

**PRELIMINARY REPORT ON THE STUDIES OF  
TROPICAL AND SUBTROPICAL PLANTS,**

(No. 1)

***ALOCASIA MACRORRHIZA*,  
SCHOTT, IN TAIWAN**

by

SHUN-CHING LEE

**INTRODUCTION**

*Alocasia*, Neck. a genus of the family Araceae, contains about 60 species of tropical Asia and the islands. They are mostly of India-Malayan origin. Among them only two species are found in Taiwan, namely *A. macrorrhiza* (L.) Schott, and *A. cucullata*, Schott. The former is distributed throughout the entire island of Formosa and growing into huge sized rootstocks with more or less fleshy and juicy, semi-woody, ascending, cylindrical stems and the latter is of the same nature but much smaller in size and distributed only in northern part of Taiwan and sometimes is cultivated by the city people for ornamental purpose. The large sized rootstock species, whose species name "macrorrhiza" designated, possesses an enormous economic potential value in Taiwan, being not paid any attention to and neglected entirely by the people, contrarily it is regarded as a "devil weed" of the forest, so instead of protect and cultivate it people usually try to get rid of it from the forest lands. Its economic values may be summarized into two aspects namely: the direct value in its fast growth in large quantity of milky starchy production; and its indirect values of its capability of utilizing the sterile rocky land, which would not grow any other vegetation and of serving as very good cover vegetation for soil and water conservation. For these reasons this plant in Taiwan is calling for our special attention and is worth of making special studies.

**BOTANICAL CHARACTERS**

The plant is herbaceous or semi-woody, with stout ascending rootstock or cylindrical stem, and containing rich milky juice. Rootstocks are extensively creeping and then ascending from 1-3 meters high and as thick as an elephant-leg of 20-30 centimeters in diameter; and annularly scarred; Leaves large, very stoutly petioled, from 50 to 150 centimeters long and 20-80 cm. broad, peltate, broadly and sagittately ovate; Leaf margins subundulate; the basal lobes blunt or rounded incurved; sinus very narrow; midrib very stout penniveined and with 2 rather strong basal veins descending into basal lobes; Spathe 2 or more together, stoutly peduncled, 20-40 cm. long, somewhat odorous; Spadix nearly as long as spathe.

## DISTRIBUTION

*Alocasia macrorrhiza*, Schott, is originated from India and distributed through all the southern islands into Formosa. It spreads the entire island from the north end to the southern tip of Formosa and altitudinally at all the elevations from 0 up to 2,000 meters above the sea level and is found practically in all the wet, rocky, and shade places, especially abundant in creek beds and on stream and river banks under heavy shade. Nine out of ten cases where there is an open hole of the canopy of the dense tropical or subtropical forest, the forest floor is occupied by this plant, See fig. 1, 2, 3, and 4.

So its distribution extends into very wide ranges longitudinally as well as altitudinally in both sterile and fertile habitat. Moisture seems to be the controlling factor of its distribution, temperature is less, and light is the least effective factor, because they can grow very thriftily under heavy shade of dense forests, even in deep canyons, where they are receiving practically no direct sunlight.

### THE PRESENT UTILITY OF THIS PLANT IN TAIWAN

The present usages of this plant by the natives in Taiwan are 3:

(1) Using their large leaves for packing vegetables, meat, fishes, lobsters, shrimps, etc. in the markets, which would consume 2-5 car-loads every day in cities of above 100,000 population and a few hundred pounds in towns and villeges. In Taipei, for instance, with a population of about 400,000, being estimated that each day will consume about 5 car-loads in different market of the city.

(2) Using some of their rootstocks for feeding hogs by the natives, but due to have an acrid taste the hogs do not like them very well, so only a very small percentage of these rootstocks are utilized by minority of farmers in the country.

(3) Using the juice of the rootstocks for medical purposes for curing the wounds and the epidermal diseases by the aboriginal people and by the country folks utilizing their antibiotic properties for curing poisonous troubles.

### THE POTENTIAL ECONOMIC VALUE OF ALOCASIA MACORRHIZA, SCHOTT

The great economic value of this plant has been overlooked and neglected is that its rapidity of growth in huge cylindrical rootstocks and its durability in growing on sterile rocky habitat, where practically no other plants can grow. Thus thousands of hectares of waste lands in Taiwan may be utilized for production of forage or for human food, if this plant is taken care of and put in a proper condition to develop. Its rapid growth of the giant rootstocks has been estimated as follows: the average size of an ascending rootstock of a 3-year growth plant to be 15 cm. thick and 1.2 meters tall, weighing about 15 kilograms fresh. Each hectare of forest land can grow at least 15,000 stocks if you cut all the other undergrowths out of the forest floor and permit this plant to develop freely under the forest trees. Then  $15,000 \times 15 = 225,000$  kilograms fresh materials and divide it by 3 years, you would get 75,000 kilgrs. per

hectare per year. The total government forest land in Taiwan is about 1,500,000 hectares and practically all of them are suitable for growing this plant as undergrowth of the forests. If we take just 10% of the forest lands and put them under special management for producing *Alocasia* carbohydrate stuffs for forage or for human food, you would get at least ten billions kgrs. of fresh raw materials annually without spending much effort and investment. Besides its direct value in producing such an enormous amount of carbohydrate stuffs and a large quantity of large leaves sold for packing meats, vegetables, etc. in the markets, this plant also has the following indirect values:

1. It will serve as a very good ground mantle to protect the soil from washing away and to keep the banks of the rivers and creeks from turning away by torrential waters.

2. Due to its great tolerant ability to shade and to sterile soils it will utilize the land for production otherwise being wasted.

3. Due to its thrifty habit of growth it will keep down all the devil weeds from thriving on the forest floor and this will enable the forest trees developing well.

4. It needs much less mineral element and water than the other shrubs and weeds from the soil, so it will minimize the competition of soil water and soil nutrition with the forest trees and thus indirectly it increases the production of the forest trees.

5. Due to its dense stocked habit of growth and to its large and thick peltate leaves arranging in better closed mosaic, it will reduce the loss of water from the surface soil evaporation, consequently it protects the forest trees from drought during the dry season in drier places.

### CONCLUSIONS

From the foregoing studies we may readily see the direct value in producing an enormous amount of forage materials and a large quantity of leaves and the indirect value in soil and water conservation and in management of the forest in Taiwan. Not much extra technical effort and financial investment are required to carry out the problem. The only important study of a chemical analysis of the plant constitution is required to find out an easier and a cheaper way to remove its acrid principles by means of leaching or treating with other chemicals. A further study about this point is expected soon.



Fig. 1. *Alocasia macrorrhiza*, Schott, thriving in rocky creek bed under dense shade of *Cryptomeria* forest, at elev. of 1,500 meters above sea level, in Chuo-Shan, Nantao Hsian.



Fig. 2. *Alocasia macrorrhiza*, Schott, being striving to grow under heavy shady, and crowdy bushes, a narrow strip in the middle of the photo, in a creek bed, at sea level elevation near Hung-Chuen.

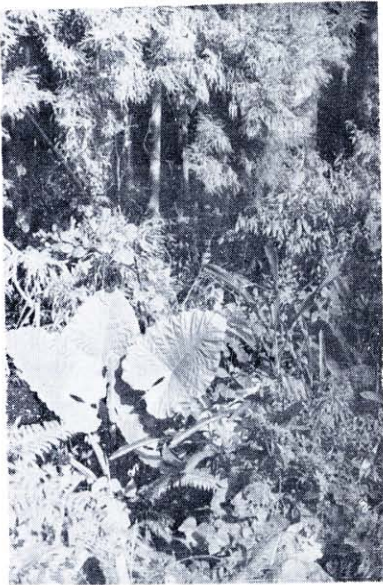


Fig. 3. *Alocasia macrorrhiza*, Schott, a single plant showing the leaf shape, veins, sinus, and margins, growing under heavy shade of *Dendrocalamus latiflorus*, Munro. In dense subtropical forest of Nantao, at elevation of 1,000 M



Fig. 4. *Alocasia macrorrhiza*, Schott, growing on rocky bed under dense bamboo forest, in an open hole of the canopy place, competing with *Alpinia formosana*, Schum. about the sunlight spot behind them, in the subtropical forest of northern part of Taiwan, at an elev. of 800 meters above the sea level.