



COVER CROPS IN OLIVE-FIELD TRIALS OF SOUTHERN AND NORTHERN SPAIN

Olive orchard covers a broad geographical area in Spain (2.521.694 ha). Therefore, soil and weed management decisions are significantly influenced by location, climatic conditions, soil, topography and grower preferences. The adoption of covered soil techniques has highly increased in the last 10 years, going from 434.828 ha in 2006 to 837.898 ha in 2017. Spontaneous cover crops are the most used in the middle of the olive orchard lanes (775.993 ha), followed by inert/plant residue mulches (53.844 ha) and autumn-sown cover crops (8.061 ha). These practices have been included within the IWM strategies studied in the south and north of Spain, according to farm-specific conditions, adaptability of species to the local conditions and seed availability.

DID YOU KNOW?

Most olive orchards in Spain show two very distinctive areas: soil beneath the olive trees, and along the lanes (intra-row and inter-row spacing), which facilitates the use of different IWM practices.

SOUTHERN SPAIN

A mix of natural brome grasses (*Bromus* spp.) is used as spontaneous cover crops in an inter-row spacing of 2 m wide. Grass cover crops have advantages for erosion control and water retention as they provide effective soil protection and high biomass production. Moreover, they have low installation costs for farmers since they only need to be sown the first 2-3 years, whereupon they are self-seeding by the seed bank produced. This cover crop can be managed by applying a broad-leaf herbicide and chemical/mechanical killing methods are not necessary because it is naturally dried at late April-early May. Additionally, the intra-row spacing is commonly covered with pruning wood residues generated on the farm. They can help to reduce the use of herbicides and improve the clay-humus complex by increasing absorption and promoting degradation. Therefore, it is not necessary to incorporate them into the soil by tillage, ensuring long-term decomposition and soil protection. The effect depends on the amount of debris, being noticeable from 7 to 8 kg·m².

manageable threshold until May, when it is killed by mechanical mowing. However, the intra-row spacing consists of untilled soil with weeds control by herbicides during the growing season.



Figure 1 - Spontaneous grass cover crops (*Bromus* spp.) in the inter-row spacing & pruning wood residues in the intra-row spacing (Cañete de las Torres, Córdoba, Southern Spain)

COVER CROPS IN NORTHERN SPAIN

Olive-field trials include a mix of white mustard (*Sinapis alba*) and other spontaneous species growing as cover crops in the inter-row spacing. Several cruciferous species, both spontaneous and cultivated, are being introduced because they possess a tap root that makes them highly promising for relieving soil compaction and because they have a high potential for controlling soil-borne diseases, especially *Verticillium dahliae*, weeds and nematodes due to their high glucosinolate contents. White mustard is sown at a rate of 10-15 kg/ha in September-October and prior to sowing, a shallow tillage operation is done to prepare a proper seedbed. The inter-row cover crop is allowed to grow during the winter without using herbicides, in an attempt to keep weed in an economical and



Figure 2 - Autumn-sown crucifer cover crops (*Sinapis alba*) & mix of spontaneous species in the inter-row spacing (Larraga, Navarra, Northern Spain)

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