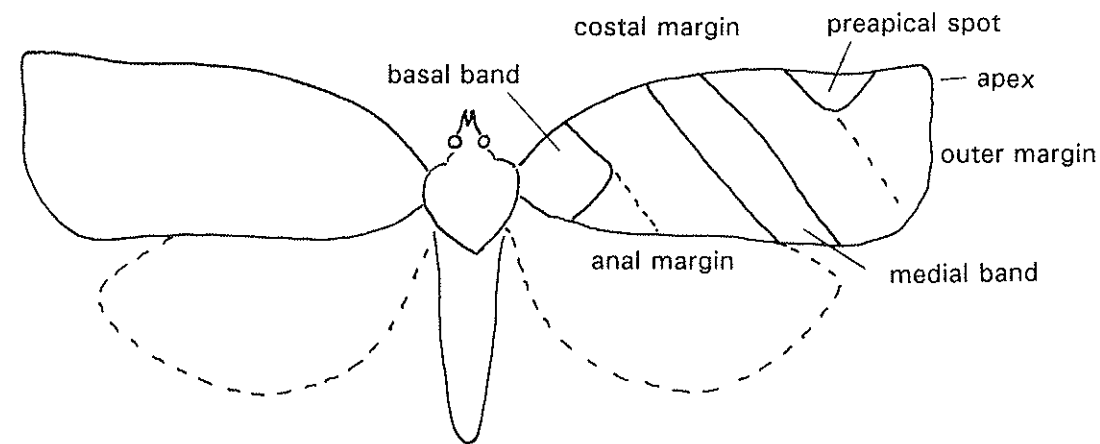


Figure 1. Generalized tortricid forewing and descriptive terms.

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Acleris chalybeana (Fernald, 1882) (Tortricinae)
(lesser maple leafroller)

Plate 1:1-3

Appearance

Wingspan 20-25 mm. Forewings are light gray with scattered dark gray markings, particularly the costal spot, and a dark gray/black dash that is sometimes located at the wing base. The clarity of these markings is variable according to the condition of the specimen.

Distribution

From Nova Scotia to Ontario (Mackay, 1962; Prentice, 1966), and south to at least Pennsylvania.

Hosts

Red maple, sugar maple, white birch, red oak, mountain maple, and beech (Prentice, 1966), boxelder (W. J. Kiel collection). Red and sugar maple may be preferred hosts (Prentice, 1966).

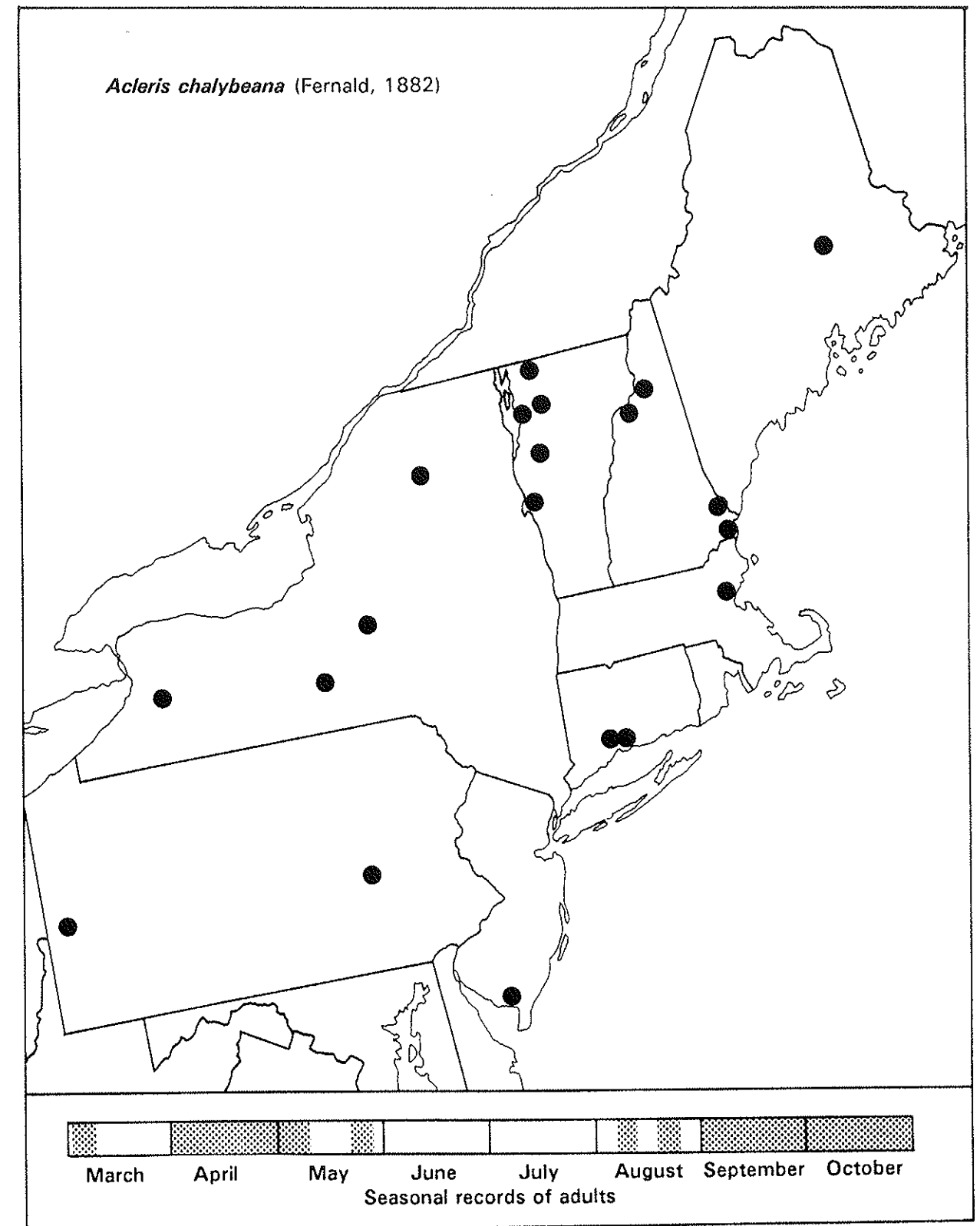
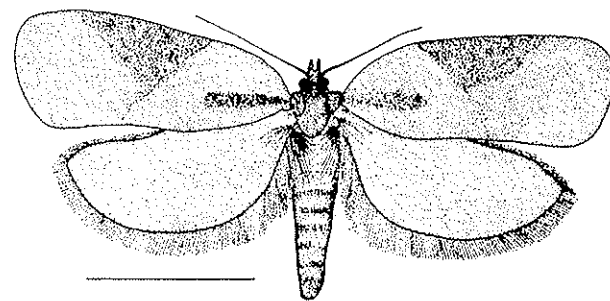
Biology

Univoltine. Adults can be collected at bait (sugar, alcohol, fruit) as well as at lights, or flushed from brush at daytime during the late fall or early spring. Reported causing serious injury to sugar maple in Wisconsin (Rose and Lindquist, 1982). Larvae solitary leafrollers (Prentice, 1966; Rose and Lindquist, 1982).

Seasonality

New England: Adult moths overwinter, sheltering under dead leaves or other forest debris and are most active in the spring (April-May) and fall (September-October). The larval period is from mid-July to mid-August in Canada (Prentice, 1966).

Parasites: *Triclistus pallipes* (Ichneumonidae) (Bradley, 1974)



Archips cerasivorana (Fitch, 1865) (Tortricinae)
(uglynest caterpillar)

Plate 1:4

Appearance

Wingspan 20-24 mm (Ives and Wong, 1988). Forewings are orange with irregular brown markings, principally along the median oblique band and the outer costal margin. The male is distinguished by the presence of a costal fold on the forewing. Hindwings are pale fawn-brown. The color pattern of this species makes it readily distinguishable from most other northeastern Tortricidae. Larvae are yellow with head capsules, thoracic and anal shields dark brown or black (Ives and Wong, 1988).

Distribution

Throughout New England. Widespread in Canada from Newfoundland to British Columbia (Prentice, 1966), and northern United States southward to the District of Columbia, Mississippi, Missouri, Utah and Nevada (Obraztov, 1959). Adults are not commonly collected in light traps, even though the larval stages may be prevalent in the area.

Hosts

Preferred host is cherry (choke, pin, black and sand cherry), but larvae wander and are collected on other deciduous trees and shrubs, including trembling aspen, apple, ash, willow, serviceberry, plum, white birch, hazel, poplar, balsam poplar, bur oak, rose, hawthorn, basswood, speckled alder, sugar maple, pin oak (Prentice, 1966 (Chapman and Lienk, 1971; MacKay, 1962; Freeman, 1958). Damage is seldom lasting, but the nests are detrimental to the appearance of ornamentals (Johnson and Lyon, 1994).

Biology

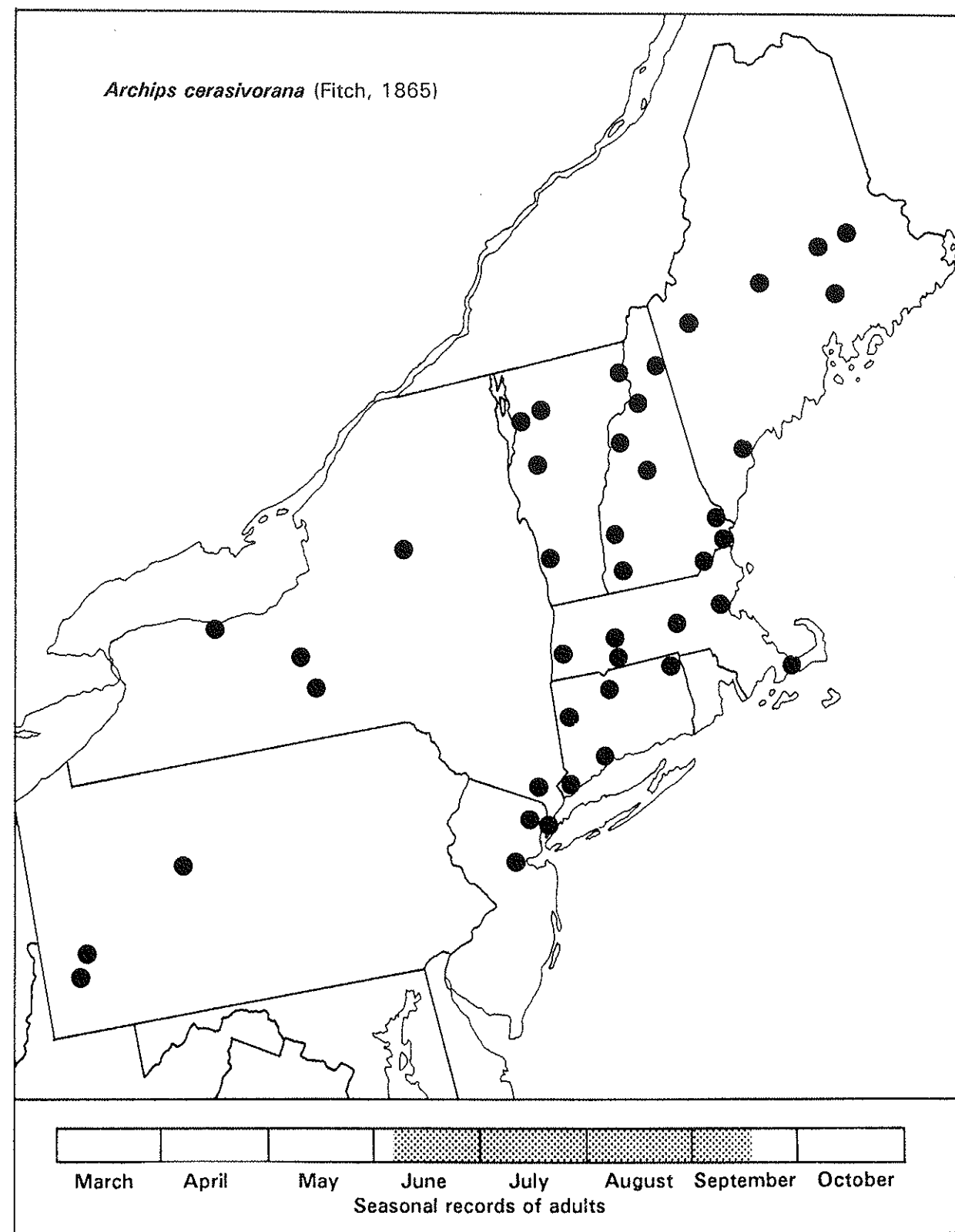
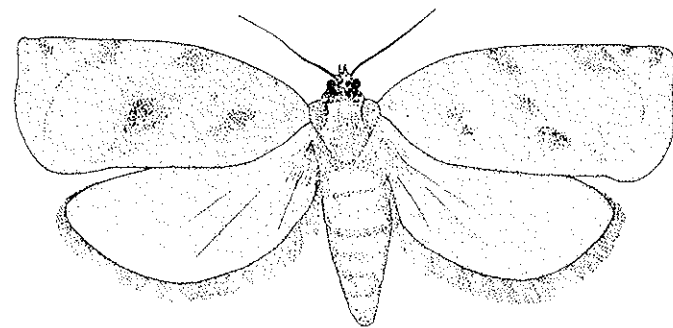
Univoltine (Chapman and Lienk, 1971; Ives and Wong, 1988). Larvae social within silk webs unfolding host leaves. Larvae up to 20 mm length, yellowish green with black heads. Larvae pupate within nest. Eggs are laid on stems in masses of 25-200 in late summer and early fall and remain attached to the host plant during the winter. Individual egg masses are oval, brown, and covered with a semitransparent secretion (Ives and Wong, 1988). Adults are not commonly collected at light traps; the easily visible larval nests may provide a more accurate indicator of this insect's prevalence.

Seasonality

New England: Adults fly from June to early September. July to late August in Maine (Brower, 1983), July to September depending on climate (Johnson and Lyons, 1994). In Canada peak emergence is in July, eggs are laid from early August and larvae are active from mid-May to mid-September (Prentice, 1966).

Parasites

Exochus albifrons, *E. nigripalpis tectulum*, *Triclistus evexus* (Ichneumonidae) (Bradley, 1974)



Archips semifera (Walker, 1863) (Tortricinae)
(oak leafroller)

Plate 1:19

Appearance

Wingspan 20 mm. Forewings pale orange-brown or olive, comprising a mixture of brown and white scales. Five prominent white spots along forewing costal margin. The basal band is bordered by a thin, white band that at times may be obscured in the dorsal half (towards the costal margin) by an extension of orange-brown coloration from the median band. A single, poorly defined patch of scales is often present on the outer edge of the median band near the center of the forewing. *Archips negaundana* (Dyar, 1902) is similar in appearance, but feeds on boxelder and is noticeably lighter in color with white hindwings.

Distribution

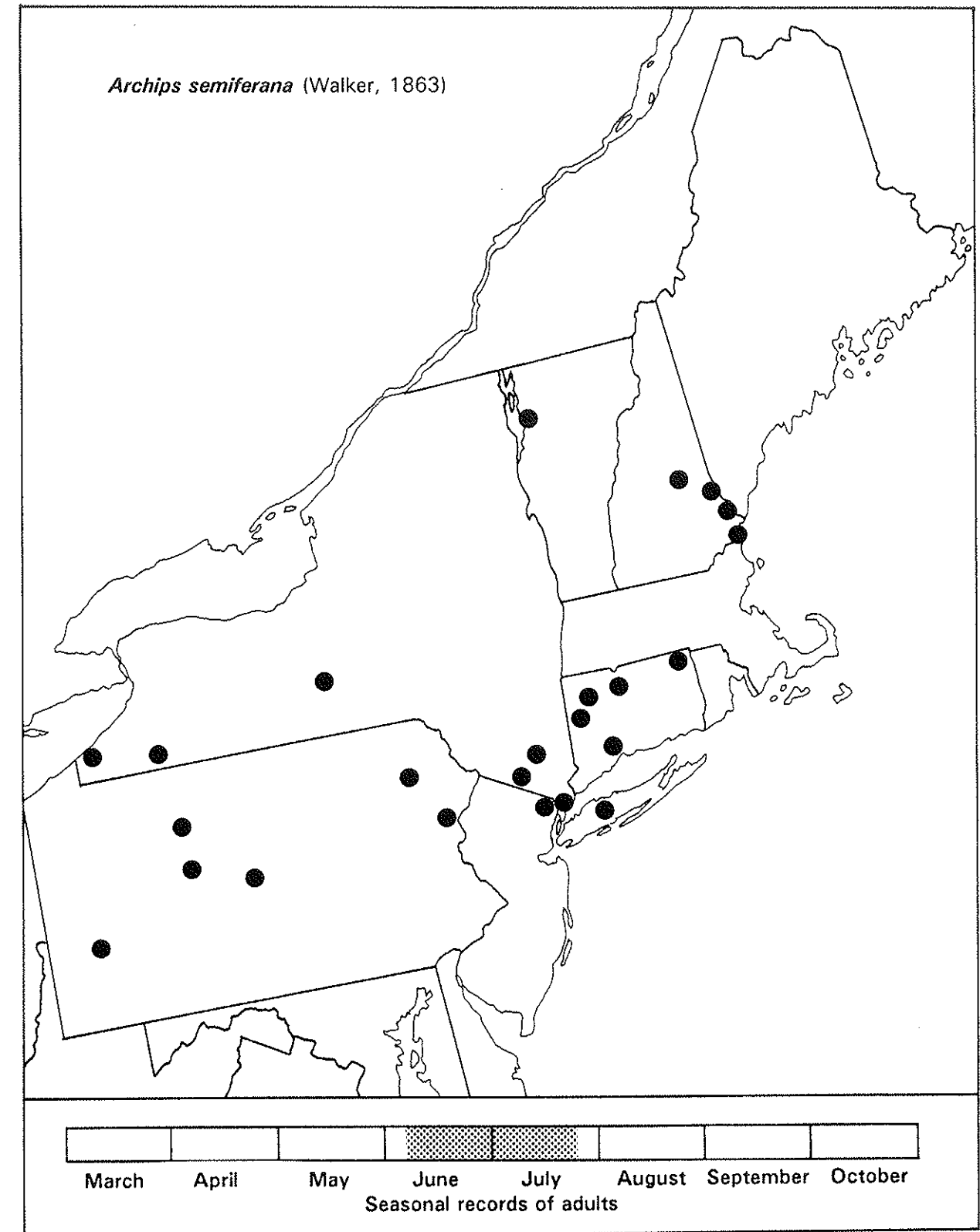
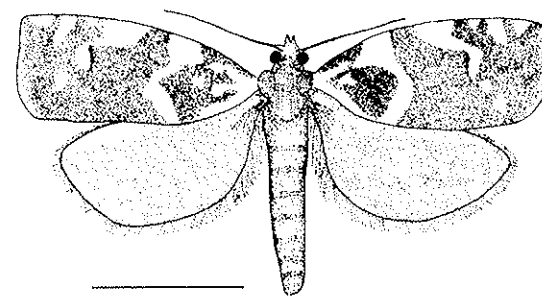
Florida (Kimball, 1965); Quebec to Manitoba, south to Colorado, Texas, and Illinois (Freeman, 1958; Chapman and Lienk, 1971). Single northeastern specimen examined in this study. In Vermont a single specimen was collected from a sandplain forest of mixed oak/maple hardwoods and pines at Camp Johnson, Burlington, Vermont.

Hosts

Oak, witch hazel, and apple (Freeman 1958; Chapman and Lienk, 1971). Forbes (1923) states that this species is most common on maple, but oak may actually constitute preferred host with maple as an incidental foodplant.

Seasonality

New England: Adult flight from June to late July (also in general - Freeman, 1958).



Catastega aceriella (Clemens, 1861) (Olethreutinae)
(maple trumpet skeletonizer)

Plate 2:7-8

This species is widely reported in the literature under the genus *Epinotia* (e.g. Johnson and Lyon, 1994), but was assigned to *Catastega* by Brown (1986).

Appearance

Wingspan 12-17 mm. Forewings are gray with darker grayish-brown or brownish-black markings (Miller, 1987). The most prominent marking is an anterior-medial transverse band extending between the middle of the wing to the inner margin at an oblique angle. The dark gray markings comprise a series of irregularly shaped and spaced v-shaped bands with the vertex of each band pointing towards the outer wing margin. Hindwings are pale gray-brown with dark band along marginal scales. Worn specimens may be difficult to recognize if these features are obscured.

Distribution

Eastern Canada (New Brunswick, Quebec, southern Ontario) (Prentice, 1966), south to Pennsylvania (Forbes, 1923), North Carolina, and west to Michigan (Johnson and Lyon, 1994).

Hosts

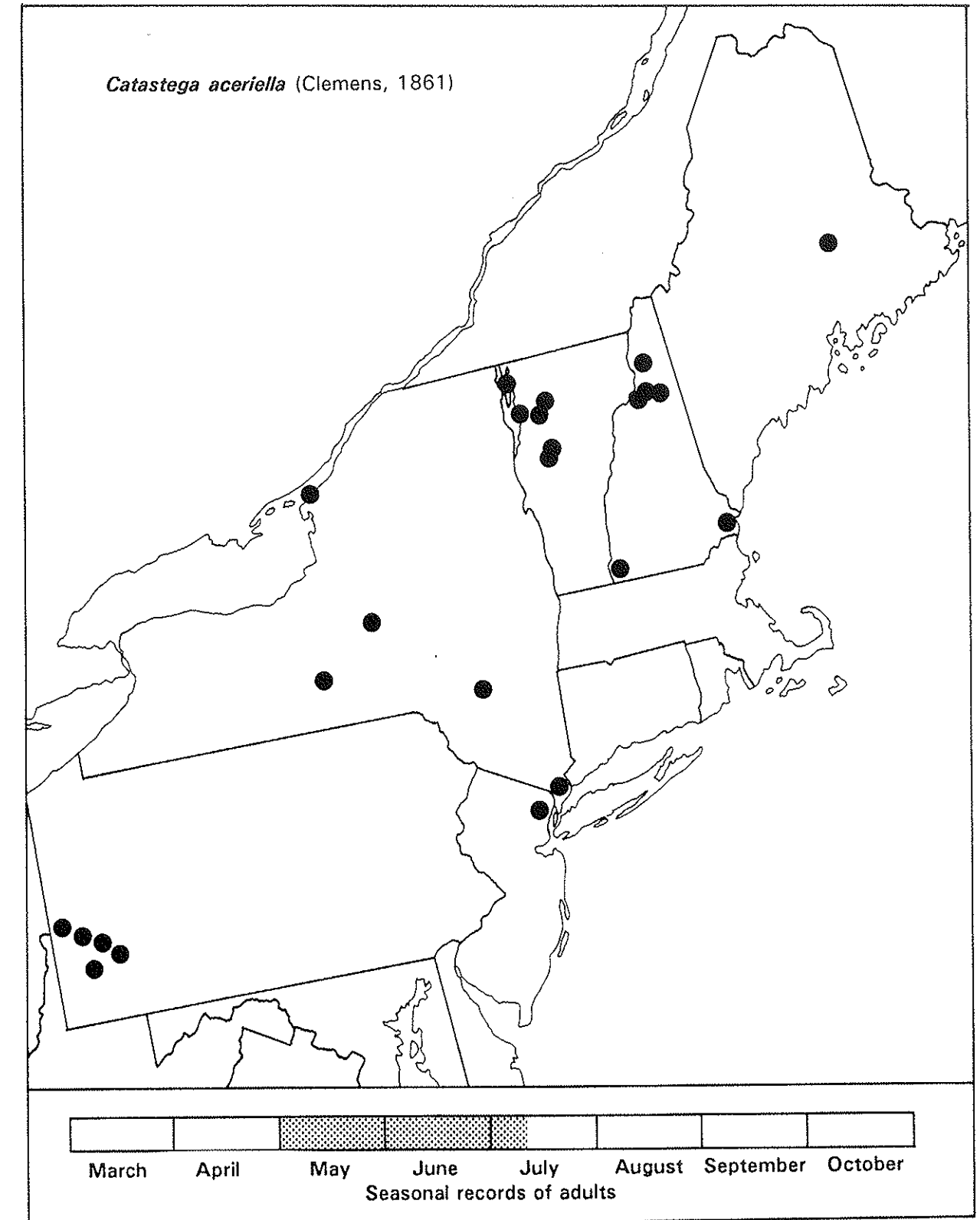
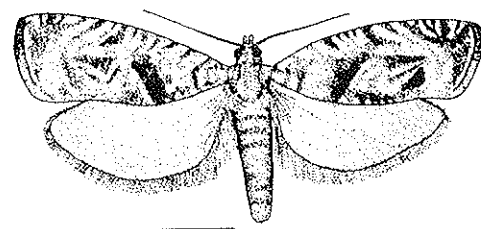
Larva feeds on sugar maple and red maple with sugar maple representing the principal host (Rose and Lindquist, 1982; Johnson and Lyon, 1994). Other hosts include hawthorn, beech, and red, black, white and chestnut oaks (Prentice, 1966; Miller, 1987; Johnson and Lyon, 1994)

Biology

Forbes (1923) notes that the adult moths sometimes occur in large numbers on the bark of trees during June. Eggs are laid singly in a random pattern on the ventral surfaces of leaves (Johnson and Lyon, 1994). Larvae are solitary feeders, and begin feeding on the underside of the leaf near the junction of two major veins, skeletonizing the leaf and spinning a silk canopy over the feeding site. As the caterpillar grows it constructs an elongated tubular shelter from silk and faecal pellets. The leaf is crumpled as edges of the leaf are drawn together (Martineau, 1984; Houston et al., 1990). Overwintering occurs in the pupal stage (Rose and Lindquist, 1982). Defoliation outbreaks have occurred in southern Quebec and Ontario, and in the northeastern United States (Rose and Lindquist, 1982).

Seasonality:

New England: Adults fly from May to early July. Adults are recorded to mid-July in Canada (Prentice 1966).



Choristoneura fractivittana (Clemens, 1861)
(hardwood leafroller)

Plate 1:9-10

Appearance

Sexes dimorphic. Female: Wingspan 25-28 mm. Forewing with basal and median pale yellow-brown bands and a prominent preapical spot. Hindwings pale yellow with gray across the anal region. Male: wingspan 20-28 mm. Forewing gray-brown with dark brown markings and marginal yellow-brown along parts of costal and outer margins, darker than female.

Distribution

Most of southern Canada and northern United States, south to Colorado, Missouri, and Tennessee (Chapman and Lienk, 1971). Rare in Canadian survey records (Prentice, 1966).

Hosts

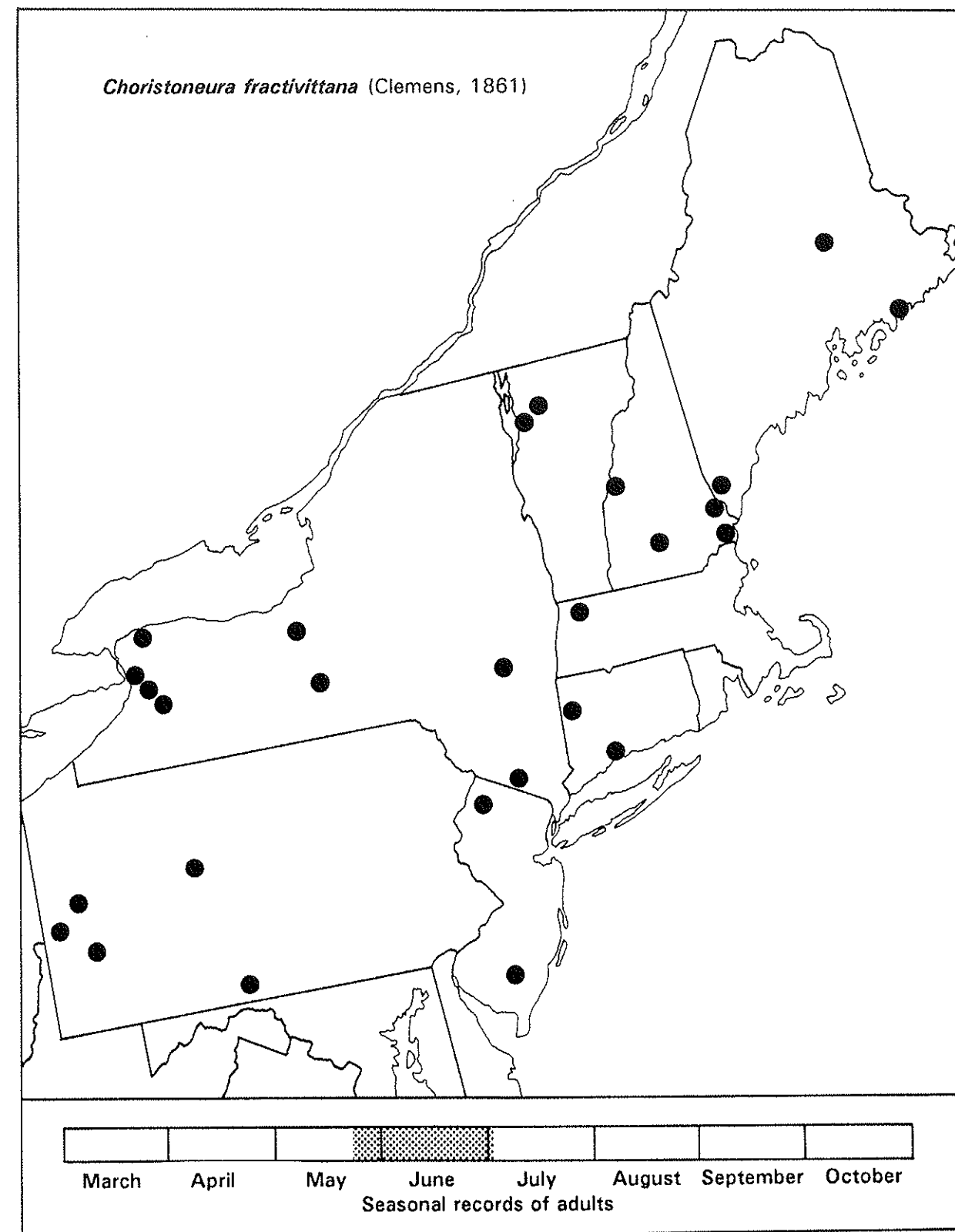
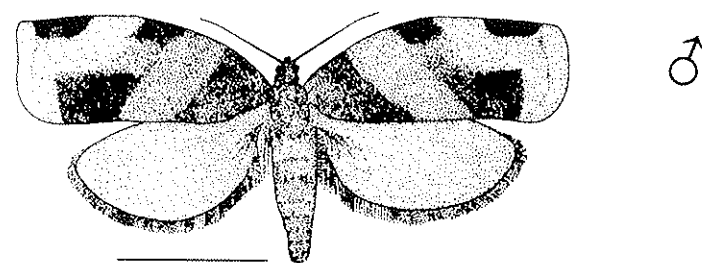
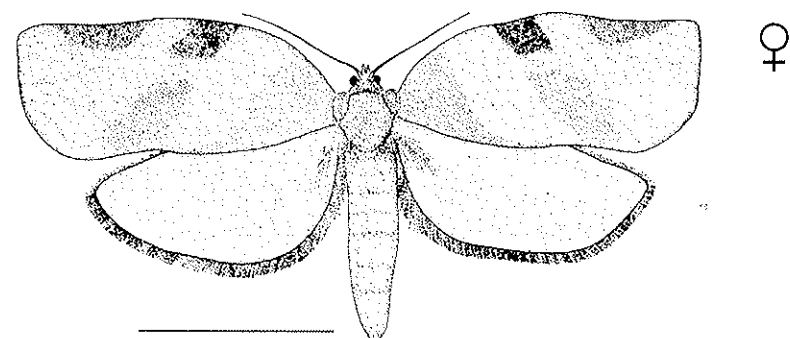
Apple, sugar maple, white birch, beech, red oak, red maple, white elm (Freeman, 1958; Prentice, 1966; Chapman and Lienk, 1971).

Biology

Univoltine. Solitary leaf roller.

Seasonality

New England: Adults fly from late May to early July. Brower (1983) records moths in June and July for Maine. The larva is present from mid-May to mid-June (Prentice, 1966).



Choristoneura rosaceana (Harris, 1841) (Tortricinae)
(oblique-banded leafroller)

Plate 1:5-8

Appearance

Similar to *C. fractivittana*, but brown in color. Wingspan: Females 25 mm; males 20 mm. Basal patch sometimes obscure and only defined by a faint outline. Forewing of male with costal fold and frequently black scaling at the point where the basal patch and costa meet. Hindwings gray over anal region with the remainder of the wing pale yellow-brown (males) or yellow-brown with orange tint (females). Color of larvae ranges from light green to yellowish-green (Ives and Wong, 1988).

Distribution

Florida (Kimball, 1965), California (Powell, 1964), southern Canada (Prentice 1966), Maine to Florida and west from Florida to California (Freeman 1958). Possibly distributed throughout most of the United States and southern Canada (Craighead, 1950).

Hosts

General feeder recorded from over 70 hosts. More frequent hosts include trembling aspen, white birch, willow, basswood, balsam poplar, white elm, chokecherry, Manitoba maple, white oak, sugar maple, and red maple (Prentice, 1966; Ives and Wong, 1988). Occasional severe damage occurs on fruit trees (Prentice, 1966). Bud damage to sugar maple can result in twig forking and stunted shoots (Simmons and Knight 1973)

Biology

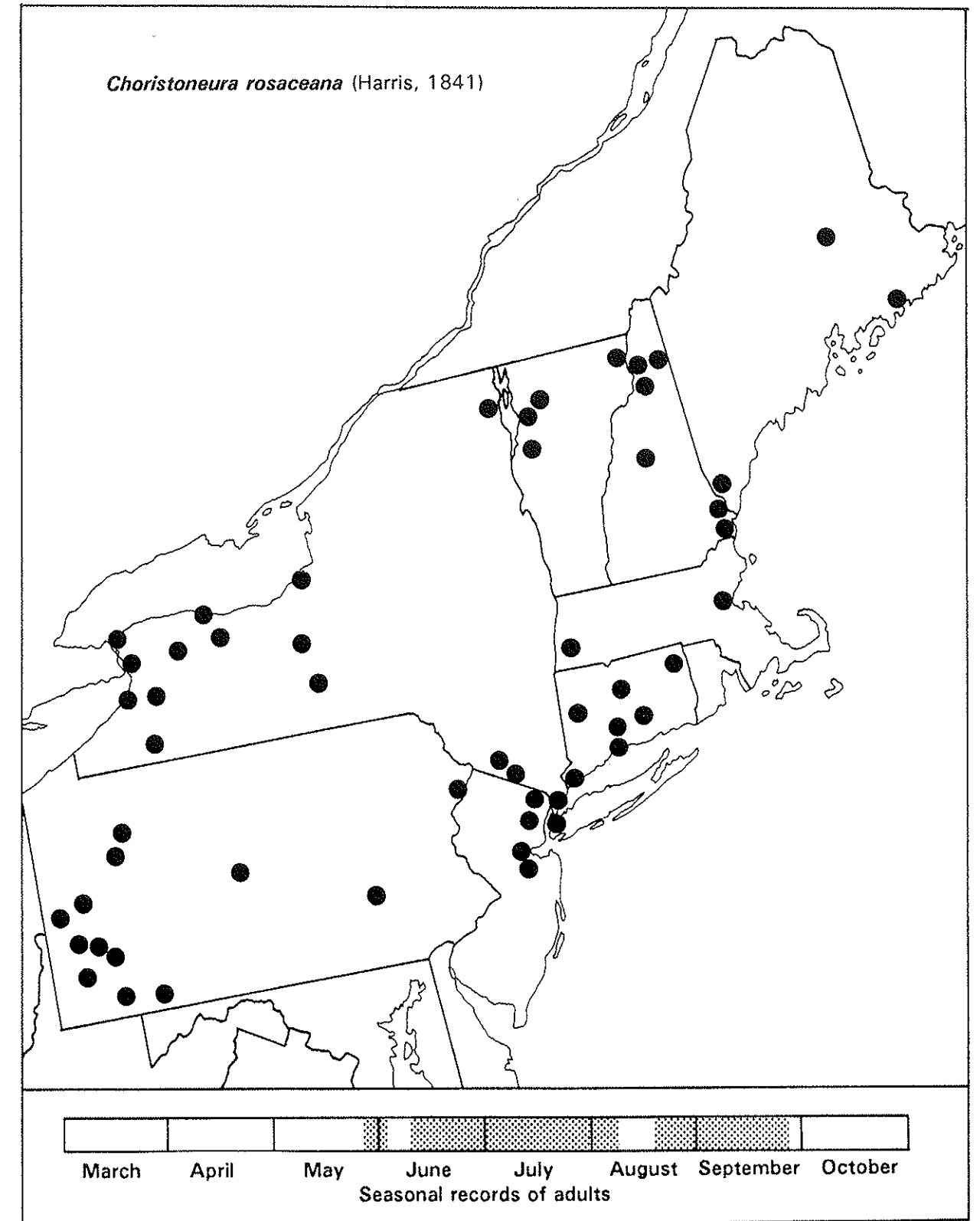
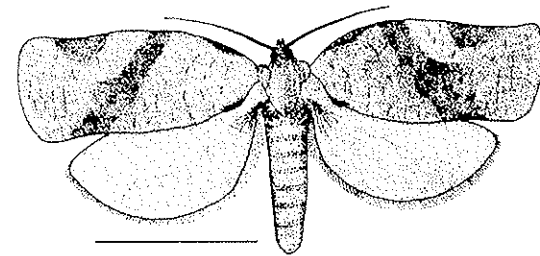
Bivoltine. Larva a solitary leafroller or leaf-tier (MacKay, 1962; Prentice, 1966). Larvae overwinter as second or third instar, and feed within buds during the spring before making a chamber from leaves (Chapman and Lienk, 1971).

Seasonality

New England: Adults fly from late May to September (or early October in Maine, Brower, 1983).

Parasites

Chorinaeus excessorius, *Exochus albifrons*, *E. nigripalpis tectulum*, *Triclistus emarginalis* (Ichneumonidae) (Bradley, 1974).



Cydia candana (Forbes, 1923) (Olethreutinae)

Plate 2:1

Appearance

Wingspan 14-15 mm. Forewings are gray-brown with transverse bands of reflective silver-gray (not always visible in worn specimens), and four distinct parallel black lines near angle of anal and outer margin. Hindwings are dull gray-brown. The mature larva described by Mackay (1959).

Distribution

New England, Pennsylvania, and south to Virginia, and West Virginia (Cornell University Collection)

Hosts

Maples (Miller, 1987).

Biology

Univoltine. Larva feeds in maple seeds (Mackay, 1959; Miller, 1987). Reared from sugar maple seeds at Randolph, Vermont (Entomology Research Laboratory collection).

Seasonality

New England: Adults fly from mid-May to early June.

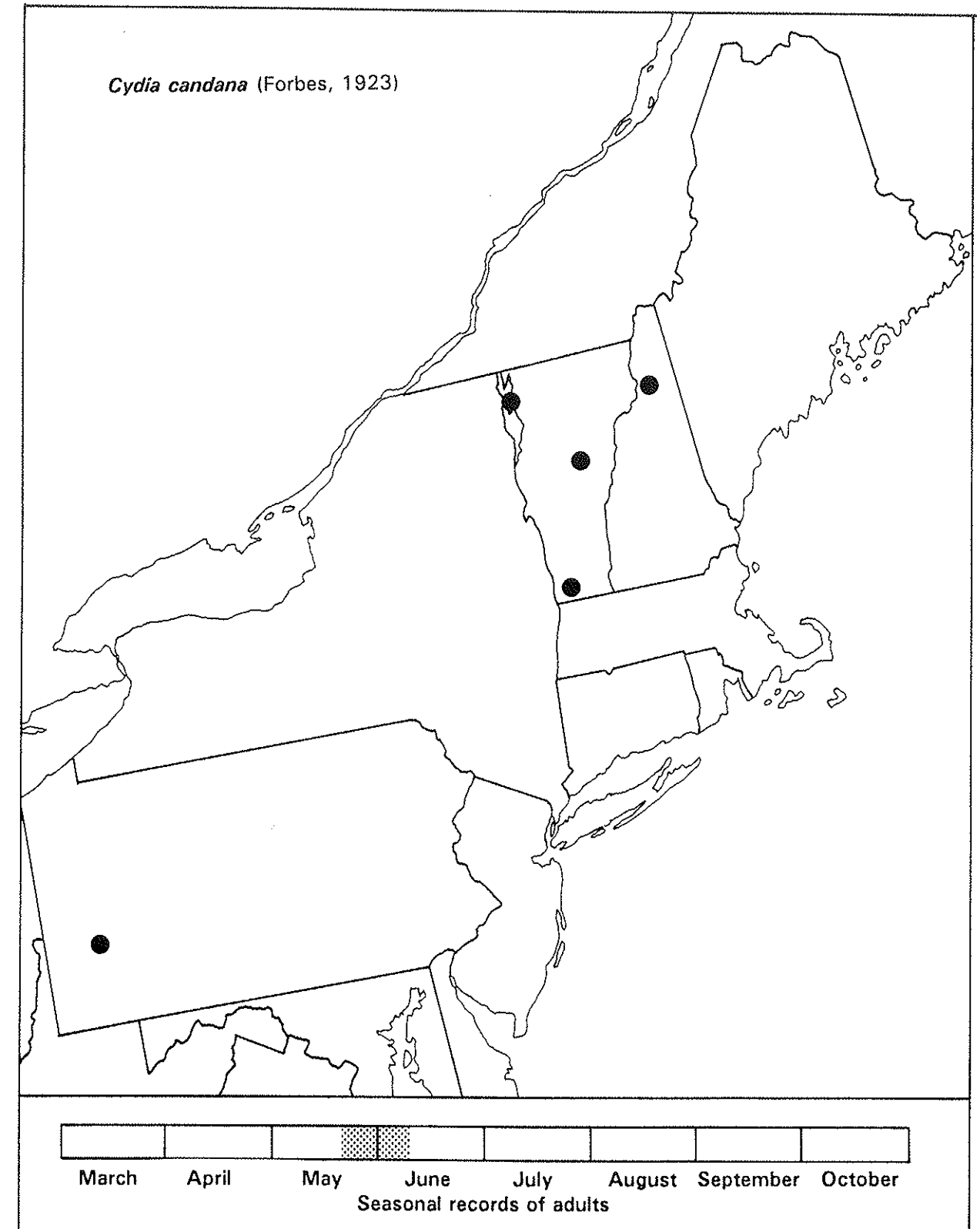
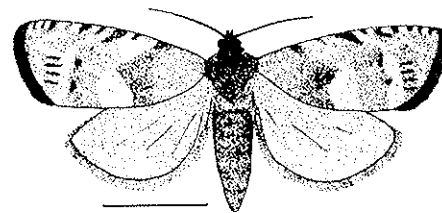


Plate 1

1. *Acleris chalybeana* (Fernald, 1882) (Tortricinae)
15 April 1994. Lamphere Woods, Bennington Co., VT
2. *Acleris chalybeana* (Fernald, 1882) (Tortricinae)
15 April 1994. Lamphere Woods, Bennington Co., VT
3. *Acleris chalybeana* (Fernald, 1882) (Tortricinae)
7 April 1991. Franklin Bog (adjacent forest), Franklin Co., VT
4. *Archips cerasivorana* (Fitch, 1865) (Tortricinae)
4 July 1994. South Burlington, Chittenden Co., VT
5. *Choristoneura rosaceana* (Harris, 1841) (Tortricinae)
3 July 1994. Waterbury, Washington Co., VT
6. *Choristoneura rosaceana* (Harris, 1841) (Tortricinae)
4 July 1985. Whitefield, Coos Co., NH.
7. *Choristoneura rosaceana* (Harris, 1841) (Tortricinae)
26 June 1978. Jefferson, Coos Co., NH. (W. J. Kiel Collection)
8. *Choristoneura rosaceana* (Harris, 1841) (Tortricinae)
9 September, 1993. Colchester Bog (adjacent forest), Chittenden Co., VT
9. *Choristoneura fractivittana* (Clemens, 1861) ♂ (Tortricinae)
10 June 1994. Lovers Lane, Grand Isle, Grand Isle Co., VT
10. *Choristoneura fractivittana* (Clemens, 1861) ♀ (Tortricinae)
11 June 1905. Hampton, Rockingham Co., NH. (University of New Hampshire Collection)
11. *Pandemis lamprosana* (Robinson, 1869) (Tortricinae)
2 August 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
12. *Pandemis lamprosana* (Robinson, 1869) (Tortricinae)
25 July 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
13. *Pandemis limitata* (Robinson, 1869) (Tortricinae)
23 July 1991. Proctor Maple Research Center, Underhill, Chittenden Co., VT
14. *Pandemis limitata* (Robinson, 1869) (Tortricinae)
14 June 1992. Horticultural Research Farm, South Burlington, Chittenden Co., VT
15. *Pandemis limitata* (Robinson, 1869) (Tortricinae)
15 July 1994. Camp Johnson, Colchester, Chittenden Co., VT
16. *Pandemis canadana* Kearfott, 1905 (Tortricinae) (Canadian National Collection, Ottawa)
8 July 1966, Night Hawk Centre, Ontario. Reared ex *Populus tremuloides*
17. *Archips rosana* (Linnaeus, 1758). (Tortricinae) (European leafroller)
28 June 1972. Laval, Quebec. (Canadian National Collection, Ottawa)
18. *Archips rosana* (Linnaeus, 1758). (Tortricinae) (European leafroller)
21 June 1935. Laval, Quebec. (Canadian National Collection, Ottawa)
19. *Archips semifera* (Walker, 1863). (Tortricinae) (oak leafroller)
1 July 1994. Camp Johnson, Colchester, Chittenden Co., VT
20. *Sparganothis pettitana* (Robinson, 1869). (Tortricinae) (maple-basswood leafroller)
25 July 1994. Underhill State Park, Underhill, Chittenden Co., VT
21. *Olethreutes nigrana* (Heinrich, 1923). (Olethreutinae)
14 July 1994. Lovers Lane, Grand Isle, Grand Isle Co., VT
22. *Olethreutes nigrana* (Heinrich, 1923). (Olethreutinae)
23 July 1994. Shaw Mountain, Rutland Co., VT
23. *Sparganothis pettitana* (Robinson, 1869). (maple-basswood leafroller)
1 July 1994. Horticultural Research Farm, South Burlington, Chittenden Co., VT
24. *Sparganothis pettitana* (Robinson, 1869). (maple-basswood leafroller)
14 July 1993. Underhill State Park, Underhill, Chittenden Co., VT

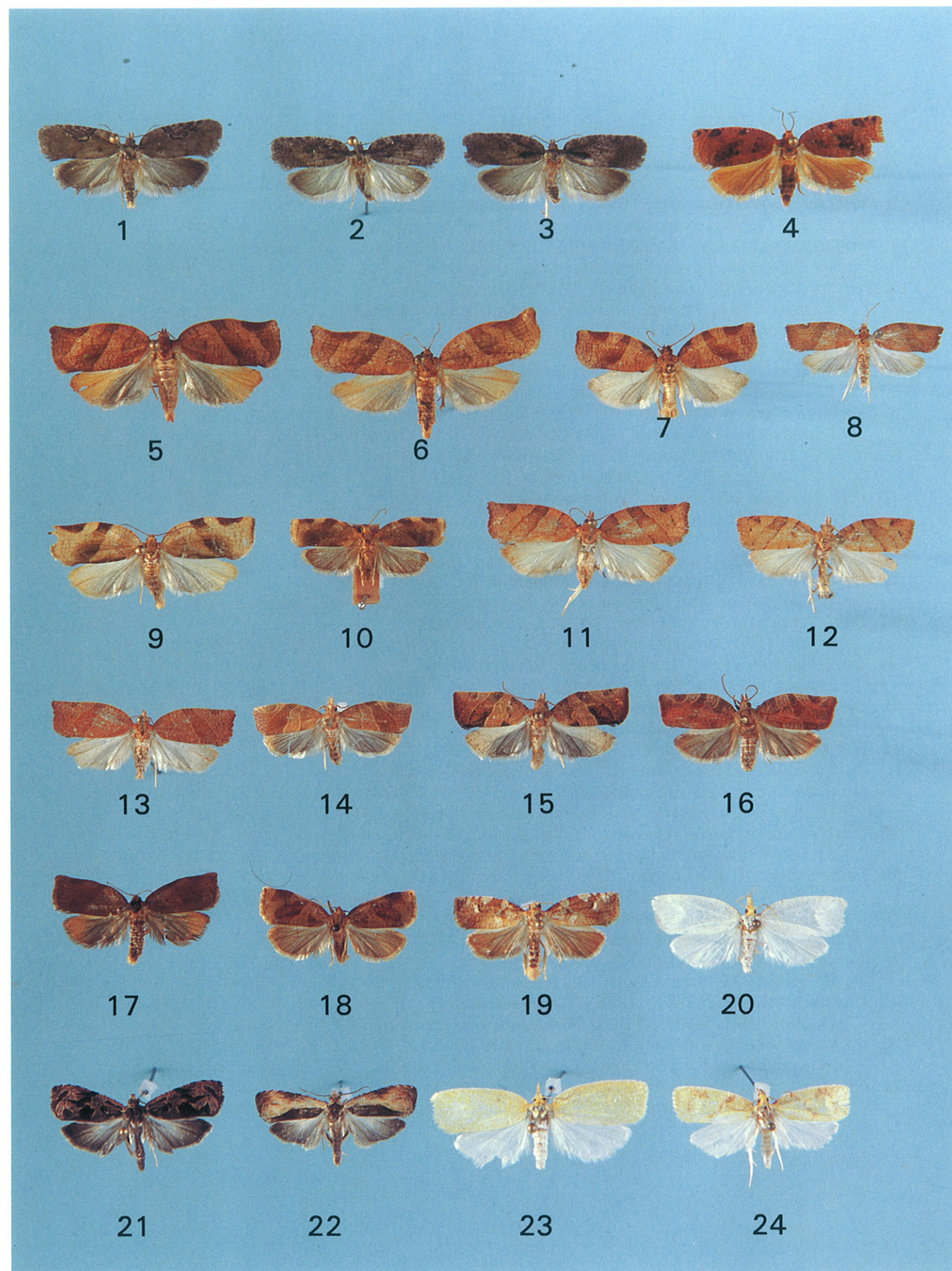


Plate 2

1. *Cydia candana* (Forbes, 1923) (Olethreutinae)
6 July 1994. Lovers Lane, Grand Isle, Grand Isle Co., VT
2. *Proteoteras aesculana* Riley, 1881. (Olethreutinae) (mapletwig borer)
9 May 1993. Horticultural Research Farm, South Burlington, Chittenden Co., VT
3. *Proteoteras aesculana* Riley, 1881. (Olethreutinae) (mapletwig borer)
12 May 1994. Lovers Lane, Grand Isle, Grand Isle Co., VT
4. *Proteoteras moffatiana* (Fernald, 1905) (Olethreutinae) (maple shoot borer)
11 July 1994. Lovers Lane, Grand Isle, Grand Isle Co., VT
5. *Gypsonoma substitutionis* Heinrich, 1923. (Olethreutinae)
20 June 1932. Ottawa, Ontario (Canadian National Collection, Ottawa)
6. *Olethreutes glaciana* (Möschler, 1860). (Olethreutinae)
16 July 1989. Mt Washington, Coos Co., NH (W. J. Kiel collection)
7. *Catastega aceriella* Clemens, 1861. (Olethreutinae) (maple trumpet skeletonizer)
12 June 1994. Lovers Lane, Grand Isle, Grand Isle Co., VT
8. *Catastega aceriella* Clemens, 1861. (Olethreutinae) (Maple trumpet skeletonizer)
16 May 1993. Whitefield, Coos Co., NH (W. J. Kiel collection)
9. *Dichrorampha bittana* (Busck, 1906). (Olethreutinae)
14 July 1993. Proctor Maple Research Center, Underhill, Chittenden Co., VT
10. *Pseudexentera cressoniana* (Clemens, 1864). (oak leafroller)
4 May 1994. Bristol, Addison Co., VT
11. *Epinotia rectiplicana* (Walsingham, 1879). (Olethreutinae)
9 June 1992. Underhill State Park, Underhill, Chittenden Co., VT
12. *Epinotia lindana* (Fernald, 1892). (Olethreutinae)
17 September 1991. Proctor Maple Research Center, Underhill, Chittenden Co., VT
13. *Olethreutes astrologana* (Zeller, 1875). (Olethreutinae)
8 June 1991. Bristol, Addison Co., VT
14. *Olethreutes nitidana* (Clemens, 1860). (Olethreutinae)
28 July 1991. Bristol, Addison Co., VT
15. *Olethreutes lacunana* (Freeman, 1941). (Olethreutinae)
10 August 1991. South Burlington, Chittenden Co., VT
16. *Epinotia momonana* (Kearfott, 1907). (Olethreutinae)
9 August 1993. South Burlington, Chittenden Co., VT
17. *Orthotaenia undulana* (Denis & Schiffermüller, 1775). (Olethreutinae) (dusky leafroller)
10 June 1994. Lovers Lane, Grand Isle, Grand Isle Co., VT
18. *Olethreutes fasciatana* (Clemens, 1860). (Zeller, 1875). (Olethreutinae)
11 July 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
19. *Hulda impudens* (Walsingham, 1884). (Olethreutinae) (Olethreutinae)
11 July 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
20. *Olethreutes appendicea* (Zeller, 1875). (Olethreutinae)
22 June 1993. Bryant Mountain, Rutland Co., VT
21. *Apotomis funerea* (Meyrick, 1920). (Olethreutinae)
22 June 1993. Bryant Mountain, Middlebury, Addison Co., VT
22. *Apotomis albeolana* (Zeller, 1875). (Olethreutinae)
12 June 1991. Underhill State Park, Underhill, Chittenden Co., VT
23. *Apotomis deceptana* (Kearfott, 1905). (Olethreutinae)
27 August 1994. Lovers Lane, Grand Isle, Grand Isle Co., VT
24. *Epinotia transmissana* (Walker, 1863). (birch catkin moth)
12 June 1991. Underhill State Park, Underhill, Chittenden Co., VT

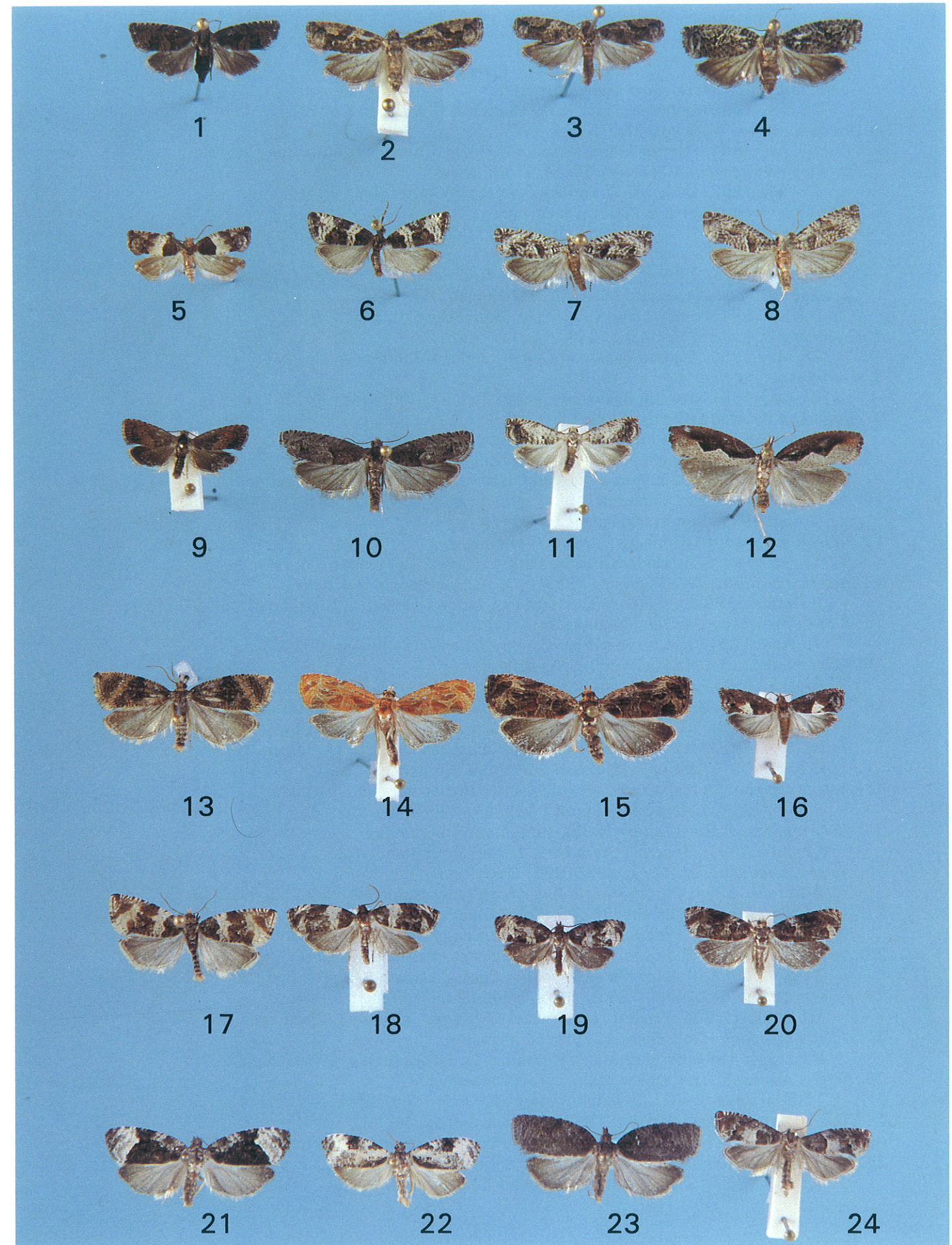


Plate 3.

1. *Coelostathma discopunctana* Clemens, 1860.
28 July 1993. Underhill State Park, Underhill, Chittenden Co., VT
2. *Anopina ednana* (Kearfott, 1907).
11 July 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
3. *Ptycholoma virescana* (Clemens, 1865). (Tortricinae)
21 July 1992. Underhill State Park, Underhill, Chittenden Co., VT
4. *Acleris cervinana* (Fernald, 1882). (Tortricinae)
19 September 1994. Underhill State Park, Underhill, Chittenden Co., VT
5. *Acleris cervinana* (Fernald, 1882). (Tortricinae)
19 September 1994. Underhill State Park, Underhill, Chittenden Co., VT
6. *Catastega timidella* Clemens, 1861. (Olethreutinae)
9 May 1994. Lovers Lane, Grand Isle, Grand Isle Co., VT
7. *Gretchena delicatana* Heinrich, 1923.
28 May 1990. Jericho Research Center, Jericho, Chittenden Co., VT
8. *Gretchena amatana* Heinrich, 1923.
21 May 1991. Jericho Research Center, Jericho, Chittenden Co., VT
9. *Gretchena deludana* (Clemens, 1864).
9 May 1991. Jericho Research Center, Jericho, Chittenden Co., VT
10. *Acleris cervinana* (Fernald, 1882). (Tortricinae)
15 September 1993. Proctor Maple Research Center, Underhill, Chittenden Co., VT
11. *Acleris braunana* (McDunnough, 1934). (Tortricinae) (alder leafroller)
6 April 1991. Ripton, Addison Co., VT
12. *Acleris schalleriana* (Linnaeus, 1761). (Tortricinae)
17 October 1991. Underhill State Park, Underhill, Chittenden Co., VT
13. *Acleris nivisellana* (Walsingham, 1879). (Tortricinae) (apple leaf twister)
8 October 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
14. *Acleris forbesana* (McDunnough, 1934) (Tortricinae)
25 April 1994. Jericho Research Center, Jericho, Chittenden Co., VT
15. *Acleris subnivana* (Walker, 1863). (Tortricinae)
6 April 1991. Proctor Maple Research Center, Underhill, Chittenden Co., VT
16. *Acleris logiana* (Clerck, 1759). (Tortricinae) (blackheaded birch leaffolder)
19 September 1994. Underhill State Park, Underhill, Chittenden Co., VT
17. *Acleris logiana* (Clerck, 1759). (Tortricinae) (blackheaded birch leaffolder)
5 April 1991. East woods, South Burlington, Chittenden Co., VT
18. *Acleris logiana* (Clerck, 1759). (Tortricinae) (blackheaded birch leaffolder)
5 April 1991. East woods, South Burlington, Chittenden Co., VT
19. *Platynota idaeusalis* (Walker, 1859). (tufted apple bud moth)
12 June 1991. Underhill State Park, Underhill, Chittenden Co., VT
20. *Acleris macdunnoughi* Obratzsov, 1963. (Tortricinae)
9 October 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
21. *Acleris flavivittana* (Clemens, 1864). (Tortricinae) (masked leafroller)
6 October 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
22. *Acleris flavivittana* (Clemens, 1864). (Tortricinae) (masked leafroller)
27 April 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
23. *Acleris celiana* (Robinson, 1869). (Tortricinae) (birch leafroller)
17 October 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
24. *Acleris maccana* (Treitschke, 1835). (Tortricinae)
9 October 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
25. *Acleris maccana* (Treitschke, 1835). (Tortricinae)
10 September 1991. Underhill State Park, Underhill, Chittenden Co., VT
26. *Acleris semiannula* (Robinson, 1869). (Tortricinae)
8 October 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
27. *Acleris semiannula* (Robinson, 1869). (Tortricinae)
13 April 1994. Shaw Mountain, Rutland Co., VT

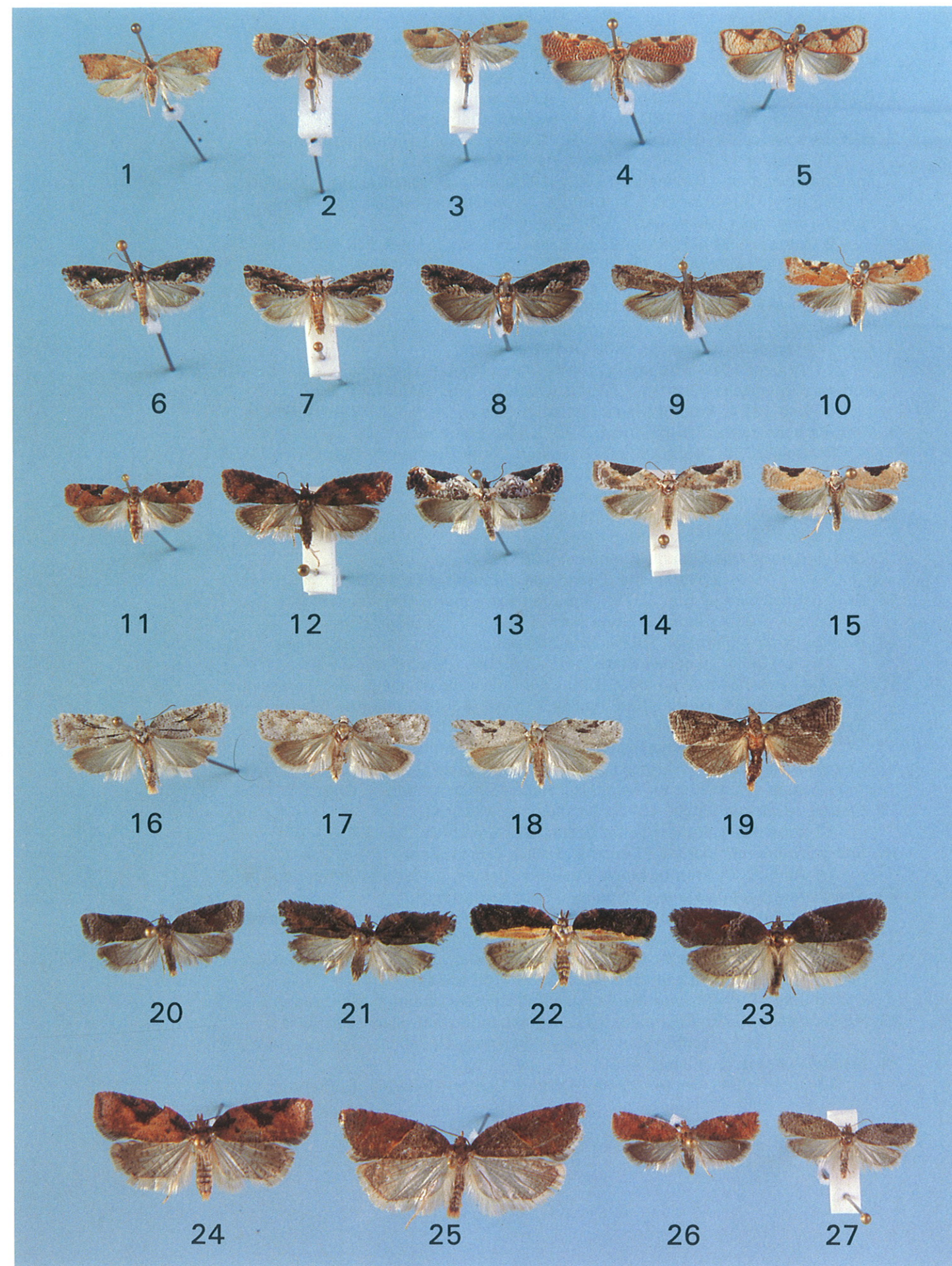
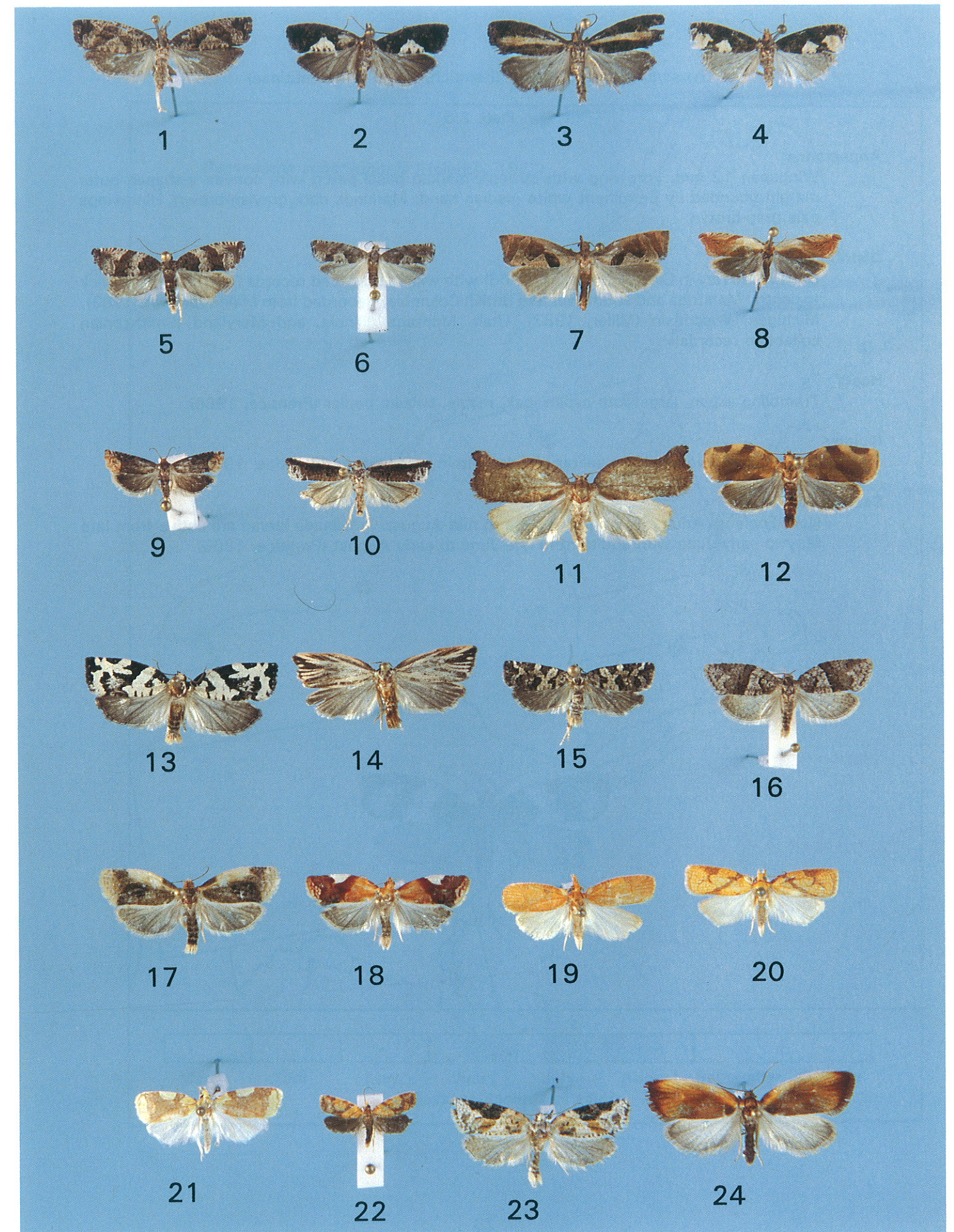


Plate 4

1. *Epinotia solandriana* (Linnaeus, 1758). (Olethreutinae) (birch-aspen leafroller)
15 August 1991. 1160 m, Mt Mansfield, Chittenden Co., VT
2. *Epinotia solandriana* (Linnaeus, 1758). (Olethreutinae) (birch-aspen leafroller)
15 August 1994. Underhill State Park, Underhill, Chittenden Co., VT
3. *Epinotia solandriana* (Linnaeus, 1758). (Olethreutinae) (birch-aspen leafroller)
25 July 1994. Underhill State Park, Underhill, Chittenden Co., VT
4. *Epinotia trigonella* (Linnaeus, 1758). (Olethreutinae)
8 October 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
5. *Gypsonoma fasciolana* (Clemens, 1864). (Olethreutinae) (willow-and-poplar leafroller)
3 June 1994. Camp Johnson, Colchester, Chittenden Co., VT.
6. *Epiblema resumptana* (Walker, 1863). (Olethreutinae)
30 May 1994. Ripton, Addison Co., VT
7. *Eucosma similana* (Clemens, 1860). (Olethreutinae)
11 August 1993. Proctor Maple Research Center, Underhill, Chittenden Co., VT
8. *Ancylis fuscociliata* (Clemens, 1864). (Olethreutinae) (alder leafroller)
6 June 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
9. *Phaneta ochroterminana* (Kearfott, 1907). (Olethreutinae)
28 July 1993. Proctor Maple Research Center, Underhill, Chittenden Co., VT
10. *Ancylis albacostana* Kearfott, 1905. (Olethreutinae)
31 May 1991. Ripton, Addison Co., VT
11. *Archips purpurana* (Clemens, 1865). (omnivorous leafroller) (Tortricinae)
16 July 1991. Proctor Maple Research Center, Underhill, Chittenden Co., VT
12. *Choristoneura fractivittana* (Clemens, 1861) ♂ (Tortricinae)
6 June 1994. Lovers Lane, Grand Isle, Grand Isle Co., VT
13. *Archips dissitana* (Grote, 1879). (spruce needle moth) (Tortricinae)
25 July 1994. Underhill State Park, Underhill, Chittenden Co., VT
14. *Archips striana* (Fernald, 1905). (lined spruce needle moth) (Tortricinae)
2 July 1991. Underhill State Park, Underhill, Chittenden Co., VT
15. *Archips packardiana* (Fernald, 1886). (spring spruce needle moth) (Tortricinae)
10 July 1994. Horticultural Research Farm, South Burlington, Chittenden Co., VT
16. *Syndemis afflictana* (Walker, 1863). (fall dead-leafroller) (Tortricinae)
28 May 1990. Jericho Research Center, Jericho, Chittenden Co., VT
17. *Clepsis melaleucana* (Walker, 1863). (trillium tortrix) (Tortricinae)
13 June 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
18. *Clepsis persicana* (Fitch, 1856). (whitetrangle tortrix)
12 June 1994. Lovers Lane, Grand Isle, Grand Isle Co., VT
19. *Sparganothis reticulatana* (Clemens, 1860). (Tortricinae)
14 July 1993. Proctor Maple Research Center, Underhill, Chittenden Co., VT
20. *Sparganothis reticulatana* (Clemens, 1860). (Tortricinae)
18 August 1992. Proctor Maple Research Center, Underhill, Chittenden Co., VT
21. *Sparganothis niveana* (Walsingham, 1879) (Tortricinae)
18 July 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
22. *Sparganothis lycopodiana* (Kearfott, 1907) (Tortricinae)
18 July 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
23. *Argyrotaenia mariana* (Fernald, 1882) (graybanded leafroller) (Tortricinae)
6 June 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT
24. *Eulia ministrana* (Linnaeus, 1758)
13 June 1994. Proctor Maple Research Center, Underhill, Chittenden Co., VT



Gypsonoma substitutionis (Heinrich, 1923) (Olethreutinae)

Plate 2:5

Appearance

Wingspan 12 mm. Forewing with strongly-marked basal patch with convex v-shaped outer margin bounded by prominent white median band. Markings dark grayish-brown. Hindwings pale gray-brown.

Distribution

Considered rare in Canada (Prentice, 1966) with widely scattered records from New Brunswick to central Manitoba and south-western British Columbia. Recorded from Maine (Brower, 1983), Michigan, Wisconsin (Miller, 1987), Utah, Montana, Illinois, and Maryland (Smithsonian collection records).

Hosts

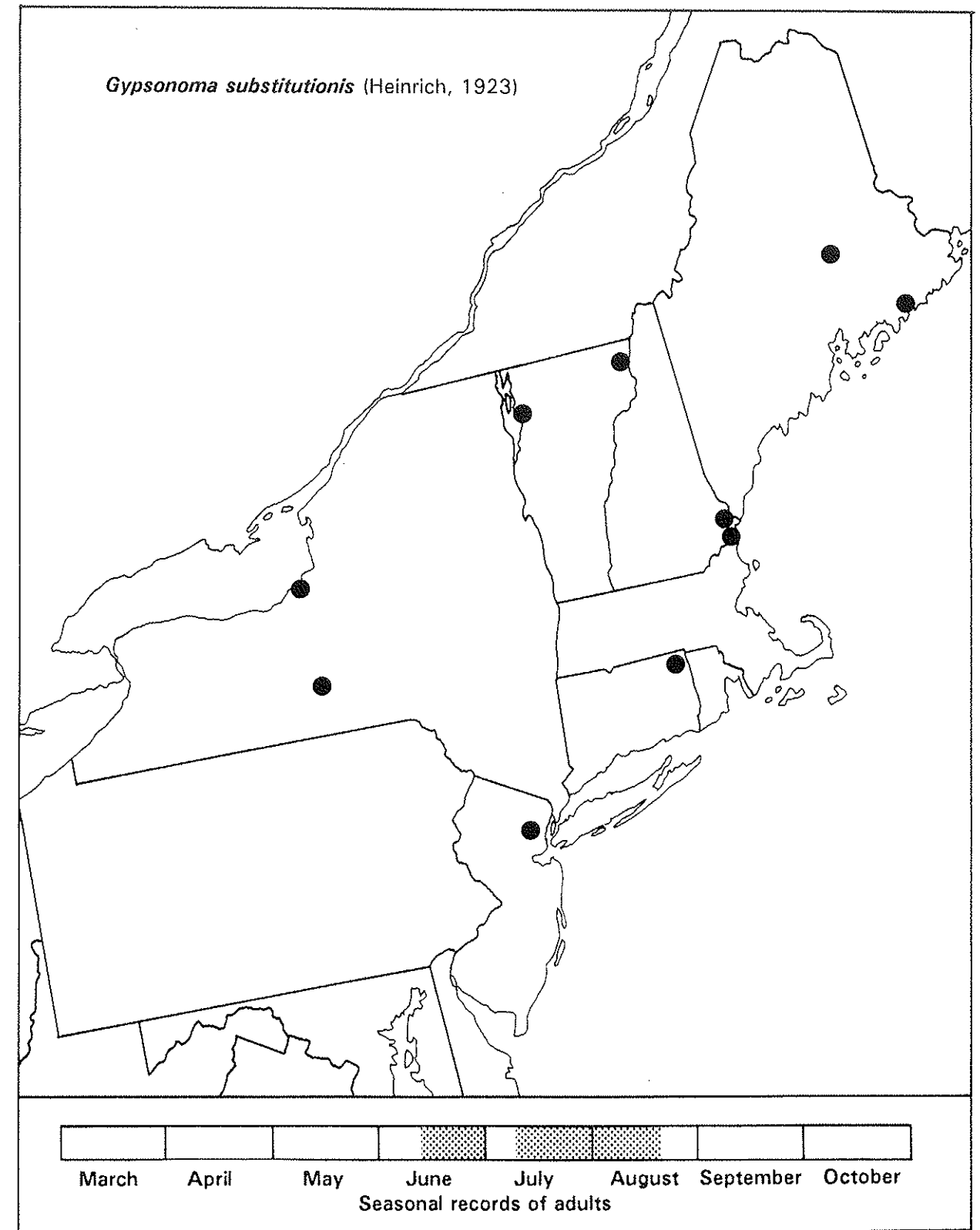
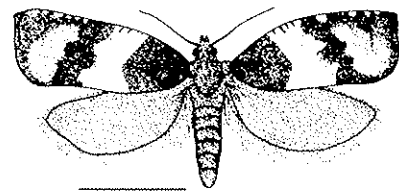
Trembling aspen, largetooth aspen, oak, maple, balsam poplar (Prentice, 1966).

Biology

Univoltine. Larva usually a solitary feeder within rolled leaves (Prentice, 1966).

Seasonality

New England: Adults fly from mid-June to mid-August. In Canada larvae are active from late May to early June with adults from late June to early August (Prentice, 1966).



Olethreutes glaciana (Möschler, 1860) (Olethreutinae)

Plate 2:6

Appearance

Wingspan 12-16 mm. Forewings black and white. The black median band is slightly hourglass in shape. White transverse bands from costal to anal margin often contain minute dark markings. A species with similar appearance is *O. bipartitana* (Clemens, 1860) which has wider white bands, particularly the outer band, and lacks minute black markings within the white areas (illustrated below). Genitalia are also distinct (Miller, 1987).

Distribution

Scattered records in Canada from New Brunswick to interior British Columbia (Prentice, 1966), and distributed from New England to West Virginia, North Carolina, west to Colorado, Montana, South Dakota, Oregon, and Washington (Smithsonian Institution Collection).

Hosts

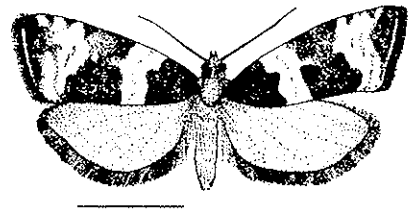
White birch, trembling aspen, sugar maple, willow, balsam poplar, chokecherry, and black cottonwood (Prentice, 1966), and sweetfern (Ferguson, 1975).

Biology

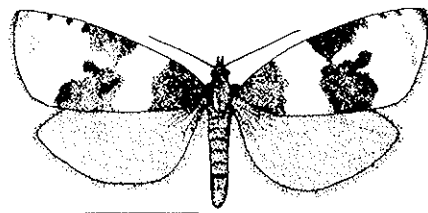
Univoltine. Solitary leafroller (Prentice, 1966). Adult is active during the day, and one of the few daytime active tortricid moths above 2,500 feet elevation in the Green Mountains, Vermont.

Seasonality

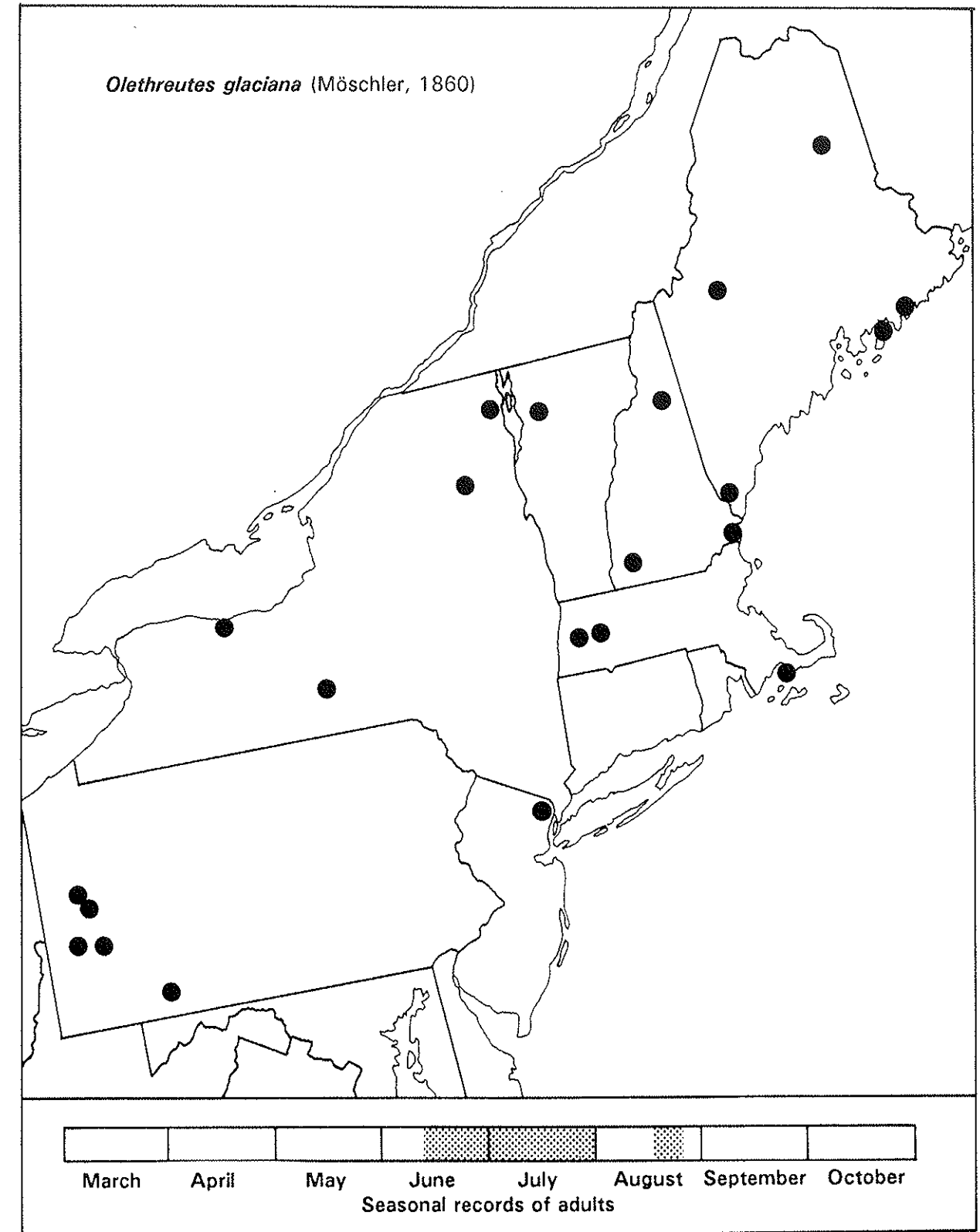
Larvae active from mid-May to late June (Prentice, 1966), with adults active in June-August.



O. glaciana



O. bipartitana



Olethreutes nigrana (Heinrich, 1923) (Olethreutinae)

Plate 1:21-22

Appearance

Forewing 9.5 to 10 mm long. Wing pattern is variable with dark marking brown or yellowish-brown (Miller, 1987). Background forewing color light brown. Hindwings gray over outer areas or throughout, with prominent anal lobes in males (illustrated below). There are two common variants: (a) forewing with irregular-shaped median transverse band, and (b) forewing with a dark band along the anal margin of the forewing. A similar species is *Olethreutes nitidana* (Clemens, 1860) (Plate 2:12) which is slightly smaller and orange-yellow in color.

Distribution

Illinois (Godfrey et al., 1987), Michigan and Wisconsin (Miller, 1987), Ohio, Ontario and south to North Carolina (Canadian National Collection). In Vermont the moth is most commonly collected in mixed hardwoods with oak and maple present.

Hosts

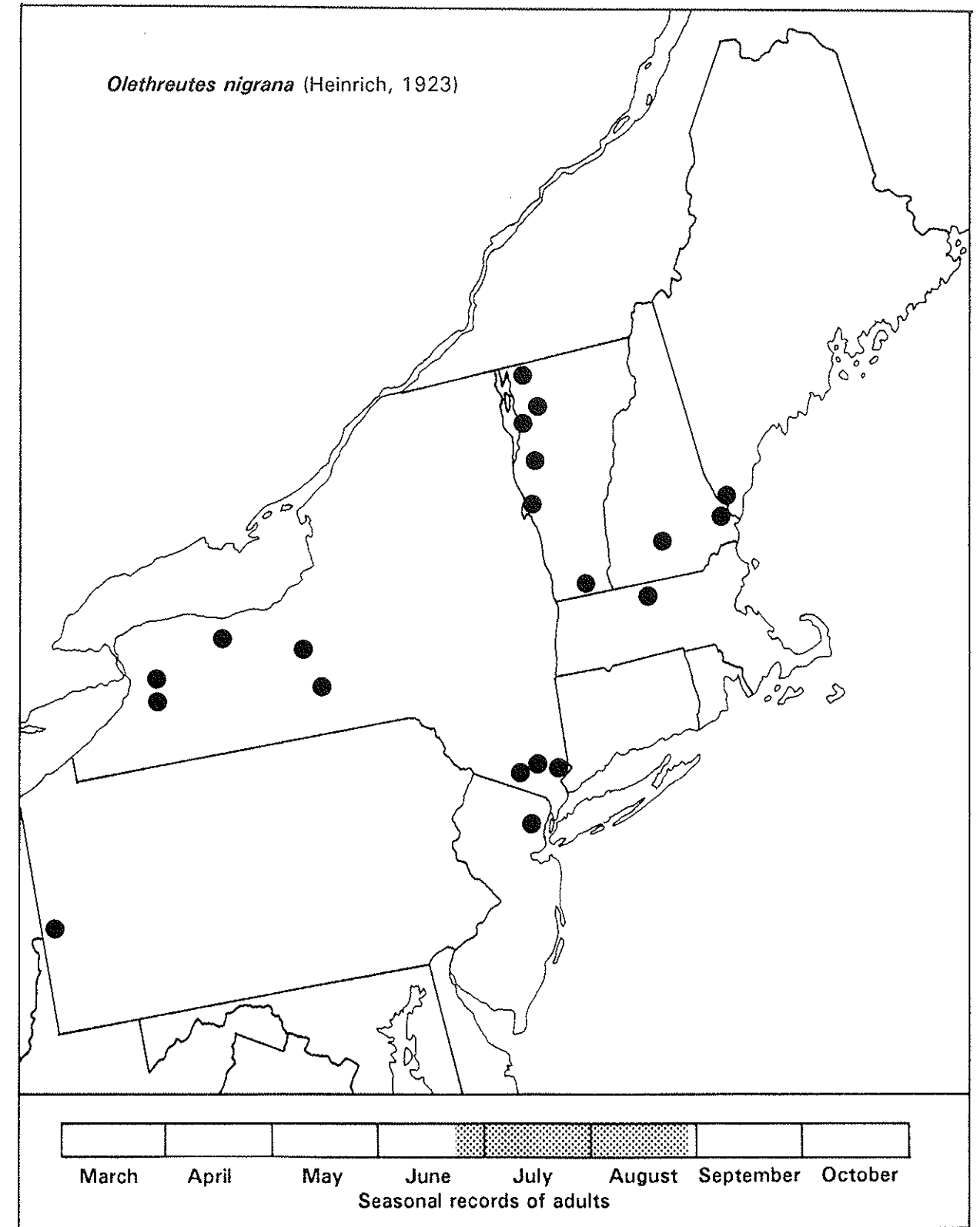
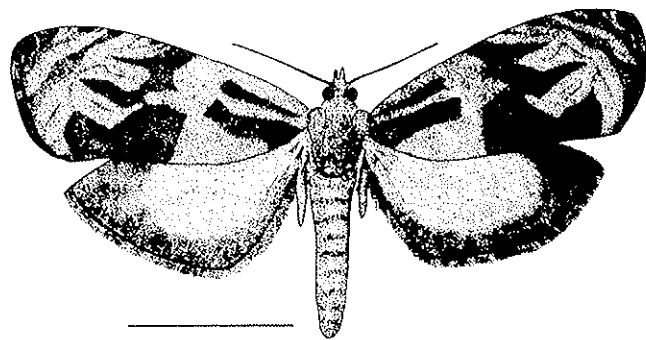
Larva feeds on maple and hickory (Miller, 1979). The similar moth *O. nitidana* is also usually found in maple forests (mid-July) and although the latter has no published host records it appears to be a good indicator species for the presence of sugar maple in Vermont forests (M. Sabourin, personal observation).

Biology

A solitary leafroller. Adults can be observed during the day among ferns and other understory plants in hardwood forests.

Seasonality

Adults fly from late June to the end of August.



Pandemis lamprosana (Robinson, 1869) (Tortricinae)
(willow-aspen leafroller)

Plate 1:11-12

Appearance

Wingspan 20-25 mm. Overall coloration of cryptic. Males have notch in the base of antenna and may have a black tuft of scales at the tip of abdomen. Forewings pale yellow-brown with three dark brown markings outlined by a darker brown edge, and outer margin with dark brown edge most noticeable in fresh specimens. Hindwings pale brown-white.

Distribution

Eastern United States, western Ontario and Wisconsin with a single additional record in British Columbia (Prentice, 1966).

Hosts

White birch, red maple, sugar maple, basswood, white elm, ironwood, yellow birch, white ash, red oak, trembling aspen, beech, honey-locust, slippery elm, ash apple, nettle, sycamore, witch hazel, and sassafras (Freeman, 1958; Prentice, 1966; Chapman and Lienk, 1971; Godfrey et al., 1987).

Biology

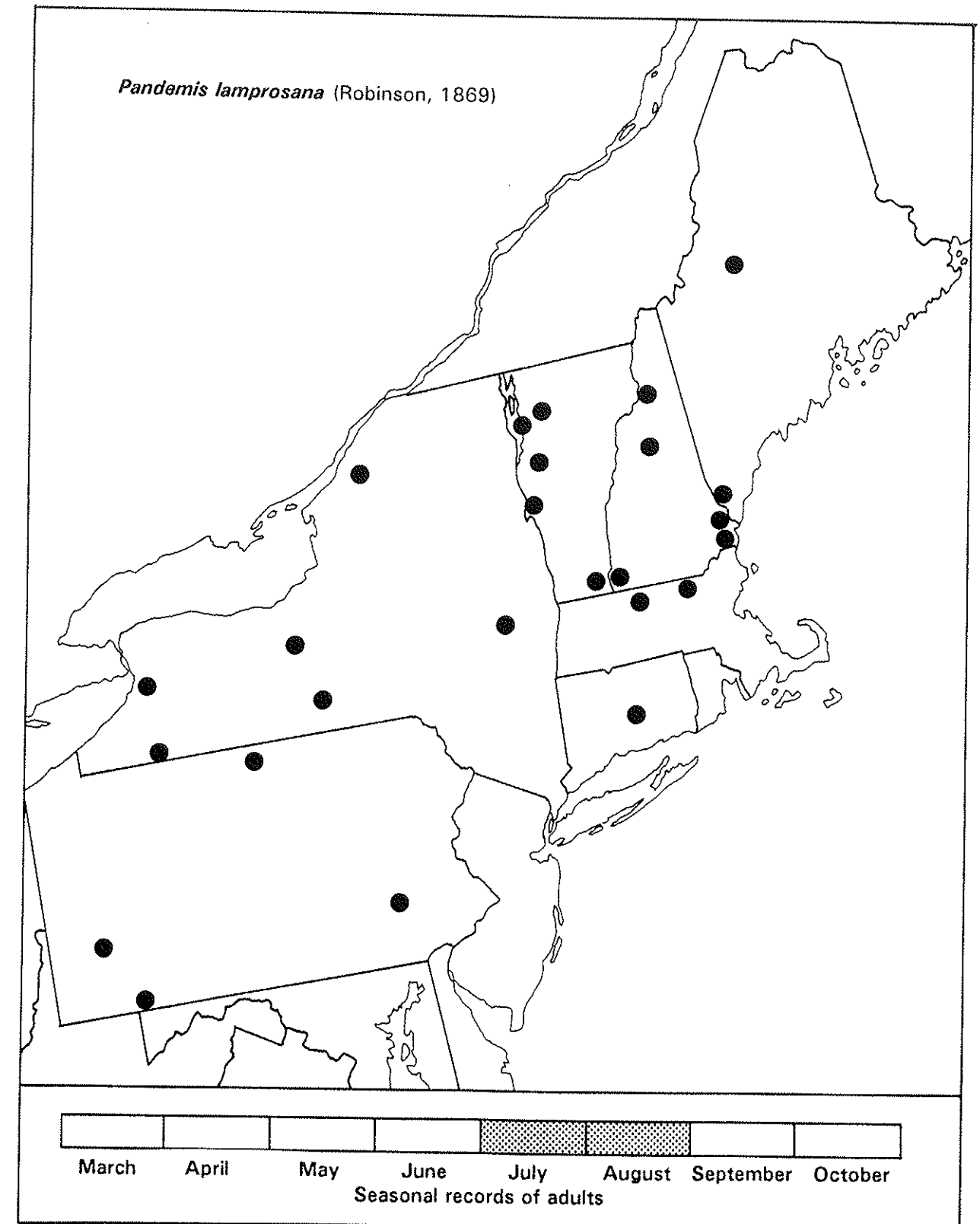
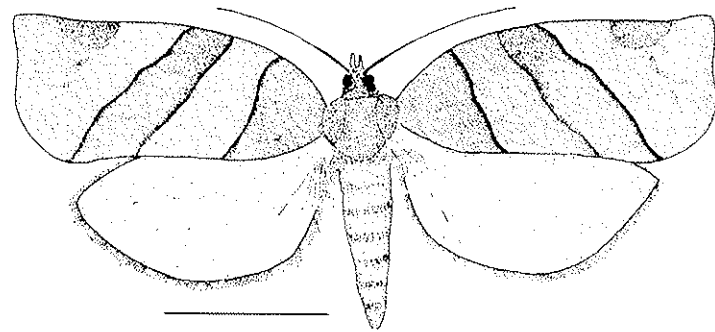
Univoltine. Larva a solitary leaf tier (Prentice, 1966). Adults may be collected during the day on the forest floor among ferns, and low-hanging branches. *P. lamprosana* is more likely to associate with hardwood forests in the east than is *P. limitata* (p. 36), and has been collected at light traps above 2,000 feet elevation on Mount Mansfield (VT). Adults at rest or will settle on forest litter when disturbed.

Seasonality

New England: Adults fly in July and August. Also recorded from late June to mid July or August (Prentice, 1966; Chapman and Lienk, 1971; Brower, 1983). Larva active from late May to late August (Prentice, 1966).

Parasites

Triclistus emarginalis, *Trieces onitis* (Ichneumonidae) (Bradley, 1974)



Pandemis limitata (Robinson, 1869)
(three-lined leafroller)

Plate 1:13-15

Appearance

Wingspan 18-22 mm. The forewing costal spot is solid, and borders of the median band and basal patch are irregular, and may be emarginate or bent. Dark patches are outlined by a pale yellow border. Males have a notch in the base of the antenna. Larvae have a yellowish-green head and body and are 19-23 mm in length at maturity. The mid-dorsal line is bluish green with a row of pale green setal bases to either side (Ives and Wong, 1988: Fig. 81G).

There are no reliable characters to separate *P. limitata* from *P. canadana* (Plate 1:16), and there is considerable doubt that *canadana* is a distinct species (M. Sabourin and W. E. Miller in preparation).

Distribution

Throughout southern Canada (Prentice, 1966), and most of the United States with apparent absence from Florida (Kimball, 1965) and California (Powell, 1964). Rare in Canadian survey collections (Prentice, 1966).

Hosts

Willow, trembling aspen, white birch, sugar maple, white elm, basswood, white oak, Manitoba maple, bur oak, slippery elm, balsam poplar, silver poplar, mountain ash, chokecherry, mountain alder, red alder (Prentice, 1966; Ives and Wong, 1988).

Biology

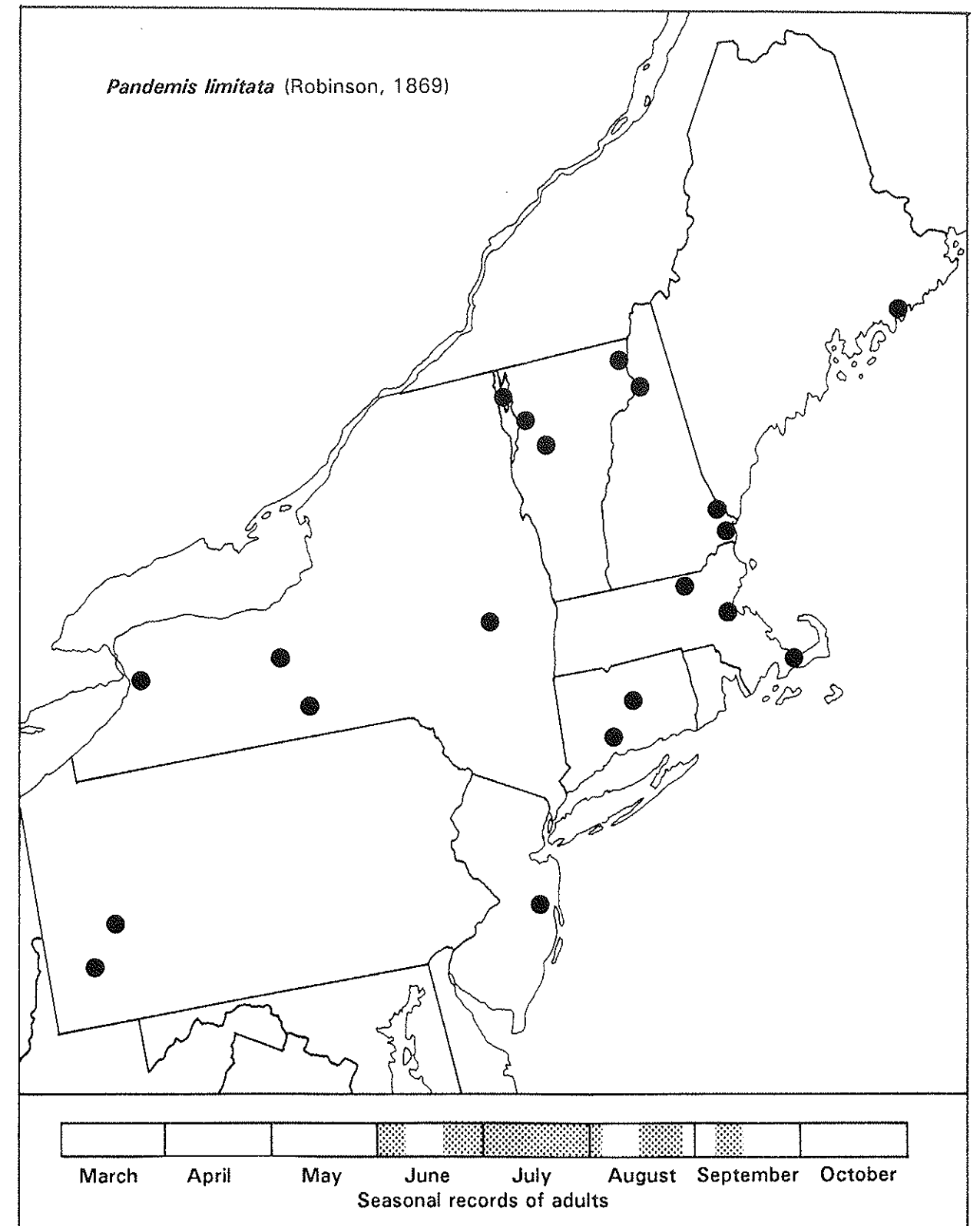
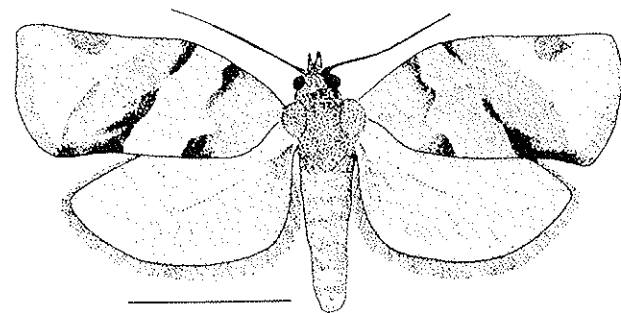
Bivoltine in some parts of the range. Larva a solitary leafroller frequently found on apple with other leafrollers (Chapman and Lienk, 1971) and considered a major pest on apple in British Columbia (Madsen et al., 1984). Also common on shade trees and woody ornamentals (Johnson and Lyon, 1994).

Seasonality

New England: Adults fly from June to September. In Canada adult flight is from July to August and the larva is active from early June to early August (Prentice, 1966).

Parasites

Acropimpla alboricta, *Itoplectis conquisitor* (Ichneumonidae) (Bradley, 1974)



Proteoteras aesculana (Riley, 1881) (Olethreutinae)
(mapletwig borer)

Plate 2:2-3

Appearance

Wingspan 15-20 mm. Forewings olive-gray with darker gray-black markings, including a strongly marked oblique band from center of costa to middle of outer margin; prominent pale area in corner of outer and inner margins; raised scale tufts present in discal (basal) area of forewing. Hindwings gray. Males with melanic sex scales along costa of hindwing.

Distribution

Distributed across Canada from Nova Scotia to southern Alberta (Prentice, 1966), and from Maine to California, Kansas, Illinois, and Maryland in the United States (Heinrich, 1923; Powell, 1964).

Hosts

Maple and buckeye (Forbes, 1923); Norway maple (Smithsonian Institution Collection); maple and horse chestnut (Heinrich, 1923), boxelder (Miller, 1987), red maple (Brower, 1983) sugar maple, silver maple, and big leaf maple (Solomon, 1995).

Biology

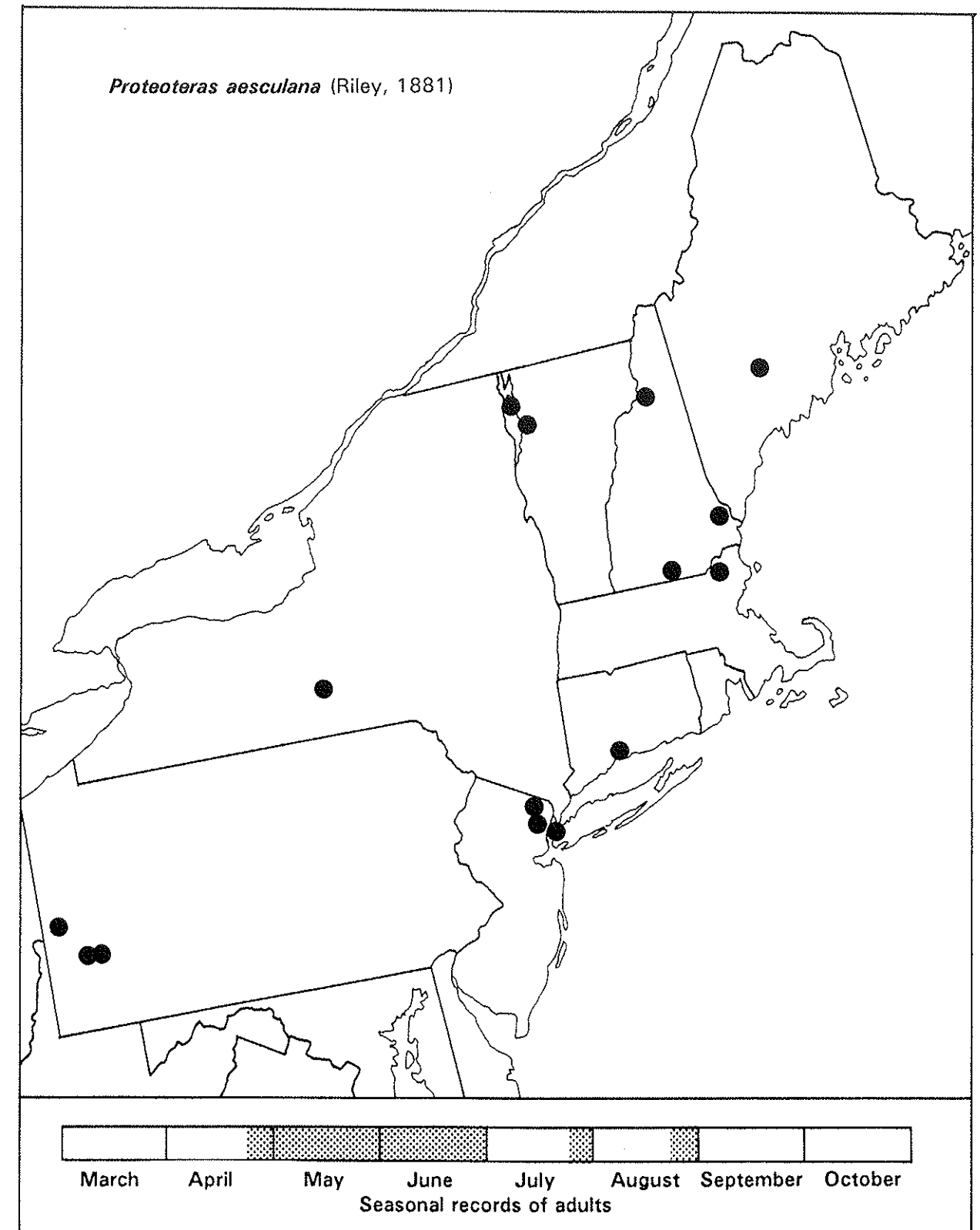
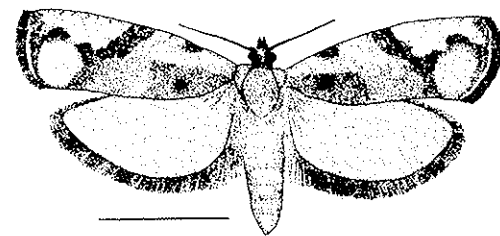
Probably mostly univoltine, but considering the wide range of records in Canadian collections it may be bivoltine in parts of its range (Solomon, 1995), or the adults may overwinter. Larvae overwinter in mined buds (Rose and Lindquist, 1982), and bore into terminal twigs (Forbes, 1923), or sometimes leaf petioles (Heinrich, 1923) and seeds (Rose and Lindquist, 1982). The species is generally found in low numbers (Rose and Lindquist, 1982). During the growing season larval feeding may prevent continued terminal growth by killing current shoots.

Seasonality

New England: Adults fly from late April to late August, but are mostly seen in May. General records range from April to October (Miller, 1987), and June to August in Maine (Brower, 1983).

Parasites

Elachertus proteoteralis, *Scambus pterophori* (Solomon, 1995).



Proteoteras crescentana Kearfott, 1907 (Olethreutinae)

(no plate illustration)

Appearance

Wingspan 16-20 mm. Forewing: pale olive gray with thick, black, mid-costal band which is more pronounced than for other *Proteoteras* species, and bends back to apex to form a crescent shape. Hindwings pale gray.

The larva is pale white with reddish brown head (Solomon, 1995).

Distribution

Quebec/New England west to Saskatchewan, south to Kansas, Illinois and Maryland (Heinrich, 1923; Prentice, 1966).

Hosts

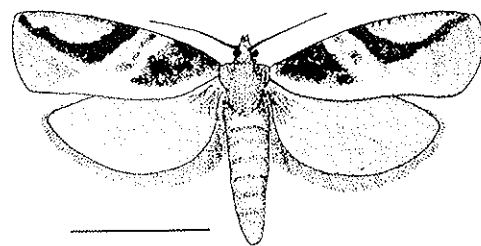
Box elder and maple (Forbes, 1923; Solomon, 1995) with boxelder as the major host (Solomon, 1995). Larval boring can result in loss of terminal growth, gall formation, and deformed trees (Wong et al., 1983).

Biology

Similar to other species of the genus. Occurs in mixed populations with *P. willingana* in the West, and likely to occur with other *Proteoteras* species, but little is known of its biology in eastern regions (Solomon, 1995).

Seasonality

New England: Adults fly from late June to mid-July. Larvae mature in May and June (Solomon, 1995).



Proteoteras moffatiana (Fernald, 1905) (Olethreutinae)
(maple shoot borer)

Plate 2:4

Appearance

Wingspan 17-18 mm. Distinct from other tortricids due to the distinct green forewings (not, however, apparent in plate illustration) with scattered black markings. Under the microscope the green color divides into patches of dark and pale whitish-green. Hindwings pale gray-brown. Males with melanic sex scales along the hindwing costal margin.

Distribution

Possibly throughout range of sugar maple. Recorded outside the northeast from North Carolina (M. Sabourin collection), Arkansas, Michigan, and Wisconsin and Minnesota (Smithsonian Institution Collection; Miller, 1987).

Hosts

Maple (Forbes, 1923), sugar, red, and silver maple (Prentice, 1966); rose, elderberry (Godfrey et al., 1987). Larval boring has caused noticeable deformity in sugar maple trees in Quebec and Michigan (Rose and Lindquist, 1982).

Biology

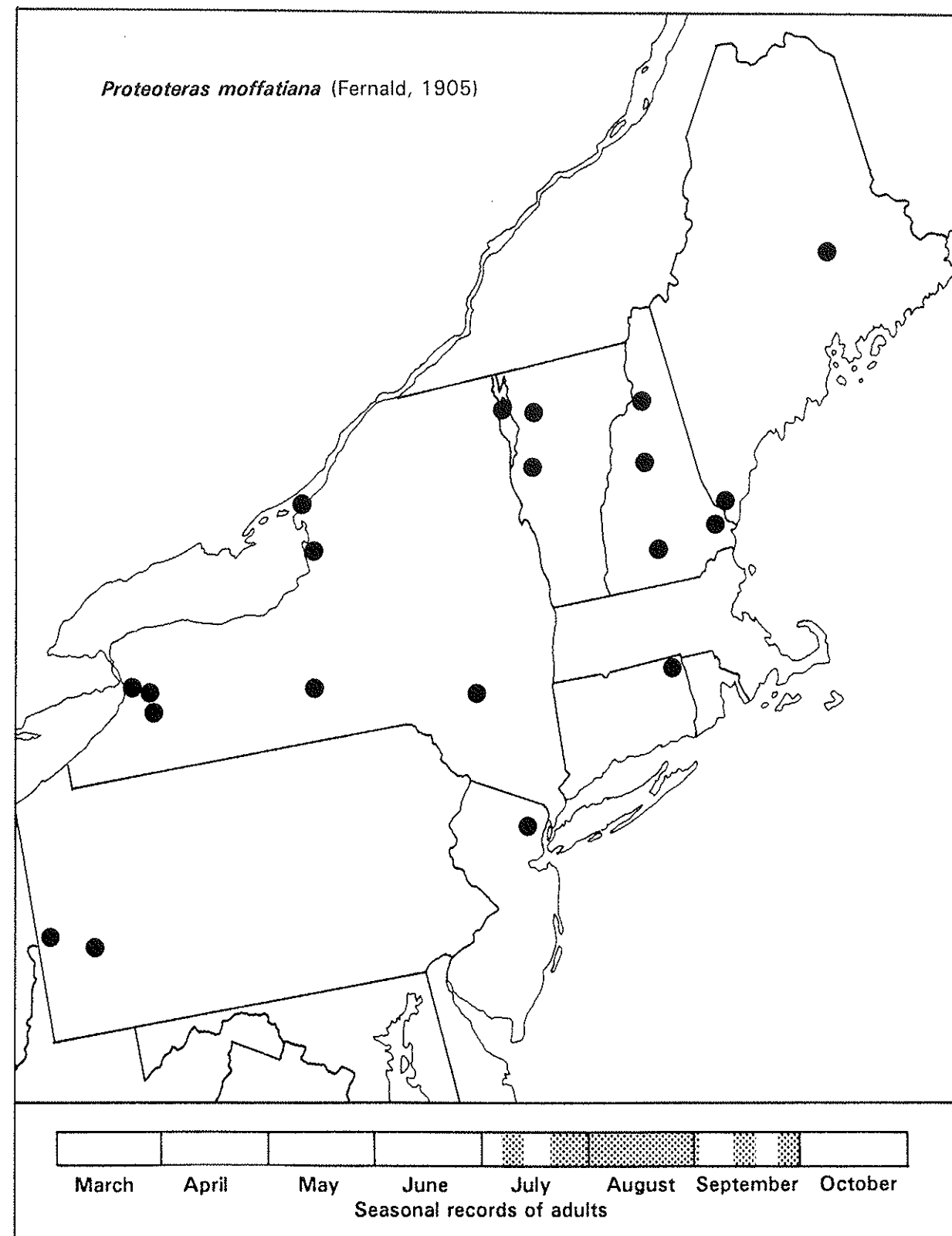
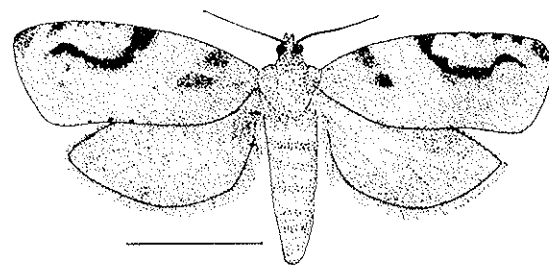
Univoltine. Larvae bore into, and overwinter in buds (Rose and Lindquist, 1982). Larvae have also been recorded boring into leaf petioles (Forbes, 1923:441). Although adults were not found to be present in large numbers by either Brower (1983) or Miller (1987), they may represent a potential pest of sugar maple. Bud mining has been identified as a major contributor to increased stem defects of sugar maple and possibly other hardwood species in Wisconsin (Miller et al., 1978). Adults are rarely collected in Quebec (Prentice, 1966), and are not commonly collected in black-light or mercury vapor light traps Vermont. Larval damage illustrated by Martineau (1984) and Solomon (1995).

Seasonality

New England: Adults fly from June to August; The same flight period also beyond New England (Brower, 1983; Solomon, 1995).

Parasites

Agathis annulipes (Braconidae) (Solomon, 1995).



Proteoteras willingana (Kearfott, 1904) (Olethreutinae)
(boxelder twig borer)

(no plate illustration)

Appearance

Wingspan 15-25 mm (Solomon, 1995). Pale gray-brown, lighter in color than *P. moffatiana*. Hindwing pale white-brown. Males with melanic sex scales along costa of hindwing.

Young larvae are yellow-white with light brown head and eye spots, later changing to greenish-yellow with dark brown head, and at maturity are whitish-yellow with brown-black heads (Peterson, 1958).

Distribution

Reported from Illinois (Godfrey et al., 1987), Great Lake States (Miller, 1987), and Saskatchewan (Heinrich, 1923). Throughout the eastern United States, Great Plains, and the Prairie Provinces of Canada (Solomon, 1995). The only northeastern record is for a single locality in New Hampshire. The absence of Vermont records in five years of general collecting and intensive survey of sugar maple forests on Mount Mansfield suggests the species may be rare or localized in the Northeast.

Hosts

Boxelder (Forbes, 1923), and red maple (Johnson and Lyon, 1994). A pest in the Prairie Provinces, and probably other areas with extensive boxelder stands (Solomon, 1995)

Biology

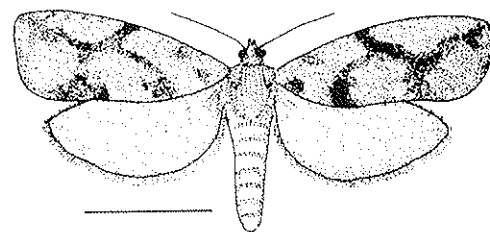
Univoltine, larvae overwinter in mined buds (Rose and Lindquist, 1982). Eggs are deposited on the underside of leaves, and the newly-hatched larvae feed along veins or midribs and construct shelters of webbing and frass. Third and later instar larvae bore into dormant leaf buds (Solomon, 1995). Larvae form galls in terminal twigs and leaf stems (Forbes, 1923; Heinrich, 1923). Pupation occurs in the soil (Peterson, 1958).

Seasonality

Adults occur from late June to early August in New Hampshire. In Canada adults fly from late June to late July. The larval period lasts from early July to May or June of the following year (Peterson, 1958).

Parasites

Ascogaster sp., *Atrometus clavipes*, *Bassus* sp., *Campoplex crassatus*, *Cremastus similis*, *Elachertus* sp., *Erynnia tortricus*, *Euderus cushmani*, *Lissonota* sp., *Macrocentrus delicatus*, and *Pristomerus euryptychiae* (Solomon, 1995).



Sparganothis pettitana Robinson, 1869 (Tortricinae)
(maple-basswood leafroller)

Plate 1:20, 23-24)

Appearance

Wingspan 20-27 mm. Forewings pale yellow, sometimes with scattered pale brown markings, or white with no markings. Hindwings white. There is some question as to the status of this species and the maple leafroller *Sparganothis acerivorana* MacKay, 1952. MacKay (1952) has found morphological differences in the larvae, and there are some supposed superficial differences in wing markings, *S. acerivorana* having two lines extended through the forewing from the costa to anal margin, especially on the males; the first set of these lines forms a "V" when wings are folded (Martineau, 1984). We have found, however, that these markings are not entirely consistent or visible, and for the purposes of this guide, no distinction is made between the two "species" and priority is given to the name *S. pettitana*.

Distribution

Maritime provinces to Saskatchewan, and Florida to the Mississippi River Valley (Martineau, 1984).

Hosts

Willow, trembling aspen, white birch, sugar maple, white elm, basswood, white oak, Manitoba maple, bur oak, slippery elm, balsam poplar, silver poplar, mountain-ash, chokecherry, mountain alder, red alder (Prentice, 1966), apple (Chapman and Lienk, 1971), and sugar maple (Brower, 1983). Large-scale outbreaks have been recorded on sugar maple in Quebec and Wisconsin (as *S. acerivorana*), and Ontario (as *S. pettitana*) (Rose and Lindquist, 1982). Bud damage to sugar maple can result in twig forking and stunted shoots (Simmons and Knight, 1973)

Biology

Univoltine. Overwintering occurs in the egg, and young larvae feed in swollen leaf buds before constructing loose conical leaf rolls from which they emerge to feed on surrounding foliage (Rose and Lindquist, 1982).

Seasonality

New England: Adults fly from late June to late August.

