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***HYLURGOPS PALLIATUS* (GYLLENHAL) (COLEOPTERA: CURCULIONIDAE: SCOLYTINAE), AN EURASIAN BARK BEETLE NEW TO NORTH AMERICA**

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**Abstract.**—*Hylurgops palliatus* (Gyllenhal), a widespread and abundant bark beetle in Europe and elsewhere in the Old World, is reported for the first time from North America, based on specimens collected between 2001 and 2004 from New York, Ohio, and Pennsylvania. This bark beetle was collected from baited Lindgren funnel traps, part of a USDA, Forest Service and APHIS National Early Detection Pilot Project surveying ports for exotic Curculionidae: Scolytinae (bark and ambrosia beetles). The native distribution, biology, and habits of this newly arrived Palearctic species are summarized from the European literature. An existing key to North American species of *Hylurgops* LeConte is modified to include this newly detected immigrant. A diagnosis and habitus photographs of the adult are provided for recognition of this species.

**Key Words:** Coleoptera, Curculionidae, Scolytinae, *Hylurgops*, North America, exotic species, new records

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Various exotic species unintentionally introduced into North America represent a serious threat to the integrity of North American forest ecosystems. An Exotic Pest Rapid Detection Team (EPRDT), under the joint auspices of the USDA Forest Service and USDA-APHIS, was established in 2001 to develop effective national strategies for the early detection and rapid response to exotic forest pests. The EPRDT promulgated national strategies for the early detection of exotic bark and ambrosia beetles (Curculionidae: Scolytinae) and implemented pilot trapping surveys with a high degree of emphasis placed on the expert identification skills of participating taxonomists.

The National Early Detection and Rapid Response (EDRR) Pilot Project for 2001 involved trapping surveys using host volatiles and pheromones specific to bark beetles as baits placed on Lindgren funnel traps at

nine ports in three regions (3 ports each in the Northeast, Southeast, and Western regions). As a result of the 2001 Northeastern regional survey, the Eurasian species, *Hylurgops palliatus* (Gyllenhal), was detected for the first time in North America. Species identity was confirmed by the senior author, based on the initial trapping of 11 specimens in a small planted stand of mixed conifers [*Pinus sylvestris* L., *P. resinosa* Aiton, and *Picea abies* (L.) Karsten] at an industrial site in Erie, Pennsylvania, on 17 April 2001; 2 more specimens were trapped at the same site on 2 May 2001. In subsequent years, EDRR provided a rapid response to this initial discovery through delimiting surveys for *H. palliatus* in NY, OH, and PA at sites with the above coniferous hosts. Additional recoveries of this exotic bark beetle were made from other baited Lindgren funnel traps placed at several lo-



cations in Erie County, PA, in 2002 and from many traps placed in surrounding counties in NY, OH, and PA in 2003 and 2004.

This paper reviews known and published information about *H. palliatus*. Herein, we provide: 1) a list of distributional records and a map for this newly detected bark beetle in the eastern United States; 2) a diagnosis and revised species key for facilitating its recognition in North America; 3) a summary of its native distribution, host tree preferences, biology and habits, and interceptions; and 4) its response to lures used with the EDRR traps.

- Hylurgops palliatus* (Gyllenhal)
- Hylesinus palliatus* Gyllenhal 1813: 340.
- Hylastes palliatus*: Thomson 1865: 349.
- Hylastes (Hylurgops) palliatus*: Reitter 1894: 63.
- Hylurgops palliatus*: Reitter 1913: 50.

Diagnosis.—*Hylurgops palliatus* is superficially similar to some species of the genus *Hylastes* Erichson, but can be differentiated by the following combination of characters: pronotum with a noticeable anterior constriction (Fig. 1), usually with about equal numbers of larger and small punctures intermixed on the disc; third tarsal segment broad, bilobed; elytra broadened posteriorly; elytral declivity usually with sparse, uniseriate rows of fine, erect, hairlike, interstitial setae; scalelike vestiture of elytra present from base to apex of declivity, more numerous on apical third; interstitial tubercles in a single row; small species, total length 2.5–3.2 mm (Wood 1982, Cavey et al. 1994).

To accommodate *H. palliatus*, couplet #7 (pg. 83) of Wood’s (1982) key to the North and Central American species of *Hylurgops* should be modified as follows (**alterations in boldface**):

7. Scalelike elytral vestiture confined to declivity, or extending anteriorly to middle of elytral disc; interstitial raised tubercles confused, not uniseriate; total length > 3.2 mm  
..... 7a

- Scalelike elytral vestiture present from base of elytra to apex of declivity, more numerous on apical third; interstitial tubercles in a single row; total length 2.5–3.2 mm; New York, Pennsylvania, and Ohio (introduced from Europe) ..... *palliatus* (Gyllenhal)
- 7a. Scalelike elytral vestiture confined to declivity; elytral disc with only a few crenulations in uniseriate rows, these usually narrow and more nearly tuberculate, most interstitial punctures on middle half almost normal (not crenulate); setae on lateral and basal margins of pronotum very fine; pronotum reticulate; 3.6–4.8 mm; California to Coastal British Columbia and Alaska ..... *rugipennis rugipennis* (Mannerheim)
- Scalelike elytral vestiture expanding anteriorly to middle of elytral disc; elytral disc with most interstitial punctures crenulate or subcrenulate, confused; setae on lateral and basal margins of pronotum coarse; pronotum smooth, shining; 3.7–5.2 mm; Utah and Colorado to inland British Columbia and east through the coniferous forest to Nova Scotia and Alabama ..... *rugipennis pinifex* (Fitch)

Native distribution.—*Hylurgops palliatus* is widely distributed in the Old World, including Africa (Algeria), Asia (Heilongjiang in China, Japan, Korea, Turkey, and Sakhalin Island, Siberia, and Ussuri in eastern USSR), and Europe (Austria, Belgium, Bulgaria, Czechoslovakia, Denmark, England, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Poland, Spain, Sweden, Switzerland, and Yugoslavia) (Wood and Bright 1992).

Biology, hosts, and habits.—*Hylurgops palliatus*, considered a non-aggressive bark beetle (Volz 1988) or so-called ‘secondary’ species (Perttunen 1957), colonizes stems and crowns of dying, decayed, or damaged conifers (Escherich 1923; Byers 1992), with some preference for Norway spruce (*Picea abies*) in the initial stages of deterioration (Nuorteva 1956; Kohnle 2004). Host selection is largely governed by olfactory recognition of host-specific volatiles (terpene mix) and ethanol (Schroeder 1988, Volz 1988, Byers 1992, Kohnle 2004). A study by Perttunen (1957), however, showed that *H. palliatus* was strongly re-



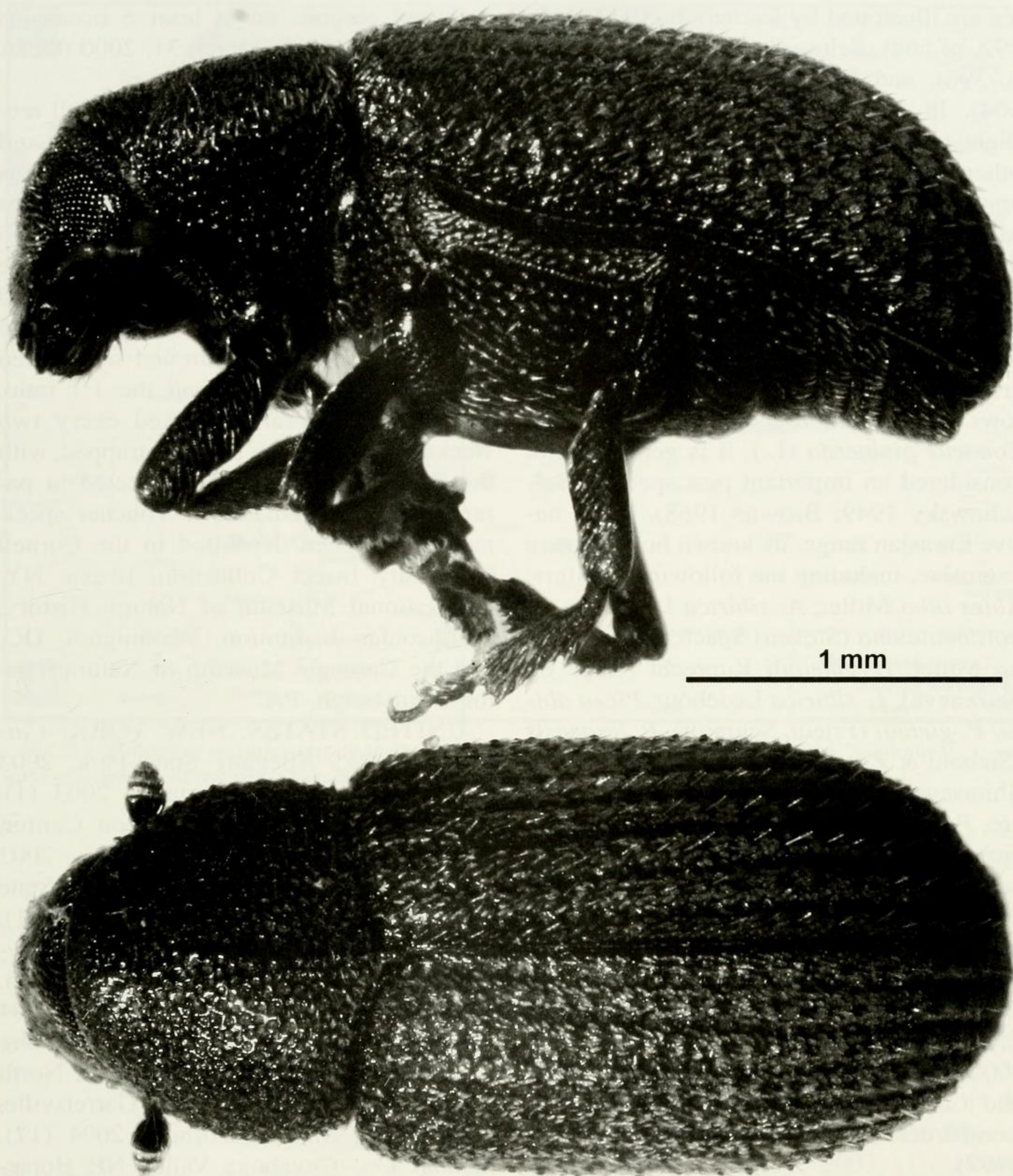


Fig. 1. *Hylurgops palliatus*. Lateral aspect (top) and dorsal aspect (bottom). Scale line = 1 mm.

pelled by a high concentration of the terpene alpha-pinene, and only slightly repelled by a low concentration. Others (Kohnle 1985, Klimetzek et al. 1986, Volz 1988) have found that *H. palliatus* responds to ethanol alone, and that increasing ethanol concentrations actually enhances the response of adults to monoterpenes.

Female beetles produce a single, longitudinal egg gallery, 3–5 cm in length (Schwenke 1974; Brauns 1991). Larval feeding tunnels may be individual for their entire length, or may merge occasionally and again separate, forming a characteristic branched pattern and terminate in pupal cells (Browne 1968). Egg and larval galler-



ies are illustrated by Escherich (1923, Abb. 292, p. 568), Schwenke (1974, Abb. 156C, p. 396), and Brauns (1991, Abb. 482, p. 604). In Europe, most workers record 2 flight periods, one in March/April and another in July, thus indicating 2 generations annually (Escherich 1923; Braun 1991). Maturation feeding by the adults occurs in the bark of the hosts. The species is monogamous. Adults are known to overwinter in the soil (Balachowsky 1949). Because this beetle is essentially a secondary invader of unhealthy trees, and frequently follows an infestation by pine shoot beetle, *Tomicus piniperda* (L.), it is generally not considered an important pest species (Balachowsky 1949; Browne 1968). In its native Eurasian range, its known host taxa are extensive, including the following conifers: *Abies alba* Miller, *A. sibirica* Ledebour, *A. nordmanniana* (Steven) Spach, *Larix decidua* Miller, *L. gmelinii* Ruprecht (Rupr. ex Kuzeneva), *L. sibirica* Ledebour, *Picea abies*, *P. glehnii* (Friedr. Schmidt), *P. jezoensis* (Siebold & Zuccarini) Carrière, *P. koyamai* Shirasawa, *P. microsperma* (Lind.) Carrière, *P. obovata* Ledebour, *P. omorika* (Pancic) Purkyne, *P. orientalis* (L.) Link, *Pinus cembra* L., *P. leucodermis* Antoine, *P. mugo* Turra, *P. nigra* Arnold (and its various subspecies), *P. peuce* Grisebach, *P. pinaster* Aiton, *P. pinea* L., *P. radiata* D. Don, *P. rotundata* Link (Moor-Bergkieber), *P. sibirica* (Du Tour) Krylov, *P. strobus* L., *P. sylvestris*, *P. uncinata* Miller ex Mirbel, and *Cedrus* spp. (Wood and Bright 1992, Lombardero 1994, Bright and Skidmore 1997).

**Interceptions.**—*Hylurgops palliatus* was one of ten targeted bark and ambrosia beetles selected for the National Early Detection and Rapid Response Pilot project, based on the frequency and number of interceptions of this species at U.S. ports-of-entry. It is the third most frequently intercepted bark beetle in the United States, with 295 interceptions from 20 countries for the period 1985–2000 (Haack 2001). In Canada, this bark beetle was intercepted from

imported cargoes on at least 5 occasions from April 1, 1997–March 31, 2000 (CFIA 2002).

**New North American records.**—All records of *H. palliatus* listed below and mapped in Fig. 2 are based on specimens collected from baited Lindgren funnel traps set at selected sites from mid-March through late May, 2001–2004. Traps were fitted with collection cups partially filled with propylene glycol (low toxicity) and water (1:1, vol./vol.). Rain and snow often diluted this volume beyond the 1:1 ratio. Traps were generally checked every two weeks. The year each site was trapped, with the number of specimens collected in parentheses, is noted below. Voucher specimens have been deposited in the Cornell University Insect Collection, Ithaca, NY; the National Museum of Natural History, Smithsonian Institution, Washington, DC; and the Carnegie Museum of Natural History, Pittsburgh, PA.

**UNITED STATES: NEW YORK:** *Cattaraugus Co.*, Allegany State Park, 2003 (1). *Chautauqua Co.*, Panama, 2003 (1). **OHIO:** *Ashtabula Co.*, Monroe Center, 2003 (50); Pymatuning State Park, 2003 (121). *Columbiana Co.*, Beaver Creek State Park, 2004 (1); New Waterford, 2004 (1). *Cuyahoga Co.*, Oakwood, 2004 (12). *Geauga Co.*, Parkman, 2004 (55); Thompson, 2004 (19). *Lake Co.*, Leroy Center, 2004 (9); North Madison, 2004 (16). *Mahoning Co.*, Meander Reservoir, 2004 (10); North Lima, 2004 (9). *Portage Co.*, Garrettsville, 2004 (172); Mantua Corners, 2004 (17). *Summit Co.*, Cuyahoga Valley NP, Horseshoe Pond, 2004 (6); Cuyahoga Valley NP, Oak Hill, 2004 (1). *Trumbull Co.*, Youngstown State University Arboretum, 2003 (9). *Tuscarawas Co.*, Beach City Dam, 2004 (1). **PENNSYLVANIA:** *Allegheny Co.*, Beechwood Farms ANC, 2004 (4); Wexford, 2004 (1). *Beaver Co.*, New Galilee, 2004 (1). *Butler Co.*, Annandale, 2004 (1); Moraine State Park, 2004 (3). *Crawford Co.*, Crossingville, 2003 (204); New Richmond, 2003 (83); Riceville, 2003 (25);



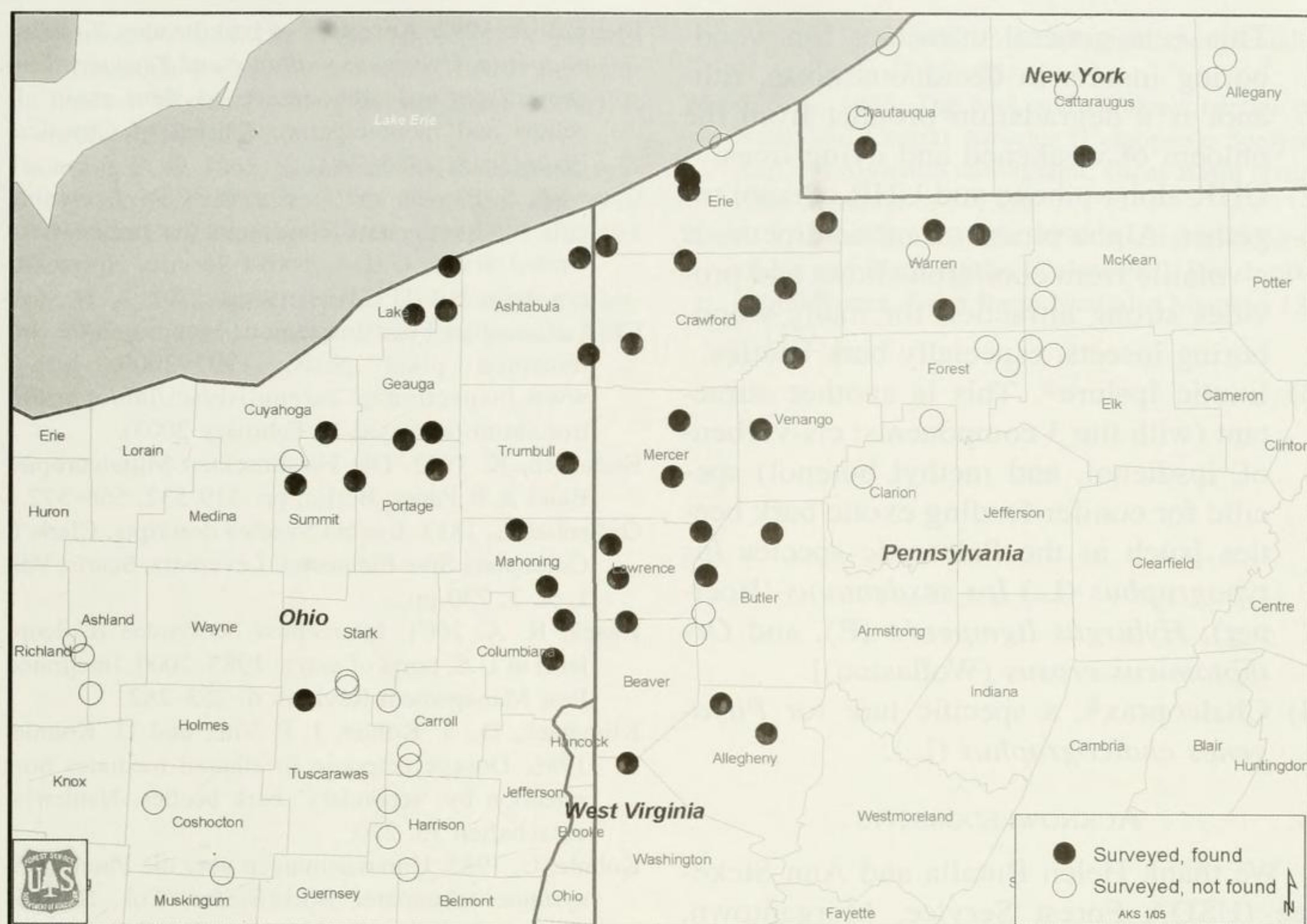


Fig. 2. *Hylurgops palliatus* survey in Ohio, Pennsylvania, and New York, 2001–2004. Solid circles = site surveyed, specimens trapped. Open circles = site surveyed, no specimens trapped.

Table 1. *Hylurgops palliatus* trap catch by lure type and year.

Lure Type	Year	Total Number
Ethanol + alpha-pinene	2001	14
	2002	78
	2003	470
	2004	369
	Subtotal	931
Ethanol only	2001	1
	2002	50
	2003	229
	2004	59
	Subtotal	339
Chalcoprax®	2002	19
	Subtotal	19
Ipslure®	2002	8
	2003	15
	2004	1
	Subtotal	24
	Total	1,313

Shermansville, 2003 (138). *Erie Co.*, Corry, 2003 (17); Erie (Asbury Nature Center), 2002, 2004 (175); Erie (Eriez Magnetics), 2001, 2002, 2004 (51); Erie (Riehl Nursery), 2002 (19); Tracy, 2003 (27). *Lawrence Co.*, Edinburg, 2003, 2004 (13); Mount Jackson, 2004 (8); Plain Grove, 2003 (3). *Mercer Co.*, Camp Perry, 2003 (9); Mercer, 2003 (9). *Venango Co.*, Polk, 2003 (2); Wallaceville, 2003 (3). *Warren Co.*, Chandlers Valley, 2003 (1); Hearts Content, 2004 (1); Youngsville, 2003 (3). *Washington Co.*, Hillman State Park, 2003 (1).

Commercial lures as baits.—Lindgren traps used in this EDRR survey were baited with one of four commercial lures or lure combinations. The trap catches of *H. palliatus* to the lures are shown in Table 1. The lures, available from PheroTech, Inc. (Delta, BC) included:

- 1) Ultra-high release (UHR) ethanol only.



This is a general attractant for wood-boring insects in deciduous hosts. Ethanol is a degradation product from the phloem of weakened and dying trees.

- 2) UHR alpha-pinene and UHR ethanol together. Alpha-pinene, a monoterpene, is a volatile from coniferous hosts and provides strong attraction for many wood-boring insects, especially bark beetles.
- 3) Exotic Ipslure®. This is another attractant (with the 3 components: cis-verbenol, ipsdienol, and methyl butenol) specific for conifer-feeding exotic bark beetles [such as the Palearctic species *Ips typographus* (L.) *Ips sexdentatus* (Boerner), *Hylurgus ligniperda* (F.), and *Orthotomicus erosus* (Wollaston)].
- 4) Chalcoprax®, a specific lure for *Pityogenes chalcographus* (L.).

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