

Once adults have fed upon foliage for a day, a relatively consistent pattern of activity, which appears to be correlated with temperature fluctuations and light intensity, may develop. Little or no activity occurs below 50° F. unless the beetles are artificially stimulated, but from 50–54° F. crawling and short flights take place. Feeding begins at about 55° F., mating at above 61° F., and oviposition above 72° F. All of these temperatures were recorded in the laboratory, with light intensity increasing. With light decreasing, the temperature, in almost every instance, must be higher to obtain the same response. It is interesting to note that, while emergence of adults usually occurs at temperatures above 60° F., activity after emergence takes place at lower temperatures.

MATING. Mating takes place in the foliage of the trees between 11.0 a.m. and 6.0 p.m. No mating occurs until the beetles have been feeding for several days, earliest mating being recorded on the third day after emergence. Periods of copulation, varying from 1 minute to 5 hours, have been recorded, but it is significant that no oviposition occurs until females have copulated for at least one period of 20 minutes or more. Thus the shorter times recorded may be considered as insufficient to stimulate oviposition, and this may imply that the spermathecae need to be filled before females will commence oviposition. Females appear to select either the male partner or the time when successful copulation takes place, and it seems that they require a minimum period of feeding and sun-basking before they will copulate. Both males and females remate indiscriminately and frequently after initial oviposition. Female behaviour followed the pattern of feeding, mating, feeding, ovipositing and feeding, in that order, during the day.

OVIPOSITION. Oviposition does not occur until a week or more after emergence, and 2–4 days following copulation, and no eggs are laid before 11.0 a.m. or at temperatures below 72° F. In the temperature range 72–76° F. light intensities approaching full sunlight are required before oviposition commences. At higher temperatures, up to 85° F., eggs are laid in shaded conditions. This temperature relationship is probably the reason for sun-basking, which is a well-known activity of buprestid beetles.

If females are exposed in glass jars to full sunlight for several 2-minute intervals, alternating with equal periods of shade, they will oviposit at lower temperatures and light intensities than those held under continuous shaded conditions. Thus, adults probably obtain the necessary body temperature and light stimulus which enables them to lay eggs in the cooler parts of the forest, by sun-basking on the foliage and trunks of exposed trees.

In high light intensities, the eggs are usually laid in a band along each side of the full-light area of the tree trunk while in shaded conditions, eggs may be laid anywhere on the trunk or branches of the attacked tree. The eggs, when first deposited, are cream or white about 0.85–1.15mm long, and 0.45–0.65mm wide. They have a somewhat pebbled chorion, and are usually laid singly or in groups of 2 or 3 under the largest bark scales, in narrow bark fissures, just large enough for the ovipositor to be inserted, and under the protruding bark scales, along the rims of wider cracks and holes. Females, when ovipositing, are characteristically furtive in behaviour. They search the stem for suitable egg sites by walking hesitantly along, variously extending the very flexible telescopic ovipositor. When a suitable site is found, the ovipositor is inserted to full length, the beetle remaining stationary for about one minute while the egg is laid, then running rapidly away from the site for some distance. After a few minutes, she may slowly return to the same spot and oviposit again. Eggs may, therefore, be located on a bark surface by watching the activity of ovipositing beetles, for though eggs are not laid on every occasion that the ovipositor is fully inserted into bark fissures they are deposited wherever a female is observed to run away from an oviposition site.