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Recommended Citation

Nye, W. P., and G. E. Bohart. 1962. Observations of the Visits of Honey Bees and Bumble Bees to Bladder Senna (*Colutea arborescens* Lam.). *Ann. Ent. Soc. Amer.* 55(2): 259-260.

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Reprinted from the
ANNALS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA
Volume 55, Number 2, pp. 259-260 March, 1962

SCIENTIFIC NOTES

Observations of the Visits of Honey Bees and Bumble Bees to Bladder Senna (*Colutea arborescens*)^{1, 2}

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The observations recorded herein were made on a few plants of bladder senna (*Colutea arborescens* Lam.) grown experimentally in the forest nursery at Utah State University. This is a yellow-flowered, leguminous shrub introduced from Southern Europe or North Africa. It is grown as an ornamental or for a wind break in much the same manner as the more familiar Siberian pea bush

(*Caragana arborescens* Lam.). Its inflated pods distinguish it from the latter.

During the period of observation in mid-May, honey bees (*Apis mellifera* L.) and several species of bumble bees were the only pollinators seen. Bladder senna has a piston type of pollination mechanism in which strong downward pressure on the keel forces the staminal column upward. It appears to be adapted to large insects such as bumble bees, since only bees of this size can operate the piston mechanism while probing the base of the corolla for nectar.

Figure 1 shows a worker of *Bombus morrisoni* Cr. grasping the keel while probing between the keel and standard petal for the nectary at the base of the flower. Pollen is dusting her sternum and a small lump of pollen has formed on her tibia. The bee's center of gravity is clearly toward the apex of the keel, as shown by the manner her midtarsae grasp the flower. In this way bumble bees obtain pollen and nectar at the same time, and every visit potentially results in pollination.

¹ Accepted for publication July 31, 1961.

² The authors wish to express their appreciation to Arthur H. Holmgren, Associate Professor of Botany, Utah State University, for the identification of the shrub.

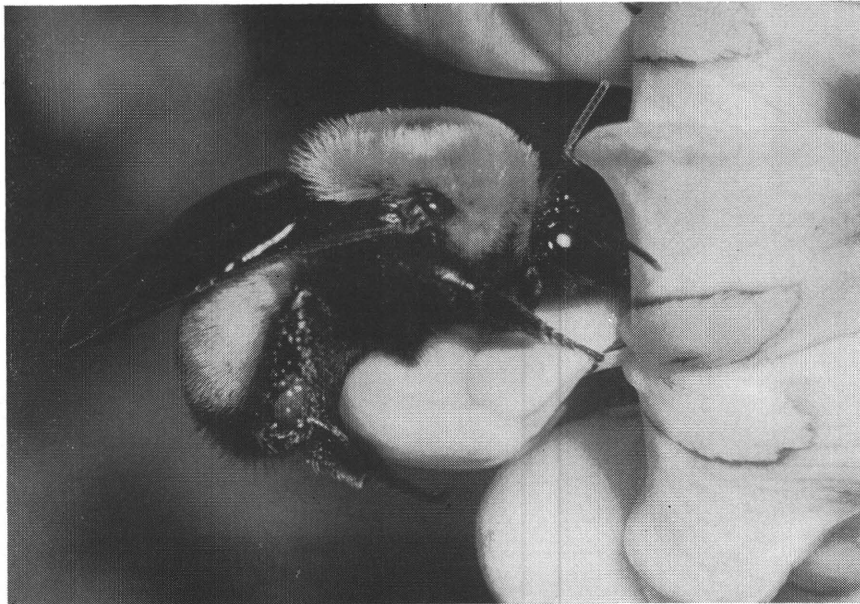


FIG. 1.—*Bombus morrisoni* collecting nectar and pollen from *Colutea*.

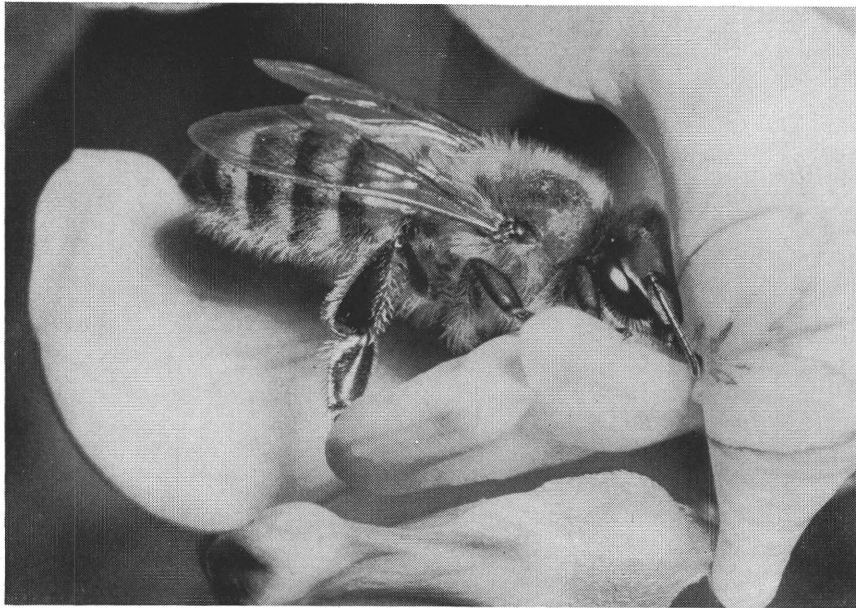


FIG. 2.—Honey bee collecting nectar from *Colutea*.

Honey bees visit bladder senna flowers for nectar and pollen separately. A bee probing as deeply as possible is shown in figure 2. She is standing on the keel with her center of gravity farther forward than that of the bumble bee in the preceding figure. At the same time her abdominal and thoracic sterna are lifted far away from the keel. In this position she does not force the tripping mechanism and her body is not in a position to receive pollen.

A pollen-collecting honey bee is shown in figure 3. She perches on the apical half of the keel and pries it open with her legs and mouth parts. Since her weight is toward the apex of the keel, the piston mechanism is probably at least partially operated. The effectiveness of honey bees as bladder senna pollinators obviously depends upon the percentage of pollen collectors. Nectar-collecting honey bees apparently never pollinate the flowers accidentally, as they sometimes do when visiting alfalfa.



FIG. 3.—Honey bee collecting pollen from *Colutea*.