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Pharmacognistical studies on seeds of *Nymphaea caerulea* Sav

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ABSTRACT

Nymphaea caerulea sav is distributed from Egypt, India and throughout south-east Australia. The seeds are edible and can be eaten raw or after parching; prescribed to treat the liver, to remedy constipation and to regulate the urine. The present work attempts to summarize the morphological and microscopic character, etc. of the seeds.

Keywords: *Nymphaea caerulea* sav, seeds, Pharmacognistical

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INTRODUCTION

Nymphaea caerulea sav is distributed from Egypt, India and throughout south-east Australia, both wild and cultivated and found in ponds, ditches and lakes up to 500m altitude. The chemical constituent reported from this plant belongs to different classes such as alkaloids, tannins, phenolic acids and flavonoids. All parts of the plant are eaten in times of scarcity the starchy rhizomes are eaten raw or boiled; they are sometimes baked. The seeds are edible and can be eaten raw or after parching; prescribed to treat the liver, to remedy constipation and to regulate the urine. Blue lotus was also used in Ancient Egypt as a key to good health, Sex and re-birth. An aphrodisiac for men and women as well as a general remedy for all illness

MATERIALS AND METHODS

Most care was taken to select healthy plant and for normal organs. The required sample of Different organs were cut and removed from the plant and fixed in FAA (Formalin-5ml + Acetic acid -5ml + 70% Ethyl alcohol-90ml). After 24 hrs of fixing, the specimens were dehydrated with graded series of tertiary-butyl alcohol as per the schedule given by Sass, 1944.

Infiltration of the specimens was carried by gradual addition of paraffin wax (melting point 58-60 °C) until TBA solution attained super saturation. The specimens were cast into paraffin blocks

A. SECTIONING

The paraffin embedded specimens were section with the help of rotary Microtome. The thickness of the sections was 10-12 μm . De-waxing of the sections was by customary procedure Johansen (1940). The sections were stained with Toluidine blue as per the method published by O'Brien et al (1964). Since Toluidine blue is a polychromatic stain, the staining results were remarkably good; and some cytochemical reactions were also obtained.

The dye rendered pink color to the cellulose walls, blue to the lignified cells, dark green to suberin, violet to the mucilage, blue to the protein bodies etc. wherever necessary sections were also stained with safranin and Fast-green and I_2 – KI (for Starch). Powdered materials of different parts were cleared with NaOH and mounted in glycerine medium after staining. Different cell component were studied and measured.

B. PHOTOMICROGRAPHS

Microscopic descriptions of tissues are supplemented with micrographs wherever necessary. Photographs of different magnifications were taken with Nikon Labphot 2 Microscopic Unit. For normal observations bright field was used. For the study of crystals, starch grains and lignified cells, polarized light were employed. Since these structures have birefringent property under polarized light they appear bright against dark background. Magnifications of the figures are indicated by the scale-bars. Descriptive terms of the anatomical features are as given in the standard anatomy books.

MICROSCOPIC CHARACTERS

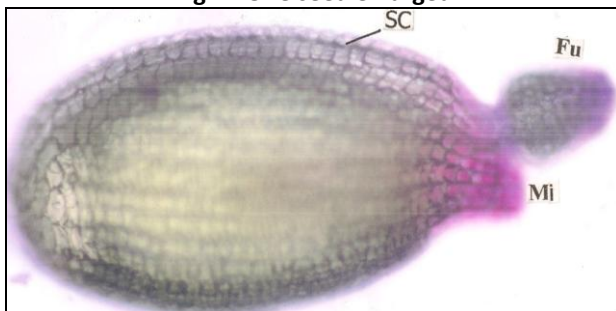
SEEDS

The seeds are elliptical, dark coloured with prominent micropyle and clube shaped fumicle. The surface of the seeds has reticulate. The surface of the seeds has reticulate thick endings . The seeds are 250 μm long and 150 μm wide.(fig.1)

FRUIT

- The fruit has many chambers divided by thick partitions. The pericarp is thick and fleshy. The pericarp is 650-800 μm thick. It has dense epidermal trichomes which are two or three celled uniseriate and unbranched. The trichomes strains dark due to tannin content. (fig.3)
- The mesocarp consists of small, compact thin walled parenchyma cells (Fig.4)
- The vascular bundles of equal size are distributed in a circle along the inner portion of the pericarp. The septa are 200 μm thick. It consists of soft, thin walled parenchyma cells.(fig.5)
- The septa become dilated into club shaped bodies towards the centre of the fruit and get fused with each other forming a central cavity, surrounded by ridges and furrows. The ridges have short, spindle shaped glandular trichomes (Fig.6).
- The seeds are surrounded and separated by septa. The septa are thick and consists of thin walled parenchyma cells.(fig.7)
- At the center of the cavity is seen a wide circular parenchymatous cylinder, which is central pillar of stigma. Numerous elliptical seeds are attached on the septa.(fig .8)
- Pollen (Fig.9-10) the pollen grains are circular with smooth exine and thin intine. The pollen grains are mixed with fertile and sterile grains. The fertile grains are larger and stain deeply while the sterile grains are smaller and stain lighter. The fertile pollen grains are 40 μm in diameter and the sterile ones are 25 - 30 μm wide.

Fig. 1. One seed enlarged



[Fu- Funicle; Mi- Micropyle; Sc- Seed coat]

Fig. 2. Seeds under low magnification

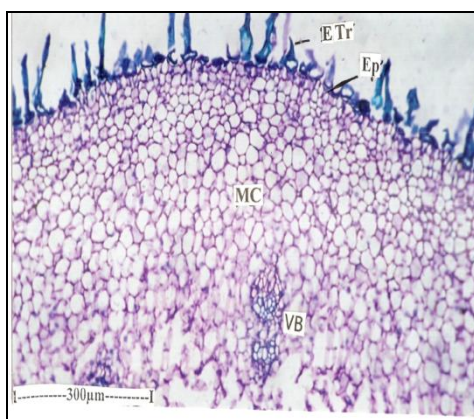


Fig .3. T.S.of fruit a sector enlarged



PC- Pericarp; Sd-seed; Sp-Septae; St- Stigma; Tr- Trichome; VB-Vascular bundle

Fig .4.T.S. of pericarp outer sector



Ep –Epidermis; Etr – Epidermal Trichome; MC –Mesocar

Fig. 5. T.S of Vascular Bundle with Ovary



Fig.6.T.S. of pericarp inner sector showing ridges & furrows

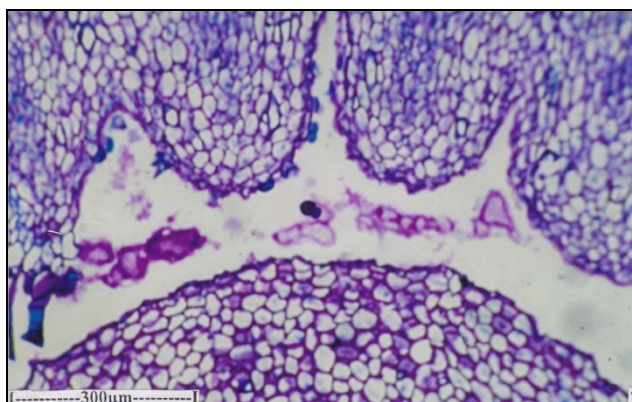


Fig.7.T.S of Seeds in between the septa



Sd- Seed; Sp- Septa; VB- Vascular bundle

Fig .8.T.S of Enlargement of Ovary

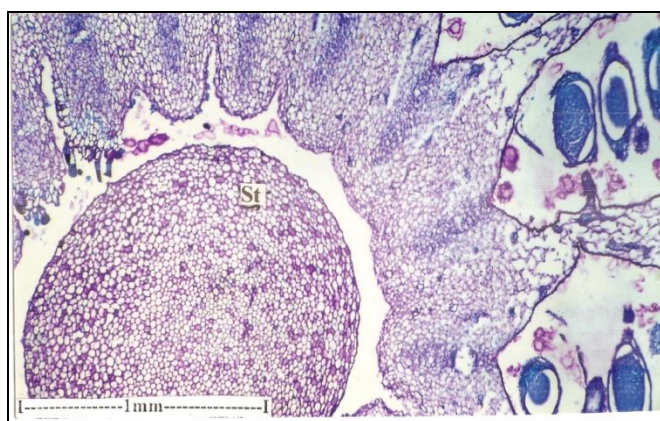


Fig. 9. Pollen grains under low magnification

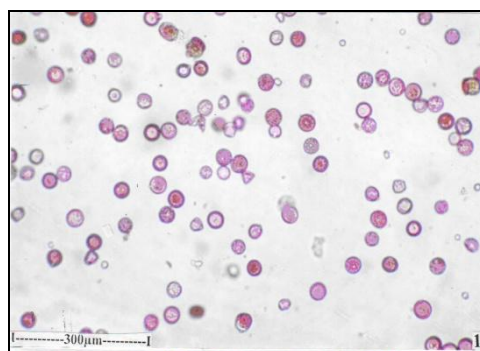
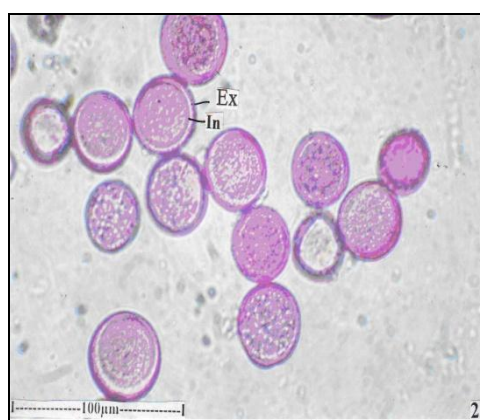


Fig. 10. Pollen grains under high magnification



[Ex- Exine; In- Intine]

RESULTS AND DISCUSSION

The macroscopic and microscopic details of the seeds of *Nymphaea caerulea* sav were investigated. The microscopical characteristic of seed shows the presence of thick and fleshy pericarp. The mesocarp consists of small compact thin walled parenchyma cells. The vascular

bundle are of equal in size and it is present along the inner portion of the pericarp. Seed is surrounded by a soft, thin walled parenchyma cell called septa. Numerous elliptical seeds are attached on the septa.

The powder contains pollen grains which include both fertile and sterile grains. The fertile grains are larger measuring 40 μm in diameter the sterile grains are 20 μm in diameter. The pollen grains consists of smooth extine and thin intine .Both entire and broken seeds are seen in the powder. The seeds are elliptical ovate and are 700 μm long and 450 μm thick.

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