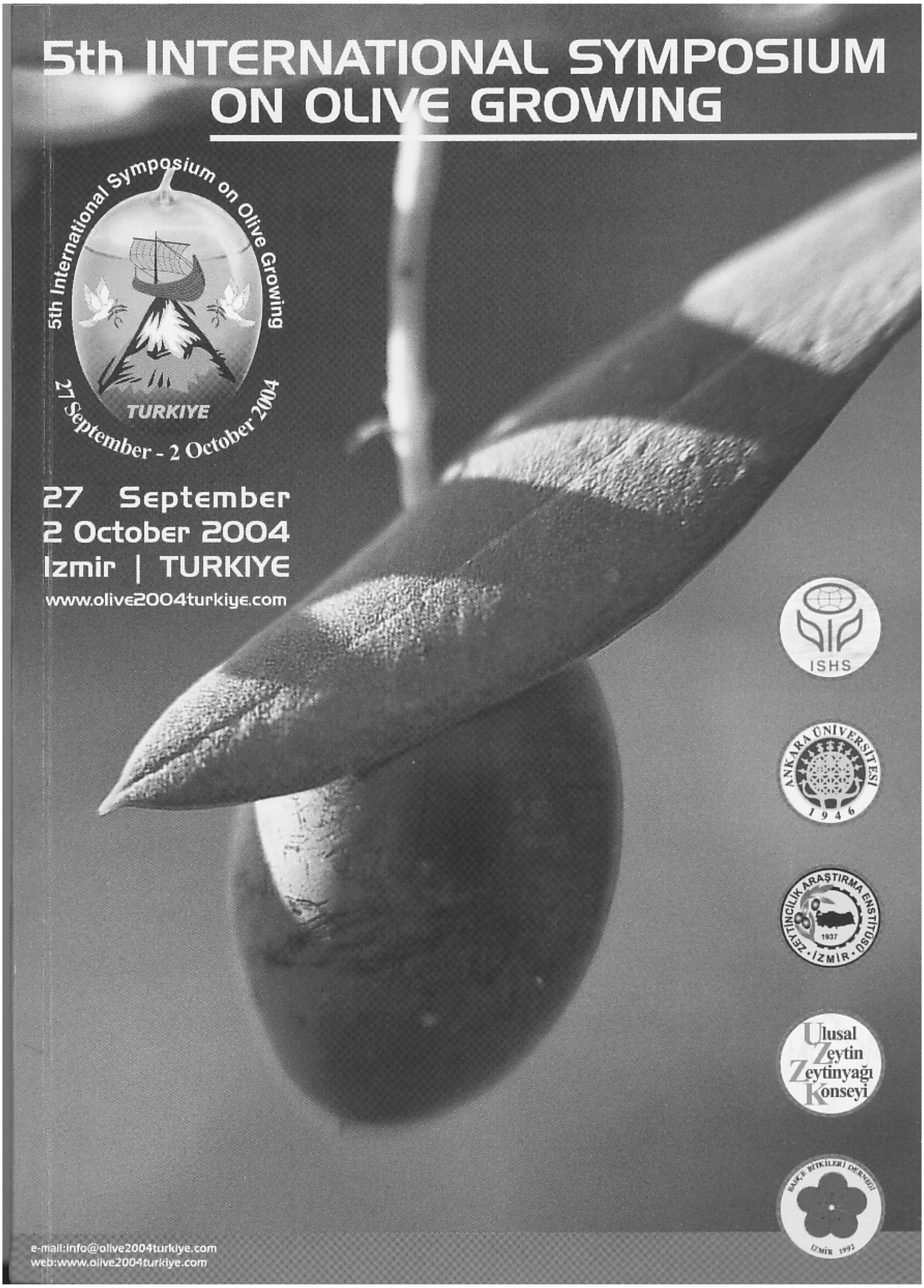

5th INTERNATIONAL SYMPOSIUM ON OLIVE GROWING
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DROUGHT RESISTANCE MECHANISMS IN OLIVE TREE

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Olive trees (Olea europaea L.) are commonly grown in the Mediterranean basin and are able to resist severe and prolonged drought under environmental conditions characterized by high temperatures and high irradiance levels. This species is able to resist drought stress by a broad range of physiological and biochemical mechanisms.
Olive trees lower the water content and water potentials of their tissues, establishing a high potential gradient between leaves and roots. In drought conditions olive plants stop shoot growth but not photosynthetic activity and transpiration. This allows continued the production of assimilates as well as their accumulation in the various plant parts, in particular in the root system, creating a higher root/leaf ratio compared to well-watered plants.
Active and passive osmotic adjustment play an important role in maintaining cell turgor and leaf activities which depend on it. Sugars, especially mannitol and glucose, play a major part in the osmotic adjustment of leaves. Organic acids, such as citric and malic, also play an important role in active osmotic adjustment. In addition, the osmotic adjustment observed in the root system allows maintenance of cell turgor, avoiding or delaying the separation of roots from soil particles. The accumulation of proline in leaves and roots indicates a possible role of this aminoacid in osmotic adjustment.
Moreover, in trees subjected to severe drought the non-stomatal component of photosynthesis is affected and likely a light-dependent inactivation of the photosystem II occurs. The increase of malondialdehyde content and lipoxygenase activity, two markers of oxidative damage related to drought stress, suggest that water deficit is associated with lipid peroxidation mechanisms at cellular level both in leaves and roots.
Finally, in olive trees, the activities of some antioxidant enzymes, such as superoxide dismutase, catalase, ascorbate peroxidase and peroxidase, involved in the scavenging of activated oxygen species and in other biochemical pathways, increase during a period of drought. This suggest that higher activities of some antioxidant enzymes are required for a better protection against oxidative stress related to water deficit.