

Herbicide Use in Spanish Olive Groves Conserves Soil and Water

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Weed control in olive groves is necessary to prevent them from competing with the olive trees for moisture. Water is the main factor limiting orchard productivity and even small increases in the amount of water stored in the soil can result in large increases in production. Traditionally, weed control in olive groves had been achieved with 4-6 tillage operations throughout the year [1]. Research demonstrated that tillage increased soil moisture content in olive groves by 8% in comparison to where weeds were allowed to grow unchecked [2]. However, tillage operations lead to soil moisture loss since the soil dries out when exposed to air. Herbicide application in olive groves controls weeds without disturbing the soil and, as a result, more water is stored in the soil than with cultivation. Research has demonstrated that no-tillage with weed control with herbicides increased the soil moisture content in olive groves by 25% over no-weed control systems [2]. The average increase in olive production with no-till was 16% [6].



Tillage in olives

Herbicide use has become a common practice in Spanish olive groves and has rapidly increased in the past twenty years. In very mountainous regions, close to 90% of the olive groves are in a system using no-tillage and herbicides for weed control [3].



Erosion in Spain

Water erosion has been a serious problem in Spanish olive groves. An average of more than 80 tons of soil per hectare has been lost every year in Andalusian olive groves with traditional tillage. Repeated ploughing leaves the soil loosened and torrential winter rain washes away the topsoil; thus herbicide use has resulted in large reductions in soil erosion. Non-tilled land treated with herbicides with bare soil erodes at half the rate of tilled soil [4].

Initially, herbicides were used to keep the soil in olive groves completely bare of vegetation. However, in recent years, the recommended practice has been to only keep the soil beneath the trees completely bare while maintaining vegetative cover between the tree rows. The vegetative cover between the rows leads to significant decreases in erosion, increased water infiltration and reduced water evaporation. The only vital condition to be met in order to obtain satisfactory results is to prevent competition for water between the olive trees and the vegetation cover. To achieve this, chemical herbicides are sprayed on the vegetative cover in the spring [5]. An experiment in Cordoba showed that while erosion with conventional tillage was 13 tons/ha and 7 tons/ha with no-tillage with bare soil, the cover crop/herbicide treatment system eroded at less than 1 ton/ha [6].



Cover crops

References

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Herbicide treated cover crops