Journal of The Bromeliad Society

VOLUME 45 • JANUARY–FEBRUARY 1995 • NUMBER 1

Population Dynamics of Some Native Florida Epiphytes. II. Mortality after a Storm

Meg Lowman[1] and Warren Linnerooth[2]

Introduction

Although it is assumed that hurricanes and severe winds cause high levels of epiphyte mortality, very little data exist to quantify this phenomenon. In March 1993, a severe storm (called the "no-name storm" because it occurred outside of the official hurricane season) blew along the west coast of Florida causing widespread damage to buildings, roads, and vegetation. It blew directly over a coastal cedar hammock on Longboat Key in Sarasota, Florida, the site of a long-term project to monitor the growth and population dynamics of epiphytes in this endangered ecosystem (Lowman and Doblecki, 1993).

Epiphytes in trees of *open* (i.e. not surrounded by other trees) and *wooded* (i.e. surrounded by trees forming a continuous canopy) canopies were counted and marked during January 1993. Mature cedar trees (approximately 12 m high) contained from 150 epiphytes in a wooded canopy to as many as 700 epiphytes in trees of the open region. Species included one orchid, *Encyclia tampensis,* and three bromeliads: *Tillandsia recurvata, T. utriculata* and *T. usneoides.* The cedar canopies averaged 40% orchids and 60% bromeliads. *T. utriculata* was the most common species.

In this report, we present the results of post-storm mortality on the epiphytes between the canopies of open and wooded cedars. We hypothesised that epiphytes growing in a wooded canopy situation would have a greater likelihood of survival because of the buffering of surrounding trees. In contrast, epiphytes growing in an open canopy would suffer higher mortality of the greater exposure to the storm and, especially, the effect of salt spray.

Methods

After the storm, two trees approximately 12 m tall were selected from the nine trees in the initial population survey (Lowman and Doblecki, 1993). The wooded tree formed part of a continuous forest stand; an open tree was isolated. These two types of trees are typical in many Florida developments; condominium owners often retain stands of trees but more commonly retain scattered, individual trees in their landscape designs.

---

[1] Director of research, Selby Botanical Gardens, 811 S. Palm Avenue, Sarasota, FL 34236.

[2] Environmental Studies Program, New College, Sarasota, FL 34237.

The epiphytes were counted according to species and size classes on both trees, using a ladder for access. Epiphyte seedlings were tallied separately so that mortality of the original population could be calculated as well as mortality in relation to the overall recruiting population.

RESULTS

Epiphyte mortality was extremely high after the storm averaging 44% of all individuals and ranging from 0% to 64% losses for different species. As hypothesised, epiphyte mortality was higher in the *open* canopy (49%) than the *wooded* one (28%) (Table 1).

Table 1. Abundance and mortality of epiphytes before and after a storm on Longboat Key, Florida.

Epiphyte	Pre-Storm Abundance	% Mortality from Storm	1994 Recruits	% Overall Population
T. recurvata	37	38%	6	–21%
T. utriculata	39	21%	14	+52%
T. usneoides	4	0%	0	0%
Encyclia tampensis	4	0%	0	0%
TOTAL for Wooded Tree	84	21%	20	+ 3%
T. recurvata	45	64%	5	–53%
T. utriculata	100	57%	14	–43%
T. usneoides	1	0%	0	0%
E. tampensis	90	33%	0	–33%
TOTAL for Open Tree	236	49%	19	–41%
TOTAL for hammock	320	42%	39	–30%

Tillandsia recurvata suffered the greatest losses of individuals, with 38% and 64% mortality in the wooded and open trees, respectively. Approximately 26% of the epiphytes blown off the trees were replaced by newly germinated individuals. In contrast, *T. usneoides* had no mortality in either canopy (and no recruits either). *T. utriculata* lost only 10% individuals in the wooded canopy but 57% mortality in the open canopy. *Encyclia tampensis* had no mortality in the wooded tree but 33% losses in the open.

Despite the proportionally high losses of epiphytes from the storm, the relative abundance of each epiphyte changed very little. For example, *Tillandsia recurvata* remained the most abundant species in the wooded canopy whereas *T. utriculata* and *Encyclia tampensis* remained equally abundant in the open canopy. *T. usneoides* represented only 6% and <1% of the epiphytes in the wooded and open canopies, respectively, both before and after the storm.

In this survey, epiphyte mortality was defined as the loss of an epiphyte from its natural position in the canopy. To examine the survival of epiphytes when fallen to the ground, we marked the fallen individuals and monitored their fate. Almost 50% of the epiphytes on the ground were dead at the time of this census (approximately six months after the storm). we predict that the remaining 50% will experience the same fate.

SUMMARY

The storm caused a significant loss of bromeliads, especially *Tillandsia recurvata* and *T. utriculata,* to the canopies of cedars in this Florida coastal hammock. Isolated trees suffered higher bromeliad mortality than did trees that were part of a contiguous stand. Of the three bromeliads native to this hammock, *T. usneoides* suffered no mortality, perhaps a consequence of its growth form that intertwines securely around its host branch.

The conservation of native Florida bromeliads may require more documentation than merely listing their abundance and distribution. The host trees and their canopy architecture on the landscape may be equally important to epiphyte survival. It may also be necessary to encourage landowners to retain stands of host trees with continuous canopy rather than landscapes with isolated trees for epiphyte conservation.

ACKNOWLEDGEMENTS:

We are grateful to Harry Luther for confirmation of bromeliad identification and to the staff of the Water Club construction site for their cooperation. Ellen Baskerville assisted with the preparation of this manuscript

LITERATURE CITED.

Lowman, M; Doblecki, S. 1993. Population dynamics of some native Florida epiphytes. J. Bromeliad Soc. 43:175-178.

CORRECTIONS

1) It should be noted that Dr. Clyde F. Reed's CUMULATIVE INDEX TO THE BULLETIN AND JOURNAL OF THE BROMELIAD SOCIETY, Volumes I–XXX contains an error in pagination: pages 137 and 138 are in reverse order.

Please note also Dr. Reed's address: **1222** Main Street, Darlington, MD 21034. (See page 40).

2) The Cultivar/Grex Registrations for 1991–June 1994 published in the September-October 1994 issue of the JOURNAL contains an error on page 219 in the entry *Tillandsia* Creation: the namer of the plant is P. Bak and not P. Koide.

3) Volume 44, May–June, page 103, figure 4, change plant name to *Puya killipii* instead of *P. cardonae.*