

ANAX JUNIUS (DRU.) ATTRACTED TO LIGHT AT NIGHT (ANISOPTERA: AESHNIDAE)

Although certain species of adult dragonflies are reportedly attracted to light (P.S. CORBET, 1962,

A biology of dragonflies, Witherby, London; S.W. FROST, 1970, *Fla Ent.* 53: 173-177), we can find few references substantiating these observations. Large crepuscular tropical dragonflies from forested regions of Africa and the neotropics occasionally are attracted to light and even enter houses (CORBET, 1962, *loc. cit.*). A. DE ST. EXUPÉRY, 1967, *Wind, sand and stars*, Jovanovitch, New York) records such an observation c. 1941-1942 at Port Étienne (20°56'N, lat.; 17°07'W. long.) on the west coast of North Africa (in present-day Mauritania). He reported that two large dragonflies were attracted to his lamp about 2300 hr and surmised that they had been blown to his small rural airstrip from their oases, hundreds of miles inland, by the hot desert winds rising before a coming sandstorm.

On 25 April, 1989 at 2300 h (local time), one of us (A.P.P.) stepped outside his home located in the Ter Hills section of southwestern Baltimore City, MD. On the front porch he encountered a large adult aeshnid, which had been attracted to the outdoor light. The dragonfly was rapidly circling the lamp in a counter-clockwise direction, making tight spirals of ~15 cm diameters. The insect buzzed loudly as it frequently banged into the edges of the glass lamp housing with the dorsum of its thorax. It continued circling the lamp for about three minutes while a net was obtained, with which it was collected easily. No other insects had been attracted to the

light at that time. The dragonfly was identified as a male green darner, *Anax junius* (Dru.), and the specimen has been placed in the University of Maryland Baltimore County (UMBC) insect collection.

The interior of the front porch of the house is painted white, and is surrounded by yew shrubs and large trees (*Liriodendron* and *Platanus*). There are restricted second growth natural wooded areas nearby containing small streams, primarily shallow intermittent tributaries of Maiden Choice Run of the Gwynns Falls Watershed. Several neighbors have shallow backyard water lily and fish pools, but there are no natural nor large artificial ponds nearby. About 20 late instar larvae of *A. junius* were collected from a small, temporary pond (about 0.12 acre), located on the UMBC campus, approximately 3.6 km south of the adult collection site on 9 Nov. 1992. This locality represents the nearest source population known to us. However, *A. junius*, like other large aeshnids, is quite capable of flying or migrating for great distances. It is one of the most common and widespread large North American species (S.W. DUNKLE, 1989, *Dragonflies of Florida peninsula, Bermuda, and the Bahamas*. Scientific Publications Nature Guide, Gainesville, FL). This species has a long flight season and several seasonal generations, but only sparse information has been published on its general life history (A.M. YOUNG 1967, *Can. Ent.* 99: 886-890; D.W. SIEVERS & A.C. AMAN, 1972, *Proc. Iowa Acad. Sci.* 79: 105-106; A.P. PLATT, 1993, *Phaeton* 14(2): 4). The latter reference describes a late summer swarming and feeding frenzy of the green darner, apparently associated either with a migration or local mass movement of the species, which occurred subsequently in this same area.

The height of the outdoor lamp bulb to which the insect had been attracted is 2.63 m. The black, metal-framed lamp contained a 60W GE Soft White incandescent bulb enclosed within a 0.64 cm thick glass lantern. Each of the four glass sides and the glass bottom contain 0.31 cm wide tapering beveled edge facets, which when viewed at right angles from the lantern housing acted as prisms, refracting the visual spectrum of colors (red-indigo). The dragonfly appeared to be attracted directly to these facets, continuously banging

its anterior dorsal thorax into the lamp's edges from below the housing. Local weather conditions at the time were overcast, and humid; air temperature was 10.6°C, with winds from the W-SW at 10-15 knots. There had been a trace of precipitation during the previous 12 hr. Large aeshnid dragonflies often patrol the open street area in front of the house, as well as the backyard, during the spring and summer months, especially during the late afternoon and at dusk.

Among insects, true postured dorsal light orientation responses have been demonstrated only for dragonflies (*Anax imperator* Leach) and locusts (*Schistocerca* sp.: Orthoptera) (H. MITTELESTAEDT, 1947, *Naturwissenschaften* 34: 281-282; — 1950, *Z. vergl. Physiol.* 32: 422-463; L.J. GOODMAN, J.B. MESSENGER & R. WEHNER, 1981, *Handb. sens. Physiol.* 8/6c [Comparative physiology and evolution of vision in invertebrates], Springer, Berlin & New York). Both kinds of insects lack stability and tend to rotate around their longitudinal axes when tethered, and allowed to fly in total darkness. Trunk alignment occurs when these species are illuminated strongly from a specific direction, and their dorsal ommatidia are maximally stimulated (MITTELESTAEDT, 1950, *loc. cit.*; W. KIRMSE & P. LEASSING, 1971, *in: H. Drieschel & N. Tiedt, [Eds], Biokybernetik*, 3: 261-264, Fischer, Jena). In *Anax*, the large compound eyes meet at the dorsal mid-line of the head. Because of the differences in flight patterns of lepidopterans and odonates, as well as the differences in the visual control centers of the two orders, it seems unlikely that the green darner was attracted to the porch light in the same manner that moths are known to spiral into a nearby flame (or other light source). The mechanisms underlying this latter phenomenon are discussed by P. FARBER (1962, *The Insects*, Time, New York).

YOUNG (1967, *loc. cit.*) notes that green darners exhibit sexual dimorphism. Both sexes possess bright green thoraxes, with all males also having conspicuous lateral blue abdominal stripes. The abdomens of all but a few females are a uniform light reddish-brown, and lack the bright irregular blue stripes of the males. Furthermore, DUNKLE (1989; *loc. cit.*) observes that males can see each other from distances as great as 20 m. Recent neurophysiological evidence

suggests that the compound eyes of certain unrelated insects such as dragonflies and honey bees may be capable of forming images equalling those of mammalian eyes (D. O'CARROLL, 1993, *Nature, Lond.* 362: 541-543; M.V. SRINIVASAN, S.W. ZHANG, & B. ROLFE, 1993, *Nature, Lond.* 362: 539-540). In this instance, the green darner may have been responding to the prismatic spectral rainbows created by the faceted glass edges of the lamp housing. Perhaps the insect had flown directly toward the green and blue light bands, which from a distance may have been mistaken for a conspecific individual, such as a rival male.

Other insect collectors occasionally have observed adult dragonflies being attracted to light sources. FROST (1970, *loc. cit.*) collected ten species of Anisoptera and seven species of Zygoptera during twelve years of collecting with black-light traps at the Archbold Biological Station in central Florida. Included among these records is one specimen of *A. junius* taken on 27 March (S.W. FROST, 1966, *Fla. Entomol.* 49(4): 243-251). At the same locality, R. YOSEF (1994, *Notul. odonatol.* 4(3): 55-56) recently observed a *Libellula axilena* feeding on other insects attracted to lighted windows after dark. R.S. Bryant of Baltimore, MD (pers. comm.) has attracted 8 odonates during June-August of 1965-1984 while collecting moths at night using a black light. These were identified as an aeshnid (*Epiaeschna heros*), 3 libellulid individuals (*Sympetrum* sp.) and 5 lestids (*Archilestes grandis*, *Lestes* sp.). Mr Bryant's home is located several blocks from the *A. junius* collection site. It is unclear whether any of these odonates were active at night by nature or whether, perhaps, they had been disturbed from nocturnal resting sites prior to being attracted to the lights.

Finally, a recent note in this journal (N. BACETTI, E. PERROTTI & C. UTZERI, 1990, *Notul. odonatol.* 3: 65-68) cites a report by G.H. BICK (1949, *Ent. News* 60: 182) as providing evidence for dragonflies being attracted to light. However, Bick actually reported collecting 43 medium-sized to large dragonflies of three genera and species in Louisiana using a flashlight at night! The dragonflies were roosting and were taken between 0.46-0.92 m above the ground on weeds and shrubs during two nights in May; they

were not attracted by the lights. One male of *A. junius* was included in this sample.

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