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Nocturnal Pollination of *Abronia fragrans* (Nyctaginaceae)

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NOCTURNAL POLLINATION OF *ABRONIA FRAGRANS* (NYCTAGINACEAE).—*Abronia fragrans* Nutt. (Nyctaginaceae) is a white-flowered herb of dry sandy soils from Idaho and South Dakota to Arizona and Texas. It can be readily observed to fit a night-blooming, moth-pollinated syndrome (Faegri and van der Pijl, The principles of pollination ecology, 1971). This does not seem to have been noted: in all references to *A. fragrans* we could find, the only indication of nocturnal anthesis was the comment of Nelson (Handbook of Rocky Mountain plants, 1969), who observed that the fragrance was more noticeable at night. Tillett (Brittonia 19:299-327, 1967), working on Pacific species, suggested that the pink flowered *A. umbellata* was visited by moths, families Noctuidae and Sphingidae, as well as by day-flying insects, but did not identify any species. We captured the moth, *Nycterophaeta luna* (Morr.) (Noctuidae) pollinating *A. fragrans* in western Nebraska and confirmed the moth-pollination syndrome.

A small population of *A. fragrans*, variously called sweet sand verbena and prairie snowball, was observed at Cedar Point Biol. Stat., Ogallala, Nebraska (Keith Co.). Observations were made in late Jul. and early Aug. 1977. *Abronia fragrans* appeared near the peak of flowering for this population, since there were numerous unopened buds. However, in 1976, this and another population at Ackley Valley Ranch, Keith Co., were through flowering by 1 Aug. Plants in Keith Co. were observed in flower discontinuously in late May and late Aug. 1978, apparently in response to rainfall.

Abronia fragrans is a perennial herb with several stems. The perianth consists of fused sepals, forming a narrow tube up to 2.5 cm long. The perianth is white and the heads of several flowers can be quite conspicuous. However, the flowers do not open until late afternoon (c. 1930 MDT) and are consequently inconspicuous during the day. The flowers emit a heavy sweet fragrance that was first detectable at approximately 2100. Nectar production apparently coincides with scent production because detectable amounts of nectar were not observed before 2100. The nectar was produced at the base of the perianth just above the ovary, and up to 2.5 cm below the stigma and the four to five stamens, which are level with the opening of the perianth. These flowering characteristics are typical of adaptations to nocturnal pollinators which in north temperate regions would be moths (Faegri and van der Pijl 1971).

Moths of the species *Nycterophaeta luna* were observed visiting the flowers about

2300. They came solitarily and visited several flowers per plant (although they were difficult to observe without disturbing them). Two moths were netted, one on 29 Jul. and one 10 Aug. 1977. They were identified by E. L. Todd, U.S. Dep. Agr. Both specimens were observed to have pollen on the proboscis. Thus *N. luna* can be concluded to be an effective pollinator.

The distribution of *N. luna* covers the Dakotas, Montana, Colorado, and Wyoming (Holland, The moth book, 1968). Thus, from the distribution data, *N. luna* could pollinate *A. fragrans* over the northern half of its range. Nothing is known of pollination in the southern half of the range. No other visitors were observed, but observations were not continuous all night, so the possibility of other visitors cannot be eliminated.

Of the approximately 35 species of *Abronia* in North America, at least 9 are white flowered. Moth pollination should be looked for in these species. Since *A. umbellata* is pink but predominately night-visited (Tillett 1967) nocturnal pollination may be even more widespread in the genus.

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