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WG 7 | Oral communications

WG 7.1 Sub theme

Ecosystem functioning

THE EFFECTS OF ZIZIPHUS LOTUS IN IMPROVING NEIGHBORING PLANTS' MOISTURE CONTENT AND ALLEVIATING DROUGHT STRESS IMPACTS ON ECOSYSTEM PRODUCTIVITY

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Abstract: Water availability is the most important limiting factor for plant growth in Mediterranean ecosystems. In these ecosystems because of scarce precipitation, vegetation is often living in marginal conditions, although adapted to summer drought. Therefore, plants must make a conservative use of available water, exploit all possible water sources and even benefit from any water facilitation effects produced by closely associated neighbors (nurse plants). These functions in turn may play a key role in shaping silvo-pastoral systems in arid and semi-arid areas. We investigated the role that *Ziziphus lotus* (L.) may play as a nurse plant by influencing, among other factors, the stem moisture content of neighboring *Thymbra capitata* (L.) Cav., and the spatial aggregation of its population in a lowland semi-arid silvo-pastoral habitat (priority habitat *5220; Annex I; Council Directive 92/43/EEC) of Cyprus in the Eastern Mediterranean. We measured, by weighing fresh stem samples and then reweighing them after drying, the shoot nightfall and predawn moisture content of 69 *T. capitata* individuals in four successive radii from *Z. lotus*. Measurement took place four times during the mid and late dry summer season and once during the wet season. We also measured in the field the spatial distribution of *T. capitata* plants. The smallest the distance *T. capitata* grew from *Z. lotus*, the significantly higher (a) the predawn shoot moisture content and the difference between predawn and nightfall shoot moisture content in *T. capitata*, and (b) the number of *T. capitata* plants per m². This significant spatial aggregation between the two species seems to be related to different mechanisms of facilitation, mainly increased water and nutrient availability (based on soil measurements). Hydraulic lift produced by the very deep rooted *Z. lotus* seems to play a key role in the processes described above. It very likely explains the significantly higher difference between predawn and nightfall shoot moisture content in *T. capitata* growing closer to the nurse plants. We conclude that *Z. lotus* shrubs can assist in alleviating drought stress impacts on ecosystem productivity and appears to have a potential in helping mitigate drought affects that can result from climatic change in arid and semi-arid silvo-pastoral systems.

Keywords: drought stress, facilitation, hydraulic lift, *Thymbra capitata*, *Ziziphus lotus*

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