

Desert Plants

A quarterly journal devoted to broadening knowledge of plants indigenous or adaptable to arid and sub-arid regions, to studying the growth thereof and to encouraging an appreciation of these as valued components of the landscape.

Frank S. Crosswhite, editor

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The Bat, the Blossom and the Biologist

a film by the
British Broadcasting Corporation

featuring
Donna J. Howell
Far Flung Adventures
Terlingua, Texas

Synopsis

The film opens with a panorama of the Chiricahua Mountains, Cochise County, Arizona, and explains that this is the summer "stage" for a remarkable plant/pollinator relationship between century plants (genus *Agave*) and nectar-feeding bats. These bats migrate northward from central Mexico following the sequential blooming of bat-adapted plant species until they arrive in Arizona. The natural history of the agaves and of the bats (genus *Leptonycteris*) is presented using sequential shots of agave growth and death and slow motion photography of the bats in flight drinking nectar and transferring pollen.

It is explained that each partner must benefit as an individual for the relationship to be evolutionarily stable. Thus an examination of the energetic physiology of the bats and the reproductive energetics and requirements of the plants is undertaken. The film shows hand-pollination experiments that demonstrate the need of the plants for outcrossing and examines strategies of the agave for attracting bat flocks and for maximizing pollen transfer.

The second emphasis of the film is the decline of bat populations and plant reproduction. It is set in northern Mexico where "moonshining" of agave liquor is a popular industry. The *mescaleros*, as the moonshiners are called, cut several species of paniculate agaves when they are "sweetest," immediately before blooming. The plants are neither managed as a resource nor replaced. The one *mescalero* interviewed in depth shows the liquor-making process from harvest through baking and distillation in his primitive, hidden still. He explains that he cuts 400 to 500 plants annually and now, after three generations of family business, he has to go as far as 70 kilometers to get his plants. He estimates that there are fifteen other *mescaleros* in the region doing the same. Thus, in one region, 7,500 plants may be destroyed each year.

In northern Mexico there are very few appropriate food plants for the bats and Dr. Howell speculates that this swathe of foodlessness is responsible for the well-documented decimation of populations of nectar bats, especially over the last 35 years. She explains that agave seed set, as demonstrated by herbarium specimens, has shown a parallel decline. In areas of the southwestern United States where populations of nectar bats have vanished or are severely reduced, agaves are realizing only 1/300th of their sexual reproductive potential.

Editor's Note

This educational film, featuring bat-pollination of *Agave*, was screened at the Symposium during special sessions on March 7 and March 9. Dr. Donna Howell, featured in the film, kindly appeared to discuss the film and answer questions.



Figure 1. A *Leptonycteris* bat darts in front of Dr. Donna J. Howell as she takes a nectar sample from an *Agave* inflorescence.



Figure 2. As *Leptonycteris* visits *Agave* flowers, the animal's head is buried among the anthers and styles and the tongue penetrates the flower tube. Cross-pollination occurs when pollen adhering to the bat's fur is pressed against the stigma of another plant in the local *Agave* population.