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**FIVE SPECIES OF THE ANT GENUS ACANTHOMYOPS
(HYMENOPTERA: FORMICIDAE)
AT THE EDWIN S. GEORGE RESERVE IN SOUTHERN MICHIGAN**

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This paper supplements one written ten years ago (Talbot 1963) concerning the *Acanthomyops* nesting in a two square mile area in south eastern Michigan. It presents a fifth species (*A. subglaber*) for the E. S. George Reserve, gives flight activities of *A. claviger*, adds a description of a method used by *A. murphyi* to invade *Lasius neoniger* colonies and extends some brood and flight records and habitat ranges.

***Acanthomyops subglaber* (Emery)**

This species has not been reported previously for the Reserve, and only two colonies have been discovered. Both nested on a ridge in a rather dense oak-hickory-cherry woods above a swamp. Each dug out for flight around a stone. The second nest surrounded a large immovable stone and continued out at one side to extend lengthwise of a long tree trunk. The trunk and soil under and around it were all well galleried. The first colony was collected only once but the second was known from 1967 through 1971.

Brood was difficult to locate so records of development are sparse. Alate pupae have been found from June 29 until August 27 and adult alates from August 24 until September 28. In 1967 females were present but in 1970 and 1971 only males were produced.

No good flight records were obtained, but in 1971 preflight activities were watched on a number of days and the end of one flight was witnessed. On August 27 males and a few male pupae were present under a movable slab lying beside the big stone but on September 1 there was still no sign of digging out for flight. The colony was not checked again until September 8 at which time males were out at the base of the stone and were trying to climb it but were held back by a ring of guarding workers. Next afternoon they tried again to climb the stone and were again kept back by workers. These days were dry and remained warm until light was quite dim. Conditions stayed the same but on September 14 it looked as if they would surely fly. At 5:10 PM (79° F, 200 ft-c straight up and 400 ft-c brightest) when the sun was slanting through the trees, males were filling several openings. By 5:20 six tight little clusters of them were pushing up along the stone side but not advancing much. A few workers were present but most of the males seemed just not ready to move up further or to spread out from the mass. At 5:35 they were essentially as before; still trying to climb the stone up into the sun's rays but making no progress (77°, 100 ft-c up and 520 ft-c brightest). No more advances took place and by 6 PM there were only a few males out (76°, 50 ft-c up, 57 ft-c brightest) and the sun was almost gone. The soil was very dry and the temperature was probably still too high as light dimmed.

During the next few days there were several rains but it was cold and windy. September 27 was a good flight day. There had been rain in the night, it was cloudy all day, temperatures ranged between 70° and 73°, there was no wind and humidity was high. I had been very busy checking flights of *Acanthomyops latipes*, *Lasius speculiventris*, *Lasius minutus*, *Lasius umbratus* and *Lasius neoniger* and did not arrive at the *A. subglaber* nest until 4:25 (72°) when light was quite dim in the deep woods. Evidently a good flight had taken place for many males were running about on top of the stone with their wings open and vibrating. More were on the log and vegetation nearby. A few were still flying. At 4:30 PM it was very dark in the woods and the temperature had dropped to 69.5°. A few males were still attempting to fly but were not succeeding and a few workers were trying to herd them back. Presumably flights continued into October but observations ceased.

It would appear that *A. subglaber* follows the usual *Acanthomyops* pattern of flying between mid-afternoon and early evening, when light is lessening and temperature dropping into the low 70's.

Acanthomyops claviger (Roger)

The 28 colonies of *A. claviger* found on the Reserve over a period of 22 years were distributed in a number of habitats as was reported in 1963 (Talbot). They were the latest of all five species in developing their males and females. Alate pupae have been collected from July 9 to August 30 and adult alates from August 13 to October 7.

Flights have not previously been reported from the Reserve but in 1972 I could stay until October 7 and was able to observe two complete flights. They took place from a colony nesting in barren, sandy soil in an opening of scattered oaks at the south end of the Blowout. When found, on September 29, the nest was dug out for flight with 16 large exits spread over 5 times 2 feet. Males and females could be seen down in the openings.

The distinctive feature of the *A. claviger* flights was that they occurred at lower temperatures than those of other *Acanthomyops* species at the Reserve. They did not start until the temperature fell below 70° F and they continued until 64° was reached. Thus they began at about the temperature when most flights of other species were ending.

Probably some flights took place in September, but those seen occurred on October 2 and 3. The first flight was a sparse one so the second will be reported. This flight was probably typical for the species except that it started rather early in the day because the afternoon was hazy and lasted a long time because the temperature decreased slowly. Table I.

At 2 PM (75°, 2800 ft-c) there was no sign of impending flight but at 2:20 (72°, 2600 ft-c) females were filling the lower parts of the openings and workers were forming a ring above them. By the time the temperature had lowered to 71° (2:43 PM, 2000 ft-c) females were making their way to the tops of entrances and a few were over their rims. When the first females began to move out onto the ground and to try to climb grasses the temperature was 70° (3:15, 1800 ft-c) and the first females flew when the temperature was just above 69° (3:23, 1600 ft-c). Only five females flew in the next 17 minutes, but during that time many females were massing about the entrances. Some were standing almost upright at their rims and others were outside on the ground. Most were looking upward and waving antennae. It seemed that conditions were not quite right for flying. Then at 3:40 (69°, 1400 ft-c) there was a sudden mass movement away from the openings. Females began climbing grasses and the abundant flying began.

At this time it was discovered that there were a good many males in the group. They flew along with the females but were, at all times, hard to see because of their small size and the great number of females.

Table 1. *Acanthomyops claviger* flights 1972.

	Time		Temperature		Light	
	Oct. 2	Oct. 3	Oct. 2	Oct. 3	Oct. 2	Oct. 3
Came up onto ground	4:45	2:55	69°	71°	—	2900
First alates flew	4:59	3:23	68°	69°	—	1600
Height of flight	5:23	4:10	65°	68°	—	1400
End of flight	5:36	5:14	64°	64°	—	440

Time-p.m. Eastern Standard.

Temperature-Fahrenheit, 10 inches above the ground.

Light-Foot candles, straight up.

Oct. 2. 17 + females flew, Oct. 3 - 7500 + females flew, together with a lesser number of males.

Soon the ground was covered with the brown females, small plants nearby were loaded with them and flying was general. Most flew away to the south where there was a break in the trees giving a wide expanse of sky (uniformly gray all afternoon). Some females fell as they tried to fly and others walked some distance before climbing so the flight area was soon very large and flying ants were hard to count even with the method of counting them against the sky as they rose from the ground.

By 3:57 they were flying at the rate of over 100 a minute and between 4:03 and 4:22 (69°-68°, 1600-1400 ft-c) they flew in excess of 230 a minute. This was the height of the flight and in this 20 minutes over 5000 females and a lesser number of males left the nest.

Between 4:30 and 4:45 (67°-66°, 1000-700 ft-c) flying gradually diminished from 100 to only about 25 flying a minute. Soon the first females began to climb down stems. Up to that time they had all been strongly impelled to move upward. Any females on my hand had insisted on climbing upward no matter how I turned them. Now some were reversing this and walking down my hand just as persistently.

Within 15 minutes (65°, 700 ft-c) only about four females were flying a minute and most had dropped or walked down from grasses and were going back into nest entrances. After the temperature reached 64° (5:11, 460 ft-c) there were few females to be seen. Eight flew after this, the last one at 5:14 (64°, 440 ft-c) and all alates which did not fly were back below ground.

It seems that, although decreasing light was necessary for flight, the range tolerated was rather wide. The ants began to fly at 1600 ft-c but could probably have flown in brighter light if temperatures had been favorable. On the other hand temperature seemed critical. They did not start flying until the temperature went below 70° and stopped at 64°. The sparse flight seen the day before had started at 68° (light was not recorded but was greater because of a hazy, slanting sun) and concluded at 64° (Table 1).

The habit of flying late in the year and at low temperatures correlates with the report of Wing (1968) that *A. claviger* queens overwinter above ground either singly or in aggregates. They may be active at quite low temperatures and perhaps infiltrate *Lasius* colonies and acquire the nest odor while the *Lasius* are still hibernating, thus becoming temporary social parasites.

Acanthomyops murphyi (Forel)

Only eleven colonies have been found on the Reserve but five of these have been known for 13, 12, 11, 9 and 7 years. Their distribution, nest structure and flight activities have been reported in the 1963 paper. Alate pupae have been collected between June 19 and August 17, males and females between July 3 and August 31. Eleven flight dates have been recorded between July 19 and August 28.

A. murphyi, like *A. latipes* is known to start colonies as social parasites (as perhaps all *Acanthomyops* do). The 1963 record I gave of a colony of *A. murphyi* with *Lasius neoniger* turned out to be a misidentification. Wing later identified the species involved as *A. latipes*. However, Sanwald (1964-65) has reported mixed colonies of *A. murphyi* and *Lasius neoniger*. He also remarked briefly that *A. murphyi* females may "flood" the entrances of *L. neoniger* nests trying to gain entrance. A conspicuous example of this "flooding" was seen at the Reserve on August 3, 1965. Rains had softened the ground and *L. neoniger* entrances were wide open and well dug out, for it was nearing their time of flights. *A. murphyi* had flown that afternoon, which had been overcast and humid with temperatures in the 70's. At 5:30 I happened along a stretch of road which had many craters of *L. neoniger*. At each a group of from 2 to 25 *A. murphyi* females were congregated and were pushing (not digging) into the entrance. Those which could get into the openings were head down; some had only the head and forebody in the hole, some had all but the tip of the gaster in and others were entirely inside. Those which could not get in were wandering about. The females seemed to be blocking each other in their attempt to enter but perhaps the sheer force of numbers helped push some down in. Unlike those which Sanwald saw, the *L. neoniger* above ground were not attacking the females or attempting to hinder them.

Acanthomyops latipes (Walsh)

This is by far the most abundant species on the George Reserve, for 56 colonies were discovered between 1951 and 1972. Probably many of these were not present throughout that entire period but several have been known for a number of years. A check on one has been kept for 21 years (1952-1972) and it is still producing males and females. This colony is located in the North Gate House lawn and it produces alpha females. At first it dug out for flights around a stump, but by 1958 the stump was thoroughly decayed and the ants moved their flight place away from it and out from under a growing mulberry tree. Later the tree was cut down and they continued to dig out from the open lawn. Another *A. latipes* colony has had flights down the middle of a road for the past 12 years.

Alate pupae are known to be present between June 6 and August 29 and adult alates between July 13 and September 29. Parts or all of 33 flights have been seen. These records enlarge the span of flights reported before as to time of year, (August 17-September 27), time of day (2:45-6:15 PM), temperature (81°-73°F) and light (2400 ft-c-360 ft-c). Twenty four of the 33 flights took place during the last week of August (16) and the first week of September (8).

A. latipes colonies may produce two types of queens, with each colony having either the alpha or the beta type. Wing (1968) considers colonies producing alpha females to be hybrids between *A. latipes* and *A. claviger*. Six such colonies have been found among 25 colonies from which females have been collected. No differences have been discerned between these and the beta producing colonies as to time of alates in the nest and time of flights.

Acanthomyops interjectus (Mayr)

Thirteen colonies of *A. interjectus* have been discovered. Most were, as reported before, in deep to open woods or woods edge, but one was in a field not far from woods edge and one was in an open field near a pond but far from any trees. Five colonies dug out for flights around stumps, two beside logs, five formed low mounds at flight time and one was simply under heavy leaf cover.

Alate pupae were collected between June 7 and July 9, males and females between June 11 and August 25. Forty-six flights have been recorded from June 16 to August 22. Most took place between mid-June and mid-July. The six seen in August had been delayed by bad weather and were small. A record of flight activities has been given (Talbot 1963).

One colony, known for nine years, was large and vigorous when discovered. It had flights of both males and females from 1954 through 1959 but in 1960, '61 and '62 only males were produced. In 1954, when 14 flights were watched, more males than females were released during early flight days. Females then exceeded males for the next few flights. Gradually, the females declined until the last flights were composed principally of males. In the earlier years flights took place around a fairly solid stump. As time passed it decayed and the colony became smaller. By 1962 the stump was gone and the ants dug out at only a few places around a series of small stones.

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**MOTHS TAKEN IN BERRIEN COUNTY, MICHIGAN
(WITH 102 NEW COUNTY RECORDS)**

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Moore (1955) published a listing of the moths of Michigan, exclusive of the Tineoidea. Other writers (anon., 1968; Voss, 1970) have extended the list of Michigan records. During the fall of 1970, and through the summer of 1971, I lived in Sawyer, Berrien County and collected a number of records new for that area. At the encouragement of M.C. Nielsen, a listing of these records is made available.

Sawyer is located in the heart of a grape growing region. An ultraviolet light trap was used for the bulk of the collecting, and grape fields were within the area in view of the collecting light. Much of the remainder of the immediate area consisted of open fields along the western edge of a railroad right-of-way. Beyond the track, about three hundred yards from the trap, was a background of scattered hardwoods.

Collecting in the Fall of 1970 was sporadic, records after mid-August are from that year. The light trap was set up again, early in 1971, about the first week of April. From that time on, it was run continually, including on rainy nights, except for a three week period in late June and early July during my absence from the area. An attempt was made to retain as many of the macroheterocera as occurred in the trap, and only a few microlepidoptera were retained. Empty egg cartons on the bottom of the trap provided a hiding place for the moths, and prevented much potential damage. (I am indebted to Leslie Ferge for this suggestion). Therefore most of the specimens taken were in very good condition.

A listing of the species captured follows, with an indication of flight period. Each month is divided into three parts, from the 1st to the 10th, the 11th to the 20th, and the 21st through the end of the month. An "x" in a particular column records at least one specimen captured during that part of the month. No comments on the relative abundance are given, because the number of actual specimens collected frequently depended upon the time available for pinning and the space left on the pinning boards. An attempt was made, however, to secure any newly observed species on the first date of their appearance, and to collect at least one for as long as the flight period lasted.

The order of the listing follows Forbes (1948, 1954, and 1960) for species within each family, and the order of the families follows Moore (1955). Species marked with an asterisk represent new records for Berrien County, since the publication of Moore's list.

I am indebted to M. C. Nielsen and J. H. Newman for determinations of difficult species.

Table 1. List of moths taken in an ultraviolet light trap at Sawyer, Berrien County, Michigan, 1970-1971.

Species	April			May			June			July			August			Sept.			Oct.			
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
SPHINGIDAE																						
<i>Phlegethontius sextus</i>												x	x	x								
<i>P. quinque maculata</i>												x	x									
<i>Pholus satellitia</i>															x							
* <i>Ceratonia amyntor</i>								x														
* <i>C. catalpae</i>							x	x			x		x	x								
<i>C. undulosa</i>							x				x	x										
<i>Sphinx chersis</i>											x											
<i>S. eremitus</i>												x										

*New record for Berrien County, Michigan.

Table 1. Continued.

Species	April			May			June			July			August			Sept.			Oct.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
SPHINGIDAE (Continued)																					
<i>Lapara bombycoides</i>								X			X										
* <i>Smerinthus geminatus</i>										X											
<i>Poanias excaecatus</i>											X	X	X								
<i>P. myops</i>						X						X									
<i>Pachysphinx modesta</i>								X													
* <i>Deidamia inscripta</i>				X	X		X														
<i>Darapsa myron</i>							X	X		X	X		X								
SATURNIDAE																					
<i>Automeris io</i>							X	X													
<i>Tropaea luna</i>														X							
<i>Telea polyphemus</i>				X	X				X												
* <i>Samia cecropia</i>				X																	
CITHERONIIDAE																					
<i>Eacles imperialis</i>										X											
<i>Anisota rubricundra</i>							X	X		X											
SYNTOMIDAE																					
<i>Scepsis fulvicollis</i>							X									X					
* <i>Ctenucha virginica</i>							X	X													
ARCTIIDAE																					
* <i>Cynia inopinatus</i>				X									X								
<i>C. tenera</i>							X	X			X										
<i>Estigemene acraea</i>							X	X		X	X										
<i>Halisidota caryae</i>									X	X											
<i>H. maculata</i>								X													
<i>H. tessellaris</i>									X	X											
<i>Eubaphe aurantica</i>														X							
<i>Euchaetias egle</i>							X	X		X											
* <i>Phragmatobia fuliginosa</i>										X	X	X	X								
* <i>Euchaetias oregonensis</i>							X	X		X	X										
<i>Pyrrharctia isabella</i>					X	X	X	X													
<i>Spilosoma virginica</i>		X	X	X	X	X			X												
<i>Apantesis virgo</i>												X									
<i>A. anna</i>							X														
<i>A. arge</i>		X							X	X	X					X					
* <i>A. figurata</i>					X																
<i>A. phalerata</i>			X	X		X	X														
* <i>Hyphantria cunea</i>			X	X		X															
NOCTUIDAE																					
<i>Schinia lynx</i>							X					X	X								
<i>S. trifascia</i>													X								
<i>Rhodophora florida</i>												X	X	X							
* <i>Heliothis phloxiphagus</i>							X			X											
* <i>H. zea</i>																			X		
<i>Agrotis tessellata</i>									X	X											
<i>A. ypsilon</i>										X											
<i>Peridroma margaritosa</i>	X		X				X			X						X					

*New record for Berrien County, Michigan.

Table 1. Continued.

Species	April			May			June			July			August			Sept.			Oct.			
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
NOCTUIDAE (Continued)																						
* <i>P. lubricans</i>							x	x														
<i>P. plecta</i>						x																
* <i>Eurois occulta</i>												x										
<i>Noctua c-nigrum</i>							x	x	x									x				
<i>N. clandestina</i>									x	x												
<i>N. brunneicollis</i>													x									
* <i>Cerastis tenebrifera</i>				x																		
<i>Scotogramma trifolii</i>					x		x	x				x										
* <i>Mamestra subjuncta</i>							x	x	x	x												
* <i>M. legitima</i>									x													
* <i>M. lilacina</i>																		x				
* <i>M. adjuncta</i>							x	x	x	x	x							x				
* <i>M. lutra</i>																						
<i>M. latex</i>																						
* <i>Sideridis rosea</i>																						
* <i>Anepia capsularis</i>																						
<i>Orthodes crenulata</i>																						
* <i>Ceramica picta</i>																						
* <i>Crocigrapha normani</i>																						
* <i>Morrisonia evicta</i>																						
* <i>M. distincta</i>																						
* <i>M. confusa</i>																						
<i>Nephelodes emmedonia</i>																						
* <i>Taeniocampa hibisci</i>																						
* <i>T. garmani</i>																						
<i>Leucania unipuncta</i>																						
<i>L. albilinea</i>																						
* <i>L. multilinea</i>																						
<i>L. pseudargyria</i>																						
<i>L. commoides</i>																						
* <i>L. phragmatidicola</i>																						
<i>Cucullia asteroides</i>																						
* <i>Eulotype electilis</i>																						
* <i>Copivaleria grotei</i>																						
* <i>Lithophane bethunei</i>																						
* <i>L. antennata</i>																						
* <i>L. unimoda</i>																						
* <i>Eupsilia morrisoni</i>																						
<i>Septis cariosa</i>																						
<i>S. lignicolora</i>																						
<i>S. arctica</i>																						
<i>S. obscura separans</i>																						
<i>S. devastator</i>																						
<i>Apamea velata</i>																						
* <i>Apamea americana</i>																						
* <i>Papaipema marginidens</i>																						
* <i>Luperina passer</i>																						
<i>Oligia fractilinea</i>																						

*New record for Berrien County, Michigan.

Table 1. Continued.

Species	April			May			June			July			August			Sept.			Oct.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
NOCTUIDAE (Continued)																					
* <i>O. bridghami</i>										x	x										
<i>Arzama obliqua</i>							x	x				x									
* <i>Euplexia benesimilis</i>				x			x														
<i>Hyppa xylinoides</i>				x	x									x							
<i>Nedra ramosula</i>	x	x		x	x	x				x											
* <i>Prodenia ornithogalli</i>				x							x	x		x							
<i>Ipimorpha pleonectusa</i>											x										
<i>Chytonix palliatricula</i>												x									
<i>Trachea delicata</i>							x	x													
<i>Apatela americana</i>													x								
<i>A. dactylina</i>							x	x													
* <i>A. lepusculina</i>				x	x		x			x	x										
<i>A. hasta</i>										x											
* <i>A. clarescens</i>										x			x	x							
* <i>A. connecta</i>							x														
<i>A. impressa</i>													x								
<i>A. oblinata</i>													x	x							
<i>Simyra henrici</i>			x	x	x		x				x										
* <i>Stibadium spumosum</i>																				x	
<i>Eudryas unio</i>							x	x						x							
<i>E. grata</i>												x									
* <i>Callopietria monetifera</i>														x							
* <i>Pyrrhia umbra</i>							x														
<i>Crambodes taldiformis</i>									x												
<i>Amphipyra pyramidoides</i>													x		x						
* <i>A. tagopoginis</i>													x								
* <i>A. glabella</i>													x	x							
<i>Leuconycta diptheroides</i>							x	x													
* <i>Balsa melana</i>				x	x		x														
<i>Ogdoconta cinereola</i>							x					x									
<i>Cerma cerintha</i>							x					x									
<i>Perigea videns</i>				x			x					x									
* <i>P. xanthoides</i>							x														
<i>Agriopodes teratophora</i>									x				x								
<i>Erastria albidula</i>														x							
<i>Neoerastria apicosa</i>														x							
* <i>Eutelia pulcherrima</i>									x												
* <i>Marathyssa basalis</i>						x															
* <i>Abrostola urentis</i>									x												
<i>Panthea furcilla</i>												x									
<i>Raphia frater</i>							x	x					x		x						
<i>Charadra deridens</i>						x															
* <i>Demas propinquinelinea</i>									x												
<i>Plusia falcifera</i>				x	x		x					x								x	
* <i>P. contexta</i>							x	x													
<i>P. precatationis</i>						x	x						x								
<i>P. formosa</i>													x								
* <i>P. aerea</i>							x	x						x							

*New record for Berrien County, Michigan.

Table 1. Continued.

Species	April			May			June			July			August			Sept.			Oct.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
NOCTUIDAE (Continued)																					
* <i>Catocala innubens</i>													X								
* <i>C. vidua</i>																	X	X			X
* <i>C. nebulosa</i>													X								
* <i>C. subnata</i>													X								
<i>C. neogama</i>													X	X			X				
<i>C. relicta</i>												X		X				X			
* <i>C. parta</i>											X										
* <i>C. briseis</i>													X								
<i>C. unijuga</i>													X								
<i>C. concumbans</i>												X	X	X		X					
<i>C. amatrux</i>															X						
* <i>C. coccinata</i>													X								
<i>C. ultronia</i>													X	X							
* <i>C. mira</i>													X	X							
* <i>C. grynea</i>													X	X							
* <i>C. gracilis</i>													X	X							
<i>C. amica</i>													X	X							
<i>Caenurgia erechthea</i>				X	X	X	X	X			X	X					X				
<i>Zale undularis</i>						X	X	X			X										
<i>Z. lunata</i>											X		X								
<i>Z. lunifera</i>				X			X	X			X		X								
* <i>Z. unilineata</i>		X		X																	
* <i>Panopoda carneicosta</i>											X										
* <i>Euparthenos nubilis</i>							X						X								
* <i>Melipotis jucunda</i>											X										
<i>Drasteria grandirena</i>							X														
<i>Scoliopteryx libatrix</i>							X														
<i>Scolecocampa liburna</i>											X										
<i>Bomolocha abalienalis</i>								X													
<i>B. baltimoralis</i>								X													
<i>Plusiodonta compressipalpis</i>													X								
<i>Plathypena scabra</i>											X										
<i>Bleptina caradrinalis</i>											X										
NOTODONTIDAE																					
<i>Melalopha apicalis</i>				X	X						X										
<i>Datana ministra</i>								X													
<i>D. perspicua</i>													X								
* <i>D. contracta</i>							X	X	X	X	X	X									
<i>Gluphysia septentrionalis</i>				X			X			X	X										
* <i>G. lintneri</i>	X																				
<i>Ellida caniplaga</i>	X									X	X										
* <i>Nadata gibbosa</i>							X			X	X	X									
<i>Peridea angulosa</i>										X		X									
* <i>Hyperaeschra georgica</i>					X	X	X			X											
* <i>Odontotia elegans</i>							X							X							
<i>Pheosia dimidiata</i>				X	X	X	X					X									
* <i>Nerice bidentata</i>				X		X				X	X										
* <i>Oligocentria lignicolor</i>											X										

*New record for Berrien County, Michigan.

Table I. Continued.

Species	April			May			June			July			August			Sept.			Oct.			
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
NOTODONTIDAE (Continued)																						
<i>Schizura unicornis</i>				x						x	x											
<i>S. ipomeae</i>								x		x												
<i>Heterocampa bilineata</i>											x											
<i>Misogada unicolor</i>								x			x		x									
* <i>Cerura occidentalis</i>				x			x				x											
<i>C. cinerea</i>							x						x									
THYATRIDAE																						
<i>Pseudothyatira expultrix</i>									x													
EUPTEROTIDAE																						
<i>Apatelodes torrefacta</i>									x													
LASIOCAMPIDAE																						
* <i>Malacosoma americana</i>										x												
<i>Epicnaptera americana</i>	x	x	x								x	x										
GEOMETRIDAE																						
* <i>Heliomata cycladata</i>									x													
* <i>Itame pustularia</i>										x	x											
* <i>Semiothisa distribuaris</i>											x	x										
* <i>Tornos scolopacinarius</i>	x			x								x										
* <i>Anacamptodes humaria</i>					x		x	x			x	x										
<i>Ectropis crepuscularia</i>				x																		
<i>Epimecis hortaria</i>									x													
<i>Melanolophia signataria</i>					x	x	x	x						x								
* <i>Lycia cognataria</i>							x	x	x				x									
* <i>L. ursaria</i>				x																		
* <i>Phigalia titea</i>				x	x																	
<i>Euchlaena effecta</i>									x													
<i>E. serrata</i>									x		x											
* <i>E. obtusaria</i>									x													
<i>E. johnsonaria</i>									x	x												
<i>Xanthotype sospeta</i>									x				x									
* <i>X. urticaria</i>									x				x									
* <i>Pero honestaria</i>							x		x						x							
* <i>Ennomos magnarius</i>															x							
<i>Metanema inatormaria</i>									x													
<i>Metarrhantis duaria</i>									x													
<i>M. hypochraria</i>									x													
<i>Apicia confusaria</i>									x													
<i>Tetracis cachexiata</i>									x	x												
<i>Sabulodes transversata</i>							x	x	x	x	x									x		
<i>S. thiosaria</i>							x	x	x		x	x	x									
<i>Synchlora aerata</i>									x													
<i>Campaea perlata</i>									x													
<i>Eugonobapta nivosaria</i>											x											
<i>Haematopsis grataria</i>									x												x	
<i>Scopula limboundata</i>									x													
* <i>Triphosa affirmaria</i>									x	x			x	x								
* <i>Lygris testata</i>													x									

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Table 1. Continued.

Species	April			May			June			July			August			Sept.			Oct.			
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
GEOMETRIDAE (Continued)																						
<i>Percnoptilota centrostrigaria</i>								x														
<i>P. obstipata</i>							x	x		x												
* <i>Eupithecia ravocostaliata</i>	x																					
<i>Dyspteris abortivaria</i>									x													
LIMACODIDAE																						
* <i>Prolimacodes scapha</i>												x										
* <i>Cochlidion biguttata</i>									x													
COSSIDAE																						
* <i>Prionyxthus robinæ</i>										x												
AEGERIIDAE																						
* <i>Sylvora acerni</i>								x	x					x								

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