

Survey for *Pachypolia atricornis* (Lepidoptera: Noctuidae)

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## INTRODUCTION

*Pachypolia atricornis* Grote was described from a single specimen from Chicago in 1874. A single specimen of this moth was collected by Jim Wiker southeast of Springfield (at a mercury vapor light on October 30, 1990, T14N, R4W, Sect. 7, SW/4 of the NE/4) during the Hunter Lake environmental impact study. At that time this species was known from only 24 specimens worldwide including records from New York (1), Minnesota (1), Ohio (1), and Kentucky (20). Other than the fact that the moth stage occurs from September (Forbes 1954) to November, no other biological information was known, including the general habitat requirements, life history, or the larval host plant(s). Construction of the Hunter Lake reservoir will result in a loss or alteration of habitat where this moth was recorded. A study was conducted in 1994 to determine the host plant of the larva which will help to determine the habitat requirements. Such information also will help to determine if the "rarity" of this species is an artifact of collecting techniques, or if it should be afforded protection status.

## MATERIALS AND METHODS

Using the same site as the 1990 study (Figure 1, Map of proposed Hunter Lake), light traps and bait stations were used to attract adults on seven evenings from October 16 to November 3, 1994. Light traps used included 1 metal halide lamp (400 watts), 1 mercury vapor lamp (175 watts), and 1 ultraviolet lamp (22 watts). All lights were hung approximately 2 feet from a double bed size, white cloth sheet which was draped across a rope that was tied between two trees. All lights were isolated from each other to reduce interference between sampling areas. A bait mixture containing grape juice, mashed peaches and bananas, yeast, beer, and brown sugar was applied to an area approximately 4 X 12 inches to tree trunks using a paint brush. Usually from 10 to 20 large trees (above about 12 inches in diameter) were selected randomly along the edges of the upland forest or along random transect lines extending from the upland forest through the bottomland forest to Brush Creek. On October 28, 70 - 80 trees were used as bait stations. Sampling at the study site began as early as 4:00 pm on 3 evenings and extended as late as 2:00 am on October 28.

Captured *P. atricornis* moths were kept alive in 60 cc. vials (screw cap lid) in an ice cooler in the field and later transferred to a home refrigerator until the next morning. Females then were held at room temperature in 1 qt. mason jars covered with nylon window screening. Paper strips (4 X 6 in.) were folded (like an accordion), moistened with 1 or 2 drops of water and placed in the jars for the moths to use as an oviposition substrate. Moths were offered sugar bait (same as described above) on a Q-tip (small cotton swab) approximately 36 hours later (October 30), and they readily fed.

By the morning of October 31, two females had begun to oviposit on the nylon screening covering the jar opening. The third female oviposited on November 3. None oviposited on the paper strips that were placed in the containers. Each female laid approximately 100

cream-colored eggs which turned dark brown within 48 hours. Eggs were successfully overwintered in tupperware-like containers at about 40°F in a non-frostfree refrigerator. Eggs which were overwintered in a frost-free refrigerator perished, presumably due to desiccation (first instar larvae shrivelled within the egg).

Eggs were removed from refrigeration on April 15 and began to hatch on April 28. All had hatched by the 29 th. The study area was revisited at that time to survey for freshly emerging leaves to select for potential food plant testing. Using the most common and earliest emerging vegetation as a guide, first instar larvae were placed in 60 cc. vials and offered the young leaves of the following species:

- Acer negundo* (Boxelder)
- Acer saccharinum* (Silver Maple)
- Carya ovata* (Shagbark Hickory)
- Celtis occidentalis* (Hackberry)
- Gleditsia tricanthos* (Honeylocust)
- Juglans nigra* (Black Walnut)
- Maclura pomifera* (Osage-orange)
- Crataegus* sp. (Hawthorn)
- Prunus serotina* (Black Cherry)
- Quercus imbricaria* (Shingle Oak)
- Quercus macrocarpa* (Bur Oak)
- Quercus muehlenbergii* (Chinkapin Oak)
- Quercus palustris* (Pin Oak)
- Ribes* sp. (Gooseberry)
- Rosa multiflora* sp. (Multiflora Rose)
- Rubus* sp. (Blackberry)
- Smilax* sp. (Greenbriar)
- Ulmus* sp. (Elm)

Two larvae were placed in each vial with fresh leaves which had been examined carefully for other insect species. Lids were placed on the vials loosely to maintain humidity and oxygen and to prevent the small larvae from escaping. Larvae preserved for future studies were treated first in KAAD (a mixture kerosene, 95% ethyl alcohol, glacial acetic acid, and dioxane), and later placed in 95% ethyl alcohol.

## RESULTS AND DISCUSSION

The results of the sampling period are shown in Table 1 and Fig. 2. The first male of *P. atricornis* was collected on October 16 at a mercury vapor light at about 8:00 pm. All other specimens (1 ♂, 2 ♀♀) were captured before 9:00 pm. at the metal halide light (1 ♂), mercury vapor light (1 ♀) or at bait stations (2 ♀♀). No *P. atricornis* moths were attracted to the ultraviolet light, however, the ultraviolet light was not used on two nights (October 28

and November 3) . Bait stations were used for sampling on all nights, except October 16. On October 28, an intensive effort was made to collect moths using 70 - 80 bait stations. Two females were captured on that date at each of two large shagbark hickory trees along the edge of the upland forest.

First instar larvae were dark brown, and many died within the first day of hatching due to the trial and error method of testing for acceptable food plants. Approximately 30 larvae remained after the second day. Larvae (two per vial) were placed in 60 cc. vials with trial host plant leaves. The first instar larva, when disturbed, stood erect on the anal prolegs at an angle of approximately 60 degrees. By the fourth day all but 8 were dead. Only one larva reached the last instar (fifth or sixth instar, 32 mm. in length) on leaves of black cherry. This specimen was reared to maturity under a bell jar with fresh wild black cherry stems with leaves cut and inserted snugly into a vial of fresh water. The larva was observed to feed mostly at night, consuming the whole leaf and leaving only the midvein. It was observed to rest for long periods off the host plant material during daylight hours. Because this was the only known larva to have been reared for this species, this specimen was preserved. One larva fed on elm for 4 days before dying. Two other larvae fed on silver maple for 2 weeks, but died at about the third instar. Third instar larvae changed their general color from dark brown (in first and second instar) to green. All specimens were deposited in the collection at the Illinois State Museum.

The last instar larva of *P. atricornis* (Fig. 3) has a brown head capsule and medium green thoracic and abdominal segments. A cream-colored line extends laterally from just behind the head capsule, where it is faintly marked, through the thorax and abdominal spiracles, where it is distinct, to the 8th abdominal segment; then passes ventrad and posteriad of the spiracle on the ninth abdominal segment to the last abdominal segment and ends on the anal proleg at the crochet. The moth is shown in Fig. 4 (First specimen, male, captured in 1990).

Independent of our study, Vernon LaGesse captured 4 adults in an upland forest (old growth oak forest) overlooking the Sangamon River bottom. The moths were taken from October 14 - 28, 1994, approximately .25 mi. south of Petersburg in Menard County (T18N, R7W, Sect. 23, NE/4, NE/4).

### CONCLUSIONS

These preliminary studies suggest that *P. atricornis* may be more widespread in distribution and more common than previously thought. One larva reached maturity on wild black cherry which is common and widespread in the eastern U.S. over the present known range of this species. It may have been rarely collected in this state in the past because of its relatively short flight season in late October to early November and its reluctance to come to ultraviolet light. Our limited observations suggest that the larva may feed at night and leave the host plant during the day to rest in seclusion. The records of *P. atricornis* reported by L. D. Gibson from Kentucky and Ohio between 1979 and 1991 show that this species was collected only by using bait stations, a collecting technique seldom used by collectors unless they are

targeting certain species. Future studies on this species, including further host plant studies and a formal description of the larva and pupa are planned. We believe no protection is needed for this species at this time.

#### REFERENCES

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- Grote, A. R. 1874. On the noctuid of North America. Ann. Rpt. Peabody Acad. Sci. 6: 21-38.

#### ACKNOWLEDGMENTS

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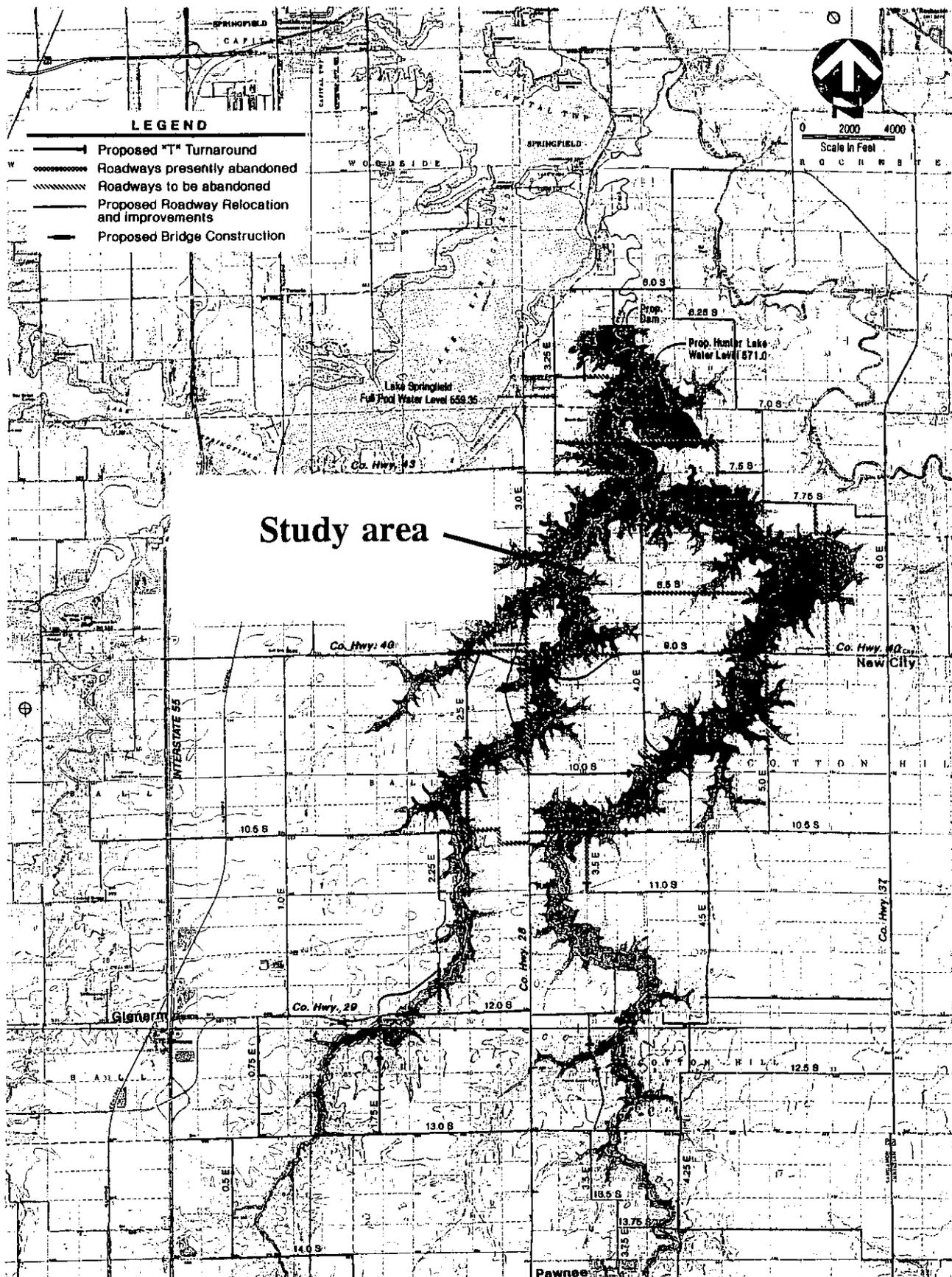


Fig. 1. Study area of the proposed Hunter Lake project.

Table 1. *Pachypolia atricornis* light trap and bait trap results; MH = Metal halide, MV = Mercury vapor, UV = Ultra-violet, Bait = no. trees with bait, no. moths captured, ----- = not used, Time = range of hours for collecting, Captured = time of capture, Temp = Daily Hi - Lo temperatures,

Date	MH	MV	UV	Bait	Time	Captured	Temp	Precip
Oct. 16	0	1 ♂	0	-----	5 -11 pm	8:00 pm	69 - 57°F	0.00
Oct. 19	0	0	0	10 trees, 0	5 -11 pm		67 - 61°F	0.21
Oct. 22	0	0	0	10 trees, 0	6 -12 pm		75 - 55°F	T
Oct. 26	0	0	0	20 trees, 0	4:30 - 11 pm		52 - 27°F	0.00
Oct. 28	1 ♂	1 ♀	-----	70 - 80 trees, 2 ♀♀	4 pm - 2 am	7:45 - 8:30 pm	61 - 53°F	0.00
Nov. 1	0	-----	-----	10 trees, 0	4 pm - 10pm		52 - 35°F	1.13
Nov. 3	-----	0	0	12 trees, 0	4 pm - 9 pm		65 - 58°F	0.00



Study Area for *Pachypolia atricornis* Project  
 (T14N, R4W, Sect. 7, SW 1/4 of NE 1/4)

- |   |                        |  |
|---|------------------------|--|
|  | Cropland               | 1. 1 female at bait  |
|  | Grass/Conserv. Reserve | 2. 1 female at bait  |
|  | Water                  | 3. 1 female at mercury vapor light                               |
|  | Bottomland Forest      | 4. 1 male at mercury vapor light<br>1 male at metal halide light |
|  | Upland Forest          |  |

Fig. 2.



Fig. 3. Last instar larva of *Pachypolia atricornis* feeding on leaf of *Prunus serotina*.

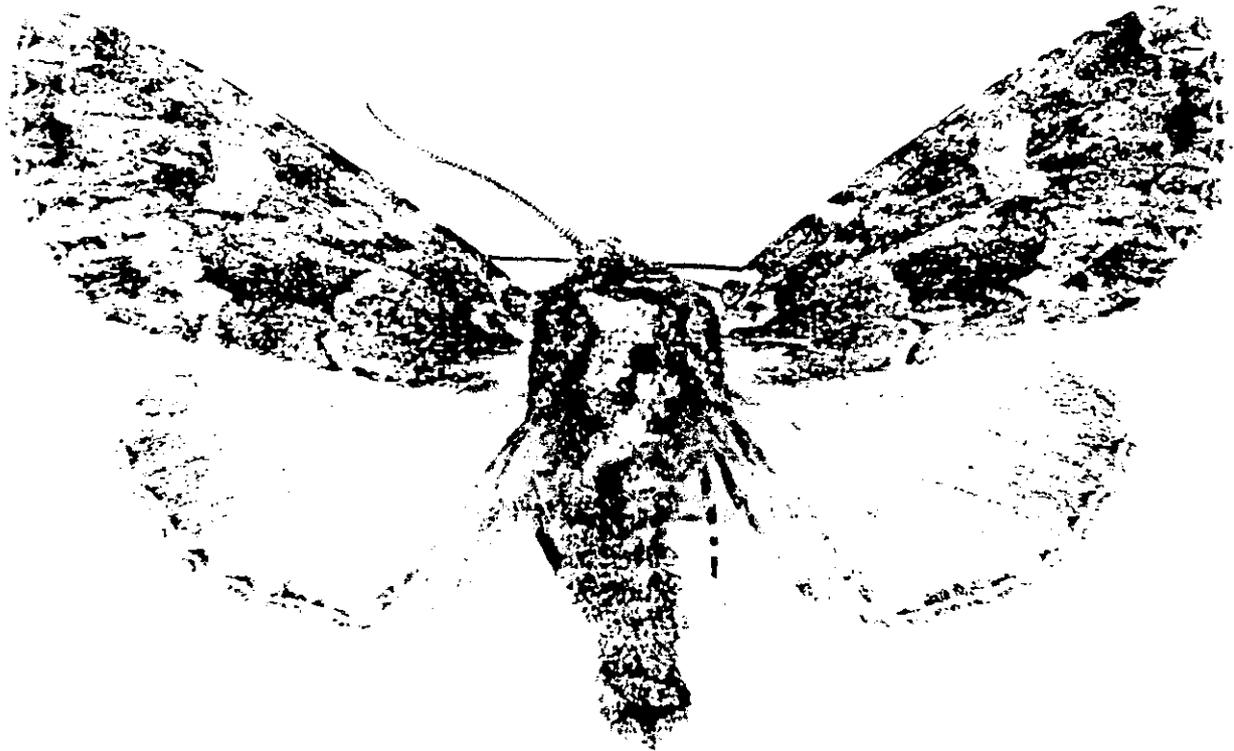


Fig. 4. Moth of *Pachypolia atricornis* (IL: Sangamon Co., T14N, R4W, Sect. 7, Oct. 30, 1990, J.R. Wiker).