

EFFECT OF LIGHT INTENSITY ON THE MORPHO-PHYSIOLOGICAL PARAMETERS AND YIELD OF THREE SELECTED CUCURBITS

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Extended Summary

Vegetables are not produced evenly throughout the year in Bangladesh. About 35% of the vegetables are produced in summer season and the rest in the winter season (Rashid, 1999). Cloudy sky, low light intensity, excess rainfall etc. are the major problems for vegetables production in summer season. Summer vegetables are traditionally grown in homestead and its surroundings beneath the fruit and timber trees. There are about 19.4 million homesteads in Bangladesh which comprises about 0.45 million hectares of land (BBS, 2004). Most of the vegetables produced and consumed in this country are coming from these homesteads. These areas are also increasing due to the construction of new houses for the ever increasing population. In this situation, vegetables cultivation needs to be increased in homestead areas. To serve this purpose, high yielding and partial shade tolerant vegetables should be introduced. The identification of low light tolerant vegetables could be one of the achievable attempts to solve such problem. Considering the above mentioned facts, a two year project was under taken during 2008-2009 with the financial support of SAURES to investigate the morpho-physiological changes and yield performance of three selected popular cucurbitaceous vegetables under four different levels of light (100, 75, 50 and 25% PAR).

Crops	Variety
Cucumber	Modumoti
Ash gourd	Thai-express (hybrid)
Bottle gourd	High-green (hybrid)

These three vegetables were included in separate experiments. In studied cucurbits, some of the morphological characters like main stem length, internode length, and individual leaf area increased, whereas main stem diameter and numbers of leaves per plant decreased due to the reduced light levels. At 50% PAR number of leaves per plant did not decrease significantly in bottle gourd but in cucumber and ash gourd leaves per plant decreased markedly. Leaf weight ratio (LWR) remained more or less similar up to 50% reduction of PAR in bottle gourd and cucumber but in ash gourd LWR increased markedly at 50% PAR level. SPAD value increased with the reduction of PAR level in all three crops i.e. partial shading stimulated chlorophyll synthesis in leaves. Compared to 100% PAR the total dry matter (TDM) did not reduce in bottle gourd and cucumber by

reduction of light up to 50% PAR level whereas in ash gourd the TDM reduced drastically at 50% PAR level. Bottle gourd produced the highest yield (41.53 t/ha) at 75% PAR level whereas cucumber (15.32 t/ha) and ash gourd (21.03 t/ha) gave the highest yield at full sunlight. Bottle gourd did not show significant fruit yield reduction at 25% PAR level compared to full sunlight, whereas significant fruit yield reduction were observed at 50% PAR in ash gourd and at 25% PAR in cucumber. However, considering TDM and fruit yield, bottle gourd and cucumber were found suitable for reduced light condition (up to 50% PAR). But ash gourd was relatively more sensitive to reduction of light level.

Bottle gourd is suitable for growing as under storey crop where about one-fourth of the natural light is available. Ash gourd may be grown under 75% of natural light. But cucumber is suitable for growing as under storey crop if only about half of the natural light is available.

