World Academy of Science, Engineering and Technology
International Journal of Agricultural and Biosystems Engineering
Vol:18, No:05, 2024

Evaluation of Living Mulches Effectiveness in Weed Suppression, and Seed Yield of Black cumin (Nigella sativa L.) Under Salt Stress

Authors : Fatemeh Benakashani, Hossein Tavakoli, Elias Soltani

Abstract : To ensure the sustainability of crop cultivation and rural economies, it is imperative that we focus on cultivating resilient crops capable of withstanding salt stress. However, the effective management of weeds in salt-affected soils remains a significant challenge. This study investigates the impact of living mulches, specifically Berseem clover (Trifolium alexandrinum) and Barley (Hordeum vulgare), on weed control, as well as the quality and yield of Black cumin (Nigella sativa) in salt-affected soil. In our research, we employed a two-fold mowing strategy for the living mulches: once following crop establishment and once before the flowering stage. Notably, the weed-free plots demonstrated Black cumin's seed yield, and oil content (31.1% to 34.3%), consistent with previous studies, highlighting its potential for the reclamation and utilization of salt-affected lands. However, Black cumin exhibited limited competitiveness against prevalent weeds in the field, such as Amaranthus retroflexus, Chenopodium album, and Portulaca oleracea, which significantly diminished both the 1000 grain mass in plots where weeds were present. Interestingly, the introduction of living mulches led to improvements in seed yield and seed oil content when compared to both weed-free and weed-infested plots. Notably, Berseem clover exhibited greater biomass than Barley, indicating its heightened competitiveness against weeds. Nevertheless, it's worth noting that in the long term, Berseem clover also competed with the main crop, thereby limiting overall productivity. Consequently, we recommend relocating the Berseem clover living mulch following the establishment of Black cumin as a strategy for weed management in Black cumin fields situated in salt-affected soils.

Keywords : weed management, competition, clover, barley, medicinal plant
Conference Title : ICAACS 2024 : International Conference on Agriculture, Agronomy and Crop Sciences
Conference Location : Montreal, Canada
Conference Dates : May 23-24, 2024