Physiological parameters of mint (*Mentha* spp.) under different shade conditions

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ABSTRACT

A field experiment was conducted at the Instructional Farm, College of Agriculture, Vellayani, Thiruvananthapuram, Kerala during the period from 2003-2004 to evaluate fifteen accessions of Japanese mint (*Mentha arvensis* L.), pepper mint (*Mentha piperita* L.) and spear mint (*Mentha spicata* L.) under each shade conditions (Open, 25 and 50 per cent shade). Peppermint recorded highest leaf area index (0.401,0.627 and 0.366 respectively), net assimilation rate (0.012,0.025 and 0.024 gm^{-2} day^{-1} respectively), spear mint recorded highest relative growth rate (0.28,0.031 and 0.027 gm^{-2} day^{-1} respectively) and absolute growth rate (0.023,0.020 and 0.017 gm day^{-1} respectively) under all the shades 180 days after planting. Among the three species pepper mint was better under all the condition. Under three different shades leaf area index (0.405) and relative growth rate (0.032 gm^{-2} day^{-1}) were highest under 25 per cent shade condition and absolute growth rate (0.035 gm day^{-1}) maximum under 50 per cent shade 180 days after planting. Among the three shades 25 per cent was better for mint cultivation. S_3A_5 (0.025) recorded highest net assimilation under open condition, S_2A_5 (0.034) recorded highest value under 25 per cent shade.

Key words: Different shades, Leaf area index, Net assimilation rate, Relative growth rate, Absolute growth rate

Mint is an important spice and medicinal herb. India is the largest producer and exporter of mint oil and contributes about 80 per cent of total world production. Mints are cultivated in USA, South European countries and Latin American countries. In India, at present Japanese mint occupies about 1.34 lakh hectares with an annual production of 12,000 tonnes and export of about 8000 tonnes of mint oil Kumar *et al.* (2004). It is mainly cultivated in the states of Punjab, Uttar Pradesh, Haryana and some parts of Tamilnadu. Mint is a crop of temperate and sub temperate climate but in India it is cultivated in humid tropics. Detailed study of physiological parameter under different shade levels was not under taken. Hence, the present study was carried out to find the influence of different shade levels on physiological parameters of Mint (*Mentha* sp.).

MATERIALS AND METHODS

The field experiment was conducted at the Instructional Farm, College of Agriculture, Vellayani, Thiruvananthapuram, Kerala during the year 2003-2004. The experiment was laid out in a Factorial Randomized Block Design (FRBD) with three replications. Suckers and stem cuttings of each of (S_1) Japanese mint (*Mentha arvensis* L.), (S_2) pepper mint (*Mentha piperita* L.) and (S_3) spear mint (*Mentha spicata* L.) accessions were rooted in the polythene bags filled with potting mixture to get uniform planting materials. Details of fifteen accessions of mint (*Mentha* sp.) collected for the study are presented in Table 1. The land was thoroughly prepared by digging and leveling. Ridges and furrows were made at 45 cm apart. Rooted cuttings were planted at 10 cm spacing along the ridges. High Density Poly Ethylene (HDPE) shade nets of appropriate mesh size were used for providing the required shade requirement of 25 per cent and 50 per cent. The three species were also grown in the adjacent open area. Observations on physiological parameters viz., Leaf area index (LAI), Net assimilation rate (NAR), Relative growth rate (RGR) and Absolute growth rate (AGR) under various shade levels were recorded from 60,120 and 180 days after planting (DAP). Leaf area was calculated by tracing the area of leaf on a graph sheet and leaf area index (LAI) was worked out as per the method suggested by William (1946). The formula given by Buttery (1970) was followed by calculating the Net assimilation rate (NAR). Relative growth rate was worked out using the formula of Blackman (1919). Absolute growth rate (AGR) given a formula of daily growth rate. AGR was worked out the formula suggested by Briggs *et al.* (1920) and expressed as gm $day^{-1.}$ Observations of plant selected at random from each replication and the average values worked out.