



DISTASTEFUL FIREFLIES SOMETIMES EMETIC, BUT NOT LETHAL.—(Note). *Photinus umbratus* fireflies are distasteful to fence lizards (*Sceloporus undulatus*) and skinks (*Eumeces laticeps*). An attacking lizard vigorously spits out the firefly, wipes its snout with its forefeet or against the substrate, and sometimes makes gaping or yawning movements of the mouth. A single experience will usually prevent further attacks for several weeks or months; when a firefly is presented to a lizard days later, the animal sometimes, without approaching the firefly, makes gaping, yawning movements (J. E. Lloyd, 1973. Coleop. Bull. 27:91-106).

We presented *P. umbratus* to 9 fence lizards in a total of 45 trials; none were eaten though 6 attacks were elicited. Four lizards never attacked (prior experience?); 3 attacked only on the first presentation and not during 4 remaining weeks of trials; 1 attacked on the second trial, and not again; and 1 attacked on the first 2 trials but not subsequently. (A feeding regimen of mealworms and crickets at 2-day intervals was established during the month preceding the tests; tests were performed in lieu of regular feeding. In all cases reported, animals that did not attack fireflies ate mealworms.)

We stuffed the gutted abdomens of live crickets with 3-7 fireflies (killed by freezing), and presented them to 5 lizards. The stuffed crickets walked and elicited attacks. In 4 attacks, by 2 fence lizards, crickets were taken headfirst partway (up to the abdomen) into the mouth and then suddenly disgorged; in 3 separate attacks and disgorgements a skink swallowed then vomited crickets smuggling 5-7 fireflies each; another skink swallowed 6 crickets containing a total of 28 fireflies and 4 hr later disgorged all and a mealworm she had eaten after refusing the seventh cricket—3 weeks later she swallowed more than 15 fireflies in 3 crickets, disgorged the third with its 6 fireflies, ate another with 6, refused the next, and during 7 subsequent hours of observation did not further disgorge or exhibit unusual behavior. A fence lizard swallowed 3 crickets with a total of 15 fireflies and in the subsequent 8 hr exhibited no unusual behavior or disgorgement, but when tested 18 days later ran from a cricket and jumped and clawed at the glass wall of the cage. Three weeks later it ate a cricket with 6 fireflies and refused 2 more and a mealworm; in 6 subsequent hours it exhibited no unusual behavior or disgorgement. Both skinks commonly pushed partially swallowed, stuffed crickets through the sand and when swallowed these were well-covered with sand.

The gaping-yawning of experienced lizards, when viewing a firefly, may be an indication of recall activity in their central nervous system, and the flight of the lizard that had previously eaten but not vomited 15 fireflies suggests that the meal produced internal discomfort. Susanne L. Sydow, and James E. Lloyd, Depts. of Zool. and Entomol., respectively, Univ. of Florida, Gainesville 32611.