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## Mass Destruction of *Phoenix loureirii* in South India

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*Phoenix loureirii* Kunth is a palm with beautiful feathery leaves and very few thorns. It is distributed between 200-2,000 m altitudes (Gamble 1967) on the hills forming the Western and Eastern Ghats of South India. Grassy, steep slopes are its favorite habitat. The trunk grows up to a height of 3.5 m and a thickness of 25 cm. Many sucker shoots are formed at the base. Flowering starts even while the stem is barely visible and continues for several years. From germination to the onset of flowering, about 10 years elapse. The growth of the stem is rather slow. About 16-20 leaves are produced per year. Judging from this and counting the persistent leaf bases, one can estimate a specimen 3 m tall to be 60 years in age. In the undisturbed condition the cool grassy slopes support dense formations of this palm. The flowering season starts in January and clusters of edible orange-red fruits turn violet-black on ripening in the months of July and August. Seedlings are found especially in the crevices and depressions harboring a layer of soil. Deep cracks in the rocks offer favorable rooting spots. A mat of fibrous roots anchors the palm firmly to the substratum besides acting as a medium for the retention of soil and associated mosses, liverworts, and grasses. Entire slopes of hilly terrain often show pure formations of *P. loureirii*. Until recently, the palm was relatively undisturbed in its natural habitat. However, an alarming trend of destruction continues to be witnessed as human exploitation of the

species rapidly increases and threatens its very existence. Even though the leaves were traditionally plaited into mats, the main cause of worry is the broom industry that thrives on the leaves of *P. loureirii*. With ever increasing demand from cities and towns, tons of foliage are being removed from the hills. Another equally disturbing aspect has been the practice of burning down the hillsides for the cultivation of cardamom, coffee, tea, potatoes, and bananas.

A reconnoitring survey conducted by the authors revealed that the destruction of *P. loureirii* is almost universal in the state of Tamilnadu forming a large chunk of Peninsular India. The southern districts of Madurai, Anna, Kamaraj, Tirunelveli, Salem and Periyar have many hill ranges with *P. loureirii*. Situated 80 km from the city of Madurai, the Palni Hills alone account for several thousand acres of forest land inhabited by this species. The Sirumalai Hills in Anna District also harbor vast stretches of slopes with *P. loureirii*. On the Eastern Ghats, the Kolli Hills (Salem Dist.), Javadhu Hills (N. Arcot Dist.) and the Tirupathi Hills (Andhra Pradesh) ranges show many natural populations of this species.

In all the districts mentioned above, the broom industry based on foliage of *P. loureirii* thrives prosperously. The technique of making brooms is simple. The leaves are cut while still tender and pliable, half way along the rachis, and left to dry in the sun. The feathery terminal parts are

ted together by their rachises after grooming the laminal strips. This is followed by trimming the tips with a flat sachet to the required length (Fig. 2). The brooms last for 3 or 4 months under ordinary domestic use. However, if used as a brush for white-washing masonry structures, the wear and tear are considerable and the broom may last only a few days. After its useful life the brooms may be burned as fuel. When dried, the dark green foliage turns pale green and then pale khaki in color. The lacy texture of the pliable laminal parts of the leaflets is admirably suited for broom making. The bunches of pruned leaflets are tied with fibers prepared from the petiole of palmyrah leaves. The binding of the pruned leaves is practiced as an art by broom makers.

The leaf gatherers come from various villages dotting the hills and adjoining plains. Boys, girls, women and men of all ages are engaged in leaf gathering for the broom industry (Fig. 1). The cut leaves are packed up in small bundles and carried off as headloads to villages where they are pruned and left to dry in the sun. Often, large collections of leaf material are seen left drying in the sun around farm houses. The finished product is transported on all available modes: headloads, bullock carts, bicycle or lorry (Fig. 3). Headload carriers may be seen in "caravans" leading to weekly village markets known as "shandies." The price of a broom varies from a rupee to one rupee and fifty cents. To make one broom nearly 10 leaves are destroyed. At this rate, to make a cartload of brooms 1 or 2 acres of hillsides would be denuded. In the absence of monitoring agencies, the total volume of business in brooms remains unknown though formidable. However, there is reason to believe that this cottage industry involves transactions to the tune of several millions of rupees for the entire state. The broom plant, *Aristida cetacea* Retz., a grass (Poaceae), was so overexploited in the past 50 years that it has become a rarity. A

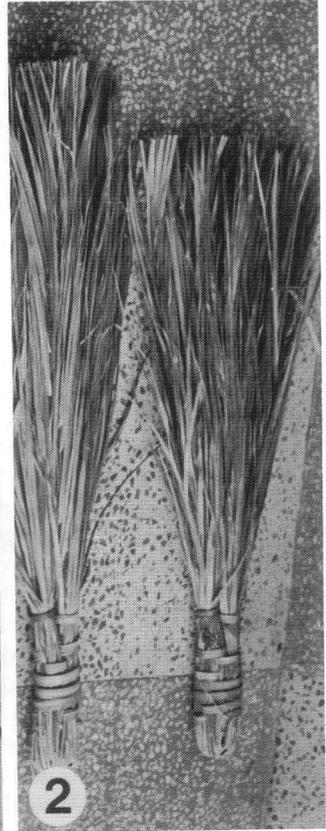
broom of this species would cost more than that made of *P. louterii* leaves. Another type of broom made from coconut leaflet midribs is also a commodity of commercial value. However, this is not used for the cleaning of fine dusty floors in houses but it is reserved for coarse work. It is gratifying, however, that coconut leaves are available in sufficient quantities for the community's requirement. It must also be mentioned that only yellowing, old leaves falling from trees are used in this case. The damage done to *P. loureirii* is of another kind causing destruction of the species. In this case, leaves are cut at the prime of their functional life.

Allotment of hillside lands for cultivation of crops and vegetables appears to be much more devastating in regard to *P. loureirii* than other native species. We had many occasions to watch the practice of burning of the vegetation on hillsides for cultivation. The tongues of flames raging on hillsides are seen several miles away during dark nights. Whole formations of *P. loureirii* become charred (Figs. 4,6,7) as the undergrowth and grass are set on fire. It is a pathetic sight to watch the green clusters of *P. loureirii* get scorched to black remains. Often the charred trunks provide charcoal for the traditional household oven. Once destroyed by fire the species never seems to come back as the soil is used extensively for raising cash crops.

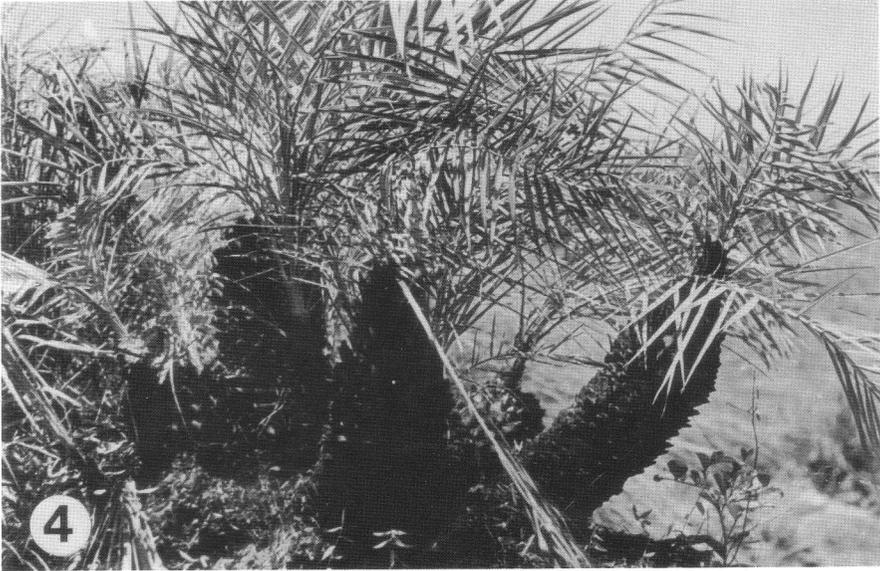
On the Pulney and Sirumalai Hills an ancient, anthropologically interesting tribal people (Paliar) live as nomads in the forests. Cabbage of *P. loureirii* is one of their favorite dishes.\* Surprisingly they do not appear to have caused severe damage to the species over hundreds of years of their existence. Inquiries show that these tribes extract cabbage from the oldest trunk in a clump but do not disturb the root stock or the offshoots. Extraction from 2 or 3

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\* Medicinal values are attributed to the cabbage of *P. loureirii* and because of this plant collectors are attracted to this species.



1. A village boy with a bunch of leaves of *Phoenix loureirii* for making brooms. 2. Brooms made of pruned leaves of *P. loureirii*. 3. A village trader with a bundle of brooms on a bicycle.



4. A stand of *P. loureirii* showing charred trunks, the effect of burning vegetation on hills for cultivation. 5. A view of the natural habitat of *P. loureirii*. The palms are almost hidden among grasses.

shoots is sufficient to meet the requirements of a family of four tribal people for a day. They also collect honey, tubers of *Dioscorea*, and wild fruits to supplement their diet. The ripe fruits of *P. loureirii*

are also eaten as a delicacy. It is said that the tribal population has remained small over the years without modern methods of population control.

The recent large scale planting of Euca-



6. Another view of burned landscape with a few scorched plants of *P. loureirii*. 7. After complete burning, charred stumps of *P. loureirii* are seen among remains of other vegetation reduced to ashes.

lyptus for paper pulp industry also adversely affects the natural formations of *P. loureirii*. As the *Eucalyptus* trees grow, the surrounding areas become denuded. Grasses and weeds disappear; the mosses,

ferns and liverworts dry up exposing the clumps of *P. loureirii*. Ultimately, the latter are also eliminated. This is an instance showing the deleterious effect of exotics on natural populations.

As a result of partial burning, abnormal shoots are produced on charred specimens of *P. loureirii*. It remains to be studied how permanent these effects are going to be in the future. Stunted palms which survive the blaze are ugly and malformed.

Destruction of *Phoenix loureirii* and grass cover leads to loss of water retention and soil erosion. In August 1986 we observed water trickling from natural slopes with undisturbed grass and *P. loureirii*, whereas the slopes prepared for cultivation were very dry. This was a live demonstration of ecological damage. The fibrous roots of *P. loureirii* not only hold the rocks and soils, preventing landslides, but also help in the retention of humus along with grass roots, mosses and lichens. In the interspaces between *P. loureirii* clumps, a number of herbaceous species, bryophytes and ferns thrive very well. All these species are destroyed by burning.

At the present rate of destruction the species might become very rare by the turn of the century. It is also natural to expect its total extinction in many parts of the peninsula in another decade. The reasons for this foreboding are not difficult to seek. The one single factor against this species is that no one has ever thought of replanting it or restoring the balance of nature while demand for cultivatable land is

increasing. The conservationists seem to be unaware of the problem. Press and media in the state are not even concerned with such marked destruction of a species which should be preserved for all time. In the picturesque Palni Hills, one more important component (*P. loureirii*) of the natural ecosystem is being destroyed, paving the way for further deterioration. *Bentinckia condapanna*, a beautiful endemic palm, became extinct in this area just a decade back. It may be mentioned in parenthesis, that another species, *P. farinifera*, occurring on the plains has been very considerably reduced by overexploitation of its stem and stems of the palmyra palm, *Borassus flabellifer*, have also been exploited for brick kilns as already highlighted by Davis (1985). Devoid of its vital component, *P. loureirii*, the future of grass ecosystems of the Western Ghats looks bleak.

#### LITERATURE CITED

- GAMBLE, J. S. 1967. Flora of the presidency of Madras. 2nd reprinted edition. Botanical Survey of India, Calcutta, 3 volumes.
- DAVIS, T. A. 1985. Palmyra palm, the state tree of Tamil Nadu is on the verge of extinction. Save this very useful tree. Environmental Awareness 8: 95-106.

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### CLASSIFIED

WANTED. Seeds, seedlings, and plants of *Nannorrhops ritchiana*, *Syagrus romanzoffiana* × *Butia*. Also a good copy of "Cultivated Palms," American Horticultural Society, 1960. DOUGLAS KEENE, 1790 North Clara Avenue, DeLand, FL 32720. 904-736-1211.