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Abstract

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Mite community assemblage in Italian traditional and in high-density olive groves*

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Notwithstanding a still widespread and considerable weight of traditional olive groves throughout Italy, there is large interest in investing in new plantations, different both for cultivars and agronomic approaches, and to renew at least partially the olive-oil heritage. Furthermore, Italy is one of the main importing countries in the world of oil and table olives. To match the internal demand and boost olive-oil production, the National Olive Plan suggests adopting modern high-density plantations like other EU Countries (*e.g.,* Spain). Traditional groves are partly replaced by high-density olive crops, which are more profitable due to substantially lower operating costs. Furthermore, the introduction of new olive crops may induce changes in agricultural landscape/agroecosystem (*e.g.,* plain areas *vs* terraced structures), and may lead to undesirable effects on the environment and pest control. The surveys on the presence and abundance of the main animal groups in traditional and high-density olive crops can be informative, mainly referring to the different ecological/functional roles they can assume (phytophagous, predatory, and vectoring role of pathogens). Mite communities are susceptible to different types of plantation density and eventual environmental effects. Concerning olives, not so many contributions approached screening on the acarofauna, and previous screenings were mainly focused on soil. The characterization of the acarofauna resident on epigeic part of olive groves may be indicative about the status of the agroecosystem and effect of plantation densities.

To carry out these activities, the Italian Ministry of Agriculture funded two research projects (RPs) aiming at monitoring the mite presence in traditional and intensive Italian olive groves, and identifying possible pest control strategies (RP: SALVAOLIVI—Safeguarding and enhancement of Italian olive heritage with research actions in the sector of plant protection; RP: DIOL—Control of harmful organisms in traditional and intensive olive cultivation). During 2018, three farms of olive orchard in Tuscany (Central Italy) were sampled. In each farm, there were: i) intensified traditional plantations following traditional patterns, and ii) intensive modern plantations of smaller tree varieties, planted at high densities (at least >700 plants/ha) and managed under an intensive-mechanized system and irrigation. The samplings were conducted from June until the harvest period, early November.

An inclusive attribution of the collected mites was considered based on their feeding guilds (phytophagy, predatory, and less specialized habits). All the predatory mites collected were phytoseiids, while the phytophagous mites belong to Tetranychiidae, Tenuipalpidae, and Tarsonemidae. Overall, there were differences in mite communities between the two olive systems (Chi-square test): predators and other mites, mainly tydeids, were more abundant in the high-density groves (predators: P=0.02; other mites, P<0.001) while there was no difference between phytophagous abundances (P=0.84). Olive grove location affected all the three mite groups considered (F test) (phytophagous mites: P=0.003; predators: P=0.004; other mites: P<0.001). The phenological plant stage, mostly associated with sampling time, had a significant effect on the abundance of predatory mites (P=0.03) and other mites (P=0.001). The type of olive grove did not seem to significantly affect the abundance of the mite groups, while site (*i.e.* landscape complexity/homogeneity) appeared more effective in setting composition and association of mite groups considered.

Keywords: traditional olive groves, high-density olive groves, phytophagous mites, predatory mites, mite communities

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