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## Brahmi - A Promising Medicinal Herb

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### Abstract

Brahmi (*Bacopa monnieri*) has been used for centuries for a variety of purposes, including improving memory, alleviate anxiety and stress, treating epilepsy etc., It contains a principal chemical *bacosides* responsible for all these medicinal properties. The antioxidants protect against cell damage caused by potentially harmful molecules and fight against chronic diseases like heart disease, diabetes and certain cancers, attention deficit hyperactivity disorder (ADHD)- a neuro-disorder characterized by hyperactivity, impulsivity and inattentiveness. The plant can be grown in a wide variety of soils, but prefers soil with high water holding capacity. It has the ability to thrive in wet environment and soils rich in organic matter. Unlike cash crops, this plant can give potential yield with minimal agronomic management thus found remunerative.

### 1. Introduction

Brahmi (*Bacopa monnieri*) is a little creeping perennial with many short and oblong branches (Figure 1). Thick leaves are grouped on the stem opposite to each other, having small, light purple or white flowers with four to five petals. The plant is known to grow on wide ranging agro-climatic conditions with the ability to grow even in marshy, shallow water, moist and muddy coastlines. It is a popular aquarium plant because of its capacity to grow in water; it can even flourish in somewhat brackish circumstances. Brahmi is a remarkable plant in that, while being an aquatic plant, it can easily be grown in pots, in a garden under the shade or even in full sun if given enough water. It grows exceptionally well in poorly drained and waterlogged areas under sub-tropical conditions. The plants grow faster at high temperatures (33-40°C), humidity (65-80%) and cultivated as summer and rainy season crop. The crop is grown in parts of Punjab, Uttar Pradesh and West Bengal.

According to various phytochemical studies, the main chemical constituents of brahmi are the alkaloids brahmine, herpestine, nicotine, saponin, monierin and hersaponin. Bacosides A1, A2, A3, and B, bacogenins A1-A4, triterpene steroids, and bacosine. In addition to the Bacopa saponins A-F, three new triterpenoid

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glycosides, bacopasides III–V were discovered. Saponins, the main active constituents of brahmi extracts, are responsible for the majority of its pharmacological actions.



Figure 1: Brahmi plant

## 2. Health Benefits

It is an ancient and traditional medicinal plant that is used to relieve stress and anxiety. It also aids in brain functions such as memory boosting. However, the main use of brahmi is to treat epilepsy. Brahmi has anti-oxidative properties that aid in the treatment of many health conditions such as heart disease, diabetes and cancer.

## 3. Cultivation Practices of Brahmi

### 3.1. Climate and soil, land preparation

Brahmi requires a warm-moist climate with temperature range of 33–40°C. It grows well in sub-tropical areas. Loam to clay loam soil is ideal for its cultivation. It requires humidity about 60–80%, however longer sunshine hours is important for its better production. The field should be thoroughly ploughed and weed-free. It requires fine tillage before sowing. 2–3 ploughing followed by harrowing are needed to make soil friable as shown in the Figure 2.



Figure 2: Land preparation

### 3.2. Planting time

Land should be ready before onset of planting. Planting should be done just after the onset of monsoon or rainy season.

### 3.3. Planting materials and crop geometry

The plant is propagated by soft herbaceous cuttings. For mass propagation, whole plant is cut into small pieces and planting is done directly in the sunken beds (Shirole et al., 2005). The stem cuttings of about 10–15 cm long should be planted at a spacing of 45–50 cm row to row and plant to plant distance i.e. in square crop geometry (Figure 3 and 4). Soil must remain moist while planting. Each with a few leaves and nodes are ideal and establish easily. The cuttings are transplanted preferably in wet soil. Flood irrigation is provided quickly just after planting. The cuttings should be transplanted in the month of June–July to get maximum herbage yield.



Figure 3: Brahmi plant cutting



Figure 4: Planting of cuttings in the puddled field



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### 3.4. Nutrient requirement

The plant has good foliage growth. At the time of land preparation, 4-5 tonnes of compost per ha is sufficient to meet its nutrient demand. Application of fertilizer @ 60-40-40 kg N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O ha<sup>-1</sup> may give potential yield; however, use of organic matters such as farm yard manure, vermi-compost and green manure are always more effective as these supplies both macro and micronutrients in addition to improving soil physio-chemical condition (Singh et al., 2007) (Figure 5). Bio-pesticides can be used to combat disease and pest infestation. In case of fertilizer application, 50% nitrogen and full phosphorous and potassium should be applied as basal and rest of nitrogen in two splits after 30 DAP and 60 DAP. Foliar spray of sea-weed extract @ 0.2-0.3% or Panchagavya @ 3% at active growing stage (preferably after 60 DAP) was found to be effective.



**Figure 5: Application of nutrients in the Brahmi field**

### 3.5. Water loving behavior and water management

Adequate soil moisture is essential for plant survival and growth like other crops. Interestingly, even the stagnation of excess water for shorter period during the monsoon season has negligible effect on its growth and development. It has been found that excess soil moisture promotes plant growth. It causes the plant to grow more quickly. It has been discovered that plots with stagnant water grow faster than other plots, even when the same amount of nutrients and management techniques are used (Phrompittayarat et al., 2011).

The soil is preferably kept moist, throughout the growth period. Even, it can tolerate 2-3 cm standing water during a certain period of growing season (Figure 6). Irrigation could be done either weekly or at 10-15 days intervals, depending on the type of soils and availability of water to maintain constant moisture in soil. One flooding irrigation before sowing is required for successful establishment of plant cuttings. It has been observed that



**Figure 6: Flood irrigation in the field**

medicinal herbs required more water as compared to other crop mainly due to longer growing season. However consumptive use of water was tremendously influenced by the irrigation schedule.

### 3.6. Weed management

The first step in weed control is to keep the weeds at a manageable level (Baruah et al., 2014). Plants completely suppress weeds 30-35 days after planting. To check for seasonal weeds in the monsoon, 2-3 manual weedings are required at approximately 20-day intervals as shown in the Figure 7. Herbicides are generally not recommended.



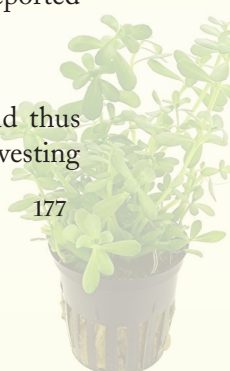
**Figure 7: Plants completely suppress weeds in the field**

### 3.7. Disease and pest management

So far, no pests, insects, or pathogens have been reported to have a significant impact on the crop.

### 3.8. Harvesting and yield

This medicinal plant is perennial in nature and thus periodic harvesting is done (Figure 8). First harvesting





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can be done after 3-4 months of planting, subsequent harvesting has to be done at 1.5-2.0 months interval depending on the biomass production. On an average 6-8 t ha<sup>-1</sup> yield (fresh biomass) can be obtained.



Figure 8: Harvesting of the plant

### 4. Economic Returns

The total cost of cultivation is approximately Rs. 45,000-50,000 ha<sup>-1</sup>. The plant biomass is sold both as live and dry as well. The dry herb is sold @ Rs. 40-50 kg<sup>-1</sup>. Thus, farmers can achieve a net profit of Rs. 1.6-2.0 lakhs ha<sup>-1</sup>.

### 5. Conclusion

Brahmi is one of the most promising medicinal herbs. As the plant does not need much attention on the cultivation practices except irrigation management, so its cost per unit production is less. Due to its principal chemicals used in combating various health issues, it has high industrial demand. Thus, the farmers may fetch high market value.

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