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Effects of flooding on grafted annona plants of different scion/rootstock combinations

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ABSTRACT

Annona atemoya Hort cv. African Pride (AP) is highly valued due to its high quality and unique flavor, but highly susceptible to water-logging. Prevalence of root diseases in saturated soils is one of the main problems in production, which restricts the development of AP in south China, where flooding frequently occurs in rainy seasons. However, some annona species, e.g. *A. montana*, *A. glabra* and *A. muricata*, are relatively tolerant to continuous flooding and periodic water-logging conditions, but of limited commercial value. Yet, the potential may exist to increase flood tolerance of commercial annona varieties by the use of flood tolerant rootstocks. An experiment was conducted with the aim to study the effects of continuous or periodical soil flooding on tree performances of four different annona scion/rootstock combinations: AP/AR/G (scion/interstock/rootstock), AR/G (scion/rootstock), AP/AR/M and AR/M, where AP stands for *Annona atemoya* Hort cv. African Pride, AR for the hybrid of "AP" *atemoya* × *A. reticulata*, used as an interstock, G for pond apple (*A. glabra*), and M for mountain soursop (*A. montana*). Plant growth, leaf net photosynthetic rates and chlorophyll fluorescence parameters were measured regularly after flooding treatments were applied. Flooding treatments reduced shoot extension, leaf production, net photosynthetic rates and maximum quantum efficiency of photosystem II (F_v/F_m) in plants of AP/AR/M and AR/M, which displayed wilting within 2 weeks of flooding, with a higher wilting percentage in AP/AR/M than in AR/M. The wilted plants shed all leaves but remained alive and sprouted new but weak shoots after 16 weeks of flooding. Long term flooding did not suppress but enhanced photosynthesis as well as tree growth in AP/AR/G and AR/G, with vigorous growth of adventitious roots. Thus, we suggest the use *A. glabra* instead of *A. montana* as a rootstock and AR as an interstock to increase flood tolerance of commercial annona varieties.

KEYWORDS

Annona; Rootstock; Interstock; Flood Tolerance; Photosynthesis

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