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Comparative ecophysiology in the leaves of long and short shoots in *Zelkova serrata*

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Zelkova serrata is the plant having two different branch systems, which are long and short shoots. Long shoots are developed toward outside of canopy from branches produced in previous year, while short shoots are produced under canopy from branches produced in previous year.

We compared ecophysiological leaf characteristics in two types of shoot of *Zelkova serrata*, to assess tolerance to water stress and clarify the meaning of two branching system in a tree. Leaves in the long shoots showed higher ability to maintain turgor pressure than those in the short shoot to changes of leaf water potential. Furthermore, Stomatal conductance and transpiration rate were higher in the leaves of long shoots than in those of short shoots. High leaf dry mass per area was shown in the leaves of long shoots compare with that in the leaves of short shoot. However, Fv/Fv that indicates maximum photosynthetic efficiency was higher in short shoots than in long shoots, suggesting that photosynthesis in the leaves of long shoot is inhibited by photoinhibition under full sun light.

These results suggest that *Zelkova serrata* must adapt itself to surrounding environment by developing two types of shoot systems having different susceptibility to environmental stress between them.

Key words: Environmental stress, long shoot, short shoot, leaf characteristics