

*Solanum villosum* is an important leafy vegetable in Kenya whose production faces low yields. Two potentially high leaf-yielding genotypes of *S. villosum*, T-5 and an octoploid have been developed. Field experiments were conducted at Jomo Kenyatta University of Agriculture and Technology to evaluate the vegetative and reproductive growth characteristics and leaf nitrogen of the genotypes under varying N levels. The experiments were carried out as split plots in a randomized complete block design with three replications. Nitrogen supply levels of 0, 2.7 and 5.4 g N/plant formed the main plots while the T-5, octoploid and the wild-type genotypes were allocated to the sub-plots. Periodic harvests were done at 5-10 days interval to quantify growth and leaf N. The octoploid plants had up to 30-50% more leaf area and up to 35-50% more leaf dry weight compared to wild-type plants. However, all the genotypes had similar shoot dry weight. The wild-type genotype had about 2-4 times higher flower/fruit dry weight as compared to the octoploid and T-5 genotypes. All the genotypes responded to N supply similarly by increasing leaf area and shoot dry weight 1.7-2.5 times. Leaf N on a dry weight basis was significantly higher in plants supplied with N, but these differences were not observed when the leaf N was expressed on leaf area basis. In conclusion, the *S. villosum* genotypes responded similarly to N limitation by drastic reduction in leaf area and dry matter production and maintaining the leaf N content on leaf area basis. The octoploid is a suitable candidate for increasing leaf yield of *S. villosum*.