ECO-PHYSIOLOGICAL STUDIES ON SHADE TOLERANCE IN NINE GRAIN LEGUME CULTIVARS

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ABSTRACT

Shade tolerance capabilities of nine grain legume cultivars belonging to three *Vigna* species were evaluated at Bandirippuwa estate, Lunuwila, by growing them in full sunlight and under shade cloth providing 30, 50, 70 and 80% shade. The objective of this study was to select shade tolerant cultivars for intercropping under coconut *(Cocos nucifera)*.

The seed yield plant^{-1} and hectare^{-1} and its components pods plant^{-1}, seeds pod^{-1} and harvest index (HI) in cultivars were reduced significantly by shade, while 100 seed weight was least affected. The magnitude of reduction varied between shade level and cultivars, which led to a significant interaction between treatments. The reduction in yield beyond 30% shade was more pronounced in black gram *(Vigna mungo)* cultivars than in green gram *(Vigna radiata)* and cowpea *(Vigna unguiculata)*. The yield reduction at 30% and 80% shade was appreciably lower in cvs. Sel. 77-262, Bombay cowpea and MI 1 than others. Yield was cloesly correlated with HI (r=0.88***) and seeds pod^{-1} (r=0.58**). The small reduction in these yield components contributed to the high yielding ability under shade.

Among growth parameters, branch number, specific leaf weight (SLW) and net assimilation rate (NAR) were markedly reduced by shade. Growth in black gram cultivars declined rapidly above 30% shade, whereas the reduction in these parameters caused by moderate (50%) and heavy (70 and 80%) shade was less in green gram than cowpea cultivars. Plant height and shoot/root ratio in green gram cultivars responded to moderate and heavy shade better than cowpea while black gram cultivars showed the least response. Further, SLW (r=0.66**) and S/R ratio (r=0.56*) were positively correlated with seed yield.