

## NYMPHAEA STELLATA (WATER LILY) AS AN ECONOMIC CROP

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### INTRODUCTION

**N**YMPHAEA *stellata* willd, well known in the vernacular as "Manel" is a species of Water Lily, closely related to *Victoria regia* Lindl. (English Giant Water Lily) which thrives in the river Amazon and to *Nelumbium speciosum* willd. (English Sacred Lotus, Sinhalese "Nelun"), the floral emblem of this country, so commonly met with in Ceylon marshes. These belong to an aquatic family of plants, collectively known as the Nymphaeaceae.

Several related forms of *N. stellata* occur in this country and are erroneously called "Manel"; those who look for the true "Manel" should guard themselves against the following, viz.:— *N. neuchali* Burm (Sinhalese "Olu" "Et-olu") whose pale pink to bright crimson flowers open after dusk; *N. lutea* L., with its showy yellow flowers and *N. sulphurea* Gilg. whose blooms are of a deep yellow colour.

### DESCRIPTION AND HABIT

Unlike the Giant Water Lily or the Sacred Lotus, "Manel" is a humble aquatic herb found flourishing in still waters, deriving sustenance from a miry sub-stratum. It thrives best in open conditions and bright sun-light but grows well under partial shade.

Once established it is often difficult of eradication as small rootstocks may remain in the mud and put out shoots after a period of quiescence. The rootstock or rhizome, which is very rich in stored starch, is short, erect, ovoid and is enclosed in a thin covering which turns horny on drying; this covering is in turn felted over with a cottony substance, specially at the apical end which is somewhat depressed. From the top

of the rootstock which remains embedded in the mud, long, slender, spongy petioles radiate upwards, and spread out to the sunlight at the water level, broad, glabrous, floating leaf-blades varying from 4-8 inches in diameter.

Beautiful, solitary, coral pinkish mauve, sweet-scented flowers of about 3-6 inches in diameter, are borne on 6-12 inches long, erect, lacunar peduncles. There is a gradual transition from sepals to petals and petals to stamens, which are numerous. Floral buds emerge perpendicularly from the surface of the water, open out gradually with the rising of the sun and begin to close up after mid-day, to spread out again on the following morning. This rhythmic process goes on for about a week. Meanwhile the flower fades through a pale violet to a dull blue. As the flower ages the peduncle loses its erectile power and the blossom droops, gradually sinks under water and matures into a globular fruit, full of longitudinally striate seeds. It is interesting to note that this phenomenon of the opening and closing of floral parts persists even in cut flowers, if placed in a receptacle with water, while the fragrance lingers with the faded flower.

#### UTILITY OF THE PLANT

As a medicinal herb this is much esteemed in Ayurveda, the whole plant, especially the rhizome, being employed in curative preparations for diseases of the head and eyes, excess of bile, diarrhoea, dysentery and urinary afflictions. Seeds are chiefly used in decoctions for correcting uteral disorders.

Unlike most roots or tuberous vegetables the edible rhizomes of this plant keep fresh over a long period. The rhizomes boiled or prepared as a curry are very palatable and are as good as, if not better than, any of the Colocasias (Sinhalese "Kiri-ala" var.) or Dioscorea yams (Sinhalese "Vel-ala" var.) sold in the market, but it does not reach the table owing to its scarcity and prohibitive price. It is only found in the medicinal herb depots or with those who cultivate the crop, but never for sale as a vegetable in the markets. The tender leaves and flower peduncles are also prepared into curries.

Rhizomes could easily be sold to the Colombo herb-depots at 50 cents per lb., while dried stamens fetch over Re. 1.00

per lb. "Manel" flowers are historically famed as the choicest floral offering that could be made at a Buddhist shrine and a fresh flower would easily be sold for a cent, often realizing five cents on festival days. Cut flowers keep fresh from three to five days and could vie with any other cultivated variety for simplicity, beauty and fragrance.

#### STATUS OF THE CROP

Apart from its occurrence under natural conditions as mentioned elsewhere, this plant is grown in small quantities by native physicians, while it is sometimes met with in ponds in flower gardens. Its cultivation as a remunerative crop or as a plant of any food value is hitherto unknown to many of us.

With the launching of the "Grow more food crops" campaign in the Kegalle range, this source of food supply was resuscitated from a state of neglect, in that several villagers have taken to intensive cultivation of this crop; such cultivation is invariably carried out in sections of paddy fields left uncultivated during the Yala season (South-West monsoon). There is hardly any village in this country where there are no ponds; these water holes instead of being allowed to idle, supporting rank vegetation and harbouring myriads of malarial mosquitoes, could be rightly utilized in the cultivation of this beneficial plant.

#### SELECTION AND TREATMENT OF SEED MATERIAL

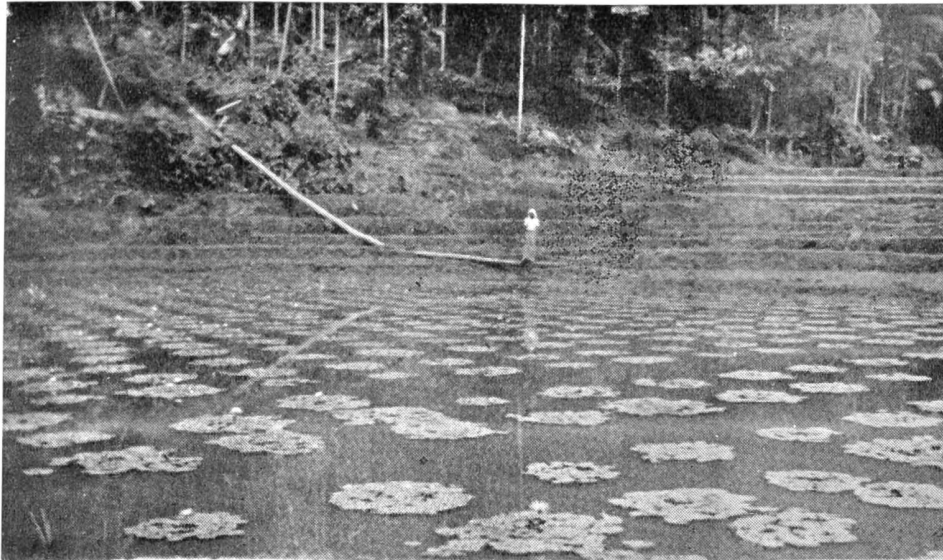
Small well-formed rootstocks are used for raising a crop. Only mature ones of last year's growth should be selected for this purpose. Before storing away the rootstocks for next year's propagation they should be dried in the open air, packed in dry earth, paddy husks or coir dust and stored away in a cool place until required. Five to ten days before planting, these rootstocks should be taken out from the packing and sprouted. This preliminary treatment which nearly corresponds to the raising of seedlings from seeds in nurseries is best done in a shallow tray spread with puddled mud, one inch deep. The rootstocks should be embedded in the mud, lying side by side with the apical end facing upwards and flush with the surface. Exposure to the morning sun, for a couple of hours everyday, hastens sprouting and tends to develop vigorous plants. Care

should be taken to prevent drying out of the mud in the trays, and this could best be assured by always maintaining a thin sheet of water over the already settled puddle. This method is inconvenient where a large nursery is needed in which case working under the same principles, rootstocks could be sprouted in a puddle section of the paddy field.

### CULTIVATION

*Nymphaea stellata* responds readily to good cultivation and manuring. The best season to grow this crop is from March to April. Ponds or paddy fields with deep, soft mud should be selected. After the harvest of Maha paddy, which is usually accomplished by the middle of February, the fields should be ploughed or worked deep with mammoties, turning in the weeds and stubble of the last crop. Green manure in the form of branch loppings or any rank vegetation should be collected spread over the field and trampled down; this will increase the humic content of the mud, especially where this is wanting. The writer is aware of several cultivators who add cow-dung, dry-fish refuse collected from boutiques, and even fertilizers in the form of bone-meal. By such attention, they not only get good harvests from the crop in question, but increased yields are obtained from the paddy crop during the following season, due to the residual effect of the manure in the soil. After the application of manure, water should be let into the field and allowed to remain from 3 to 4 weeks, during which time the organic matter has partly decomposed. At the end of this interval the field should be thoroughly puddled and allowed to settle down.

According to the writer's experience, planting done in rows 3 feet apart, with 2 feet to 3 feet in the row has given very satisfactory results. After about 2 to 3 days, when the turbid water has cleared, the sprouted rootstocks should be pressed down into the mud, good care being taken not to bury the young sprouted leaves. As the plants put on more leaves, more water should be led in, until a depth of 6 to 12 inches is maintained. It will be noticed that, as the water level rises, the petioles keep on extending and thus the leaves keep pace with the rising water surface and spread themselves out to the sunlight. Plants



*Top Figure :*

Field of Manel showing proper spacing of Plants

*Lower Figure :*

Manel crop in flower

begin to bloom about one month to one and half months from time of planting. Apart from the opening of scattered flowers which occurs throughout the life of the crop, flowering takes place in three or four distinct flushes, and round about the Wesak festival in the month of May these crops are at their best, resembling a beautiful pattern of pinkish hue worked on a bright green carpet. Each plant bears from 15 to 25 flowers during its life time. With the close of the flowering season 5 to 10 stolon-like processes radiate from the top and sides of the mother rootstocks and before assuming an inch in length, each growing point swells out into a globular growth which later becomes a daughter rootstock. The young rootstocks are light-brown in colour, thin-skinned and to all appearances resemble very much the fruits of *Nephelium longana* (English Logan, Sinhalese "Mora.") As the young rootstocks start to grow in size and to mature, the large leaves die out, while a new set of very small leaves (each about 1/20th of the size of normal leaves) appear crowded together at the surface of the water. This dwarfing of leaves signifies the maturity of the crop.

#### SEED RATE AND YIELDS

Assuming the planting distance as 3 feet by 3 feet, an acre will need 4840 seed rhizomes. As about 20 rhizomes go to the pound, roughly 2 cwt. of seed material is needed to plant up an acre. A normal crop gives a return of about 10 fold which works out to a yield of 20 cwt.

#### PESTS

Land crabs and tortoises are the greatest enemies of this crop, in that crabs nibble off the sprouts of young plants, while tortoises feed on the young leaves. Considerable damage is often done by a caterpillar pest, identified as the larvae of *Nymphula crisonalis*. These caterpillars are semi-aquatic in habit and feed on leaves and flowers. Instead of spiracles which are characteristic in normal caterpillars these larvae possess numerous thread-like processes along the body, which function somewhat like the gills of aquatic organisms, and enable them to absorb oxygen from the water, whilst living under such conditions. The larvae pupate within a doubled-up

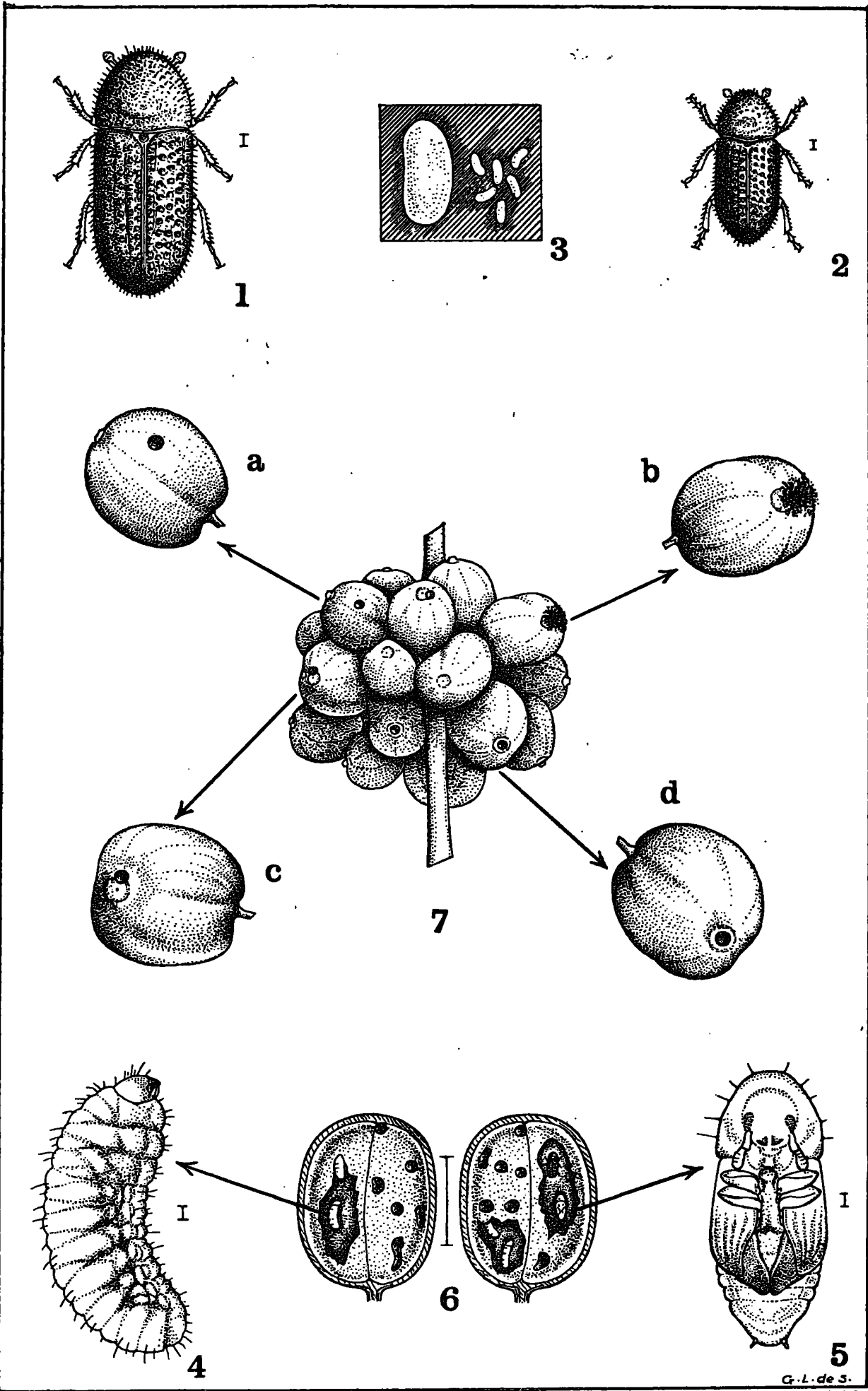
section of a leaf margin. The writer is aware of a whole crop of *Nymphaea stellata* destroyed within the course of a week and on examination found the skeletons of leaves teeming with caterpillars. Fortunately for the cultivator the pest had made its appearance just before harvesting of the crop.

#### REFERENCE

*Tropical Gardening and Planting*.—H. F. MacMillan.

#### ACKNOWLEDGMENT

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