

SUMMARY

A series of outdoor experiments were conducted to determine the nature of the competitive relationships between the perennial grass-weed torpedograss (Panicum repens L.) and two broad-leaf vegetable crops, mungbean (Phaseolus aureus Roxb.) and tomato (Lycopersicon esculentum Mill.).

Increasing weed density significantly reduced the growth and yield of both mungbean and tomato, but the overall adverse effects on tomato were greater than on mungbean. A weed density of 8 plants/ pot did not significantly reduce the mean shoot dry weight or Leaf area Index of mungbean, but this density reduced the mean root dry weight significantly, by 52%, indicating that significantly 'below-ground' competition had occurred. Tomato was much more sensitive to competition both below- and above-ground. Even the presence of a single weed plant (density 1 weed plant/ pot) significantly reduced the mean shoot dry weight, mean root dry weight and Leaf Area Index of tomato by 56.7%, 39.6% and 69.7% respectively, compared with the "weed-free" condition.

The presence of torpedograss upto 4 weeks after transplanting of mungbean, did not alter any of the crop growth parameters significantly, but the presence of weed competition beyond 6 weeks reduced yield parameter significantly. The whole-season 'unweeded' mungbean gave 54% of the yield of the whole-season 'weed-free' check. In the case of tomato, the 'unweeded' crop gave only 13.8% of the yield of the 'weed-free' crop, indicating that tomato was more sensitive to competition by torpedograss.

When tomato was kept 'weed-free' from week- 4 onwards at least, a yield similar to that of whole-season 'weed-free' check was obtained. Similarly, the presence of the weed beyond the first 4 weeks reduced tomato yields significantly to a level comparable with the whole-season 'weedy' check. Both these results strongly indicated the sensitivity of tomato to the presence of the weed during the 'critical' first four - six weeks after transplanting. Mungbean was found to have significantly greater Leaf Area Index and initial growth rate compared to tomato and hence appeared to withstand competition from the grass-weed better. When the nature of the competitive relationship was further investigated with the 'replacement series' approach, evidence was obtained that mungbean and

torpedograss were not vigorously 'excluding' each other. The relative yields of mungbean was not significantly affected by the weed, based on any parameter such as shoot, root, or total plant and leaf area, and the relative yield totals of the association did not differ from unity, significantly. On the other hand, the relative yields of tomato (based on above parameters) were significantly depressed in the presence of torpedograss compared to monoculture yields. Torpedograss also showed significantly greater "gains" in this association, based on the yield of a number of growth parameters. The relative yield totals of the torpedograss and tomato association however, did not deviate significantly from unity, probably indicating that the "gains" made by the weed, were balanced by the "losses" of the crop.

The overall results of the study indicated that unlike with the less sensitive mungbean, the growth and yields of tomato were significantly reduced by torpedograss. The basis of the competitive advantage mungbean has over the weed, appeared to be due to the rapid and relatively extensive leaf area production.