UNUSUAL ASPECTS OF THE LIFE CYCLE OF SATURNIID MOTHS

For many years I have collected, raised and observed several species of saturniids (giant silk moths). Many people are already familiar with their life cycle, so I would like to focus on some interesting aspects I have encountered while observing the short-lived adult stage. One of the most intriguing aspects of behavior involves the assembling of males.

In North America there are many species of Saturniinae, but the species I have concentrated on are *Hyalophora cecropia, Antherea polyphemus, Callosamia promethea*, and *Actias luna*. The first two are very common in the Toledo area and the cocoons are easily obtained. The latter two are less common. The cocoon of *A. luna* is found on the ground and it is virtually impossible to find. In order to study the Luna I found it necessary to purchase cocoons from a biological supply house, then mate the adults and rear the larvae.

If you are going to assemble moths, the first thing you must have is a freshly emerged female of the desired species. Place the moth in a cage with adequate ventilation. Sometimes I place the female directly in the cage; other times I let it emerge from the cocoon in the cage so I don't have to disturb it.

The time period during which a female moth releases pheromone (or "scent") varies with the species. The four species I mentioned run the spectrum from 7:00 p.m. to 6:00 a.m. However, the time the female releases her pheromone and the time the first males begin to arrive are not necessarily the same. The promethea releases pheromone between 7:00 p.m. and dark; the luna about 11:00 -12:00 p.m.; the polyphemus between 2:00 and 4:00 a.m.; and, the cecropia between 4:00 a.m. and dawn.

I have gotten up many nights at the proper time to observe the results. I would almost always be surprised. Sometimes I would have more specimens than I could handle, and other times there would be none. The number of males attracted depends on such things as weather and population distribution. One thing I've noticed about the cecropia female is that she may not release her pheromone on the first night if she is small in size.

If undisturbed, the females are usually content to sit quietly until after mating. Sometimes if I'm short of females I let her attract males, but I keep her isolated so that she is not mated. This way I can extend my experiments over several days or until the next female emerges.

My first surprise observation was in 1970 when a friend's cecropia female attracted 10 males in a single night. We only expected one or two! But as long as you protect the female from potential mates she will continue to release pheromone until the end of the species pheromone period. In the meantime, every male within range of the pheromone will probably find his way to the female. Of course, under natural conditions that probably won't happen because the first male to arrive will mate with the female.

Originally we thought that ten males was phenomenal. But on several other occasions that year we attracted up to 25 males. On June 30, 1974, with 4 females producing pheromone, we broke our previous record. From my notes: "Males started coming before 4:00 a.m. and continued until 5:30 a.m. We surpassed the record before 5:00 a.m., and reached 45 by 5:31 a.m. (EDT)." In 1979 I was able to record new records of 47 and then 48 males (in one night). The most incredible night occurred in 1980, on June 26: "6:00

a.m. (EDT) --111 male cecropia moths attracted by two females. Caught as many as I could, but saw at least 2 others I could not catch. An unbelievable number for me to grasp. Starting about 4:40 until 5:45 a.m.." Neither my friends nor I have ever seen a night like that one since!

One of the experiments I do with these males is to mark them with paint and set them free after mating with the female, or the next evening. I mark them with different colors so that I can differentiate between different release days. The results have been variable and are somewhat dependent on the number caught and released, but recently I got 3 out of 5 (60%) to return. Our usual return rate is 10%. For example, one day in 1974 I attracted 20 males and only 2 were marked. All the rest were new.

Through the use of different colored markings I have discovered that some male moths come back night after night. And, several have skipped a night and then come back the next night. One even came back after a four day absence. Some have come from different locations.

An example of a large number of returned males with different markings came on the day after-the 111 specimens were attracted. I released 105 of them marked with red paint. On the 27th of June (1980) a friend and I caught only 91 males. From my notes "Had a big turnout of marked ones. •most marked ones were red from June 26 evening... Five were red and yellow ones from earlier release... total of 35 were marked."

From these different groups one can see a cross section of large, small, new or battered individuals. A sample of the composition comes from the 111 specimens of June 26 (1980): "Besides large and small, there was another badly tattered one... Several had holes pecked in their rear eyespot as if birds had attempted to eat them. Most were perfect, and a few had small chips off wings."

Another thing I've noticed about male cecropia moths is that the hair on the last abdominal segment near the reproductive organs gets worn off during mating. If this is a reliable indicator of mating activity, then I can say that both mated and unmated males will come to waiting females. At one point two male Lunas mated twice with different females. However, half of all eggs from the four females did not hatch, indicating, perhaps, that the males spent themselves on the first female.

Polyphemus moths are very sensitive to disturbances, and the pheromone seems not to spread great distances with the result being that we rarely get more than one or two males, if at all. At Mud Lake in the Irish Hills of Michigan, we once got 9 males in a single night. Promethea is easy to handle, but their usual habitat is even further away so the most we have gotten is 2 males.

- *Gary Lovell*

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EDWIN WAY TEALE: A MEMORIAL

Edwin Way Teale was a naturalist, photographer, writer and one-time president of the New York Entomological Society. He was born in Illinois in 1899. Most of his famous work was done in the period between 1940 and 1960; hence many Ohio Lepidopterists members may not be familiar with his works. Mr. Teale's insight, wonderment, and perception is worthy of attention from a new generation of entomologists and naturalists.

I first became aware of Mr. Teale because he wrote the text and took the photographs in the Insect Life Merit Badge booklet published by the Boy Scouts of America in 1967. The section he wrote on giant silk moth assembly inspired me to try it with my first cecropia moth. I attracted only one moth that first time, but the rest is history, as they say (see the accompanying article from Y.E.S. QUARTERLY on Saturniidae).

Edwin Way Teale wrote more than a dozen books on insects and insect photography. "Grassroots Jungle" and "Strange Lives of Familiar Insects" are two of his most popular.

After completing an M.A. degree at Columbia in 1927, he spent 13 years as a staff writer with Popular Science Monthly. In 1941 he turned his attention full-time to writing nature books. Wild things had always fascinated him, even from his childhood days, and so with camera and pen he recorded the natural events he had seen around him over the years.

In his later years he wrote about his travels. I have read his "Autumn Across America" and "North With the Spring". He would travel with his wife and visit places that the normal tourist would abhor, and even a naturalist wouldn't always think of.

Mr. Teale was a mentor for me, but I did not fully realize this until I came across a copy of "Near Horizons". This turned out to be the first book I've ever reread! I was amazed at the things I remembered, some I knew I read in those pages, others I knew not whence they came.

My studies of giant silk moth mating habits were a direct result of interest peaked from his book along with cricket and katydid sounds, praying mantis and painting insects to see if you could see them again. My notes, started in 1969, are full of all these things and more.

My style and interest in what I see going on in the insect and natural worlds when I travel is highly influenced by Mr. Teale's travelogue style books.

I've written about the differences in places I've stayed compared with Toledo, Ohio. When I travelled by car to Florida, I stopped at many places not just for a rest, but to witness close at hand the changes in insect and plant life and temperature and weather as it went from the cool Toledo September to the hot Florida sun.

I had not read his books since my early teen years and can't recall thinking about Mr. Teale for many years. As I reread "Near Horizons" last winter I thought of Mr. Teale as a close friend.

I seriously thought about contacting him to thank him, until I saw his birth year on the back of the book - and he would have been age 95! I would have thought that I would have seen an obituary, as I usually read the paper or would have seen something somewhere on TV or other media. So, I decided to inquire at the local library. To my amazement there is a reference book for finding nearly every writer who ever lived, dead or alive.

Edwin Way Teale died on October 18, 1980. I was very distraught to learn this news, even after so many years had passed, and I was saddened by the fact that it was too late to thank him.

Nearly all of his books were listed in our library's computer and all were in stock. One can always try garage sales and used book stores if you'd like to locate copies of his wonderful books.

Good bye Edwin Way Teale, and thank you.

- *Gary Lovell*

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