Inheritance and quantitative trait locus analysis of low-light tolerance in cucumber (Cucumis sativus L.)

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ABSTRACT. The low-light tolerance index was investigated in a set of 123 F₂,₃ lines during the seedling stage across 2 seasons, and the heredity of low-light tolerance was assessed via different genetic analysis methods. The results of the classical analysis showed that low-light tolerance is controlled by an additive-dominant polygene, and the polygenic inheritance rate of separate generations was >30%. In addition, 5 quantitative trait loci (QTLs) exhibited a low-light tolerance index across both seasons, including 2 QTLs (Llti1.1 and Llti1.2) on the 1st linkage group (variances of 6.0 and 9.5%) and 3 QTLs (Llti2.1, Llti2.1, and Llti2.1) on the 2nd linkage group (variances of 10.1-14.0%). The classical analysis method and QTL information on the heredity of low-light tolerance showed that it is controlled by several major genes and a mini-polygene. The results
will facilitate the breeding of resistance to low-light stress in cucumber.

**Key words:** Cucumber (*Cucumis sativus* L.); Low-light tolerance; Seedling; Classical genetic analysis; QTLs