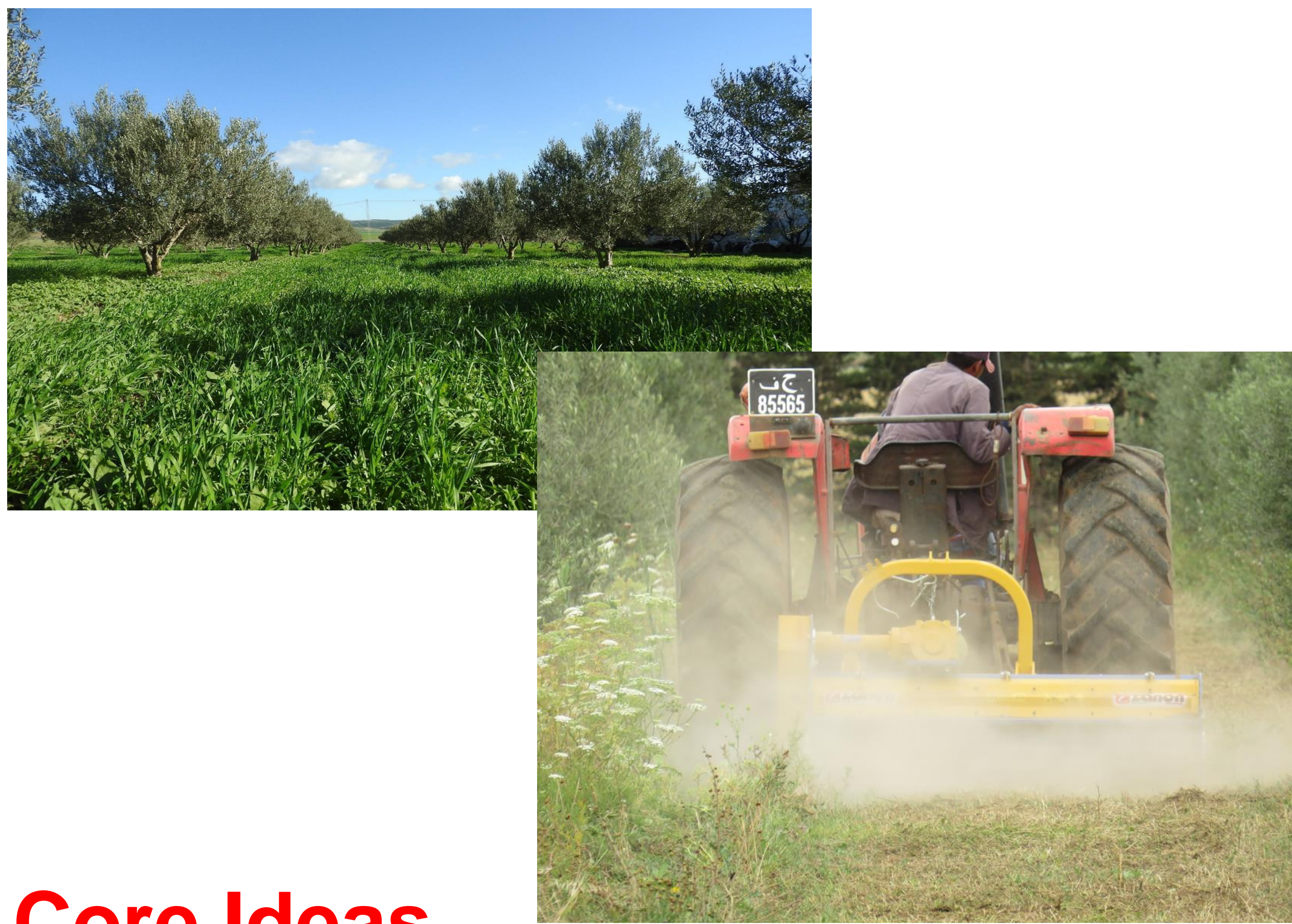


Introduction

Climate change causes severe soil drought and the water in the soil becomes insufficient for crop growth. New eco-friendly agricultural practices for sustainable food production are needed. Mulching is the practice of maintaining a layer of material (usually non-living) on the soil surface in contrast to maintaining a bare surface between plants or crop rotation. Mulches can conserve resources such as available soil and water (Kader et al. 2017; Prosdocimi et al. 2016; Lötze 2014) in addition to providing partial chemical-free weed control and buffering soil temperature fluctuations (Lötze 2014). Cover cropping seems to be the superior orchard floor management tool for reducing erosion and runoff, and while doing this it may provide additional benefits that further improve soil fertility and nutrient cycling (Pardini et al. 2002).

Material and Methods

The field experiment was conducted in Borj El Amri in the Northern region of Tunisia (36°62'N, 9°82'E). At the time of the experiment, the trees were 5 years old, had a height of 2.5–3 m, and were planted 3 m apart. The experiment was conducted on three different olive oil varieties: two of them, Chetoui and Chemlali, are local for Tunisia whereas the third, Koroneiki, is imported from Greece. The climate of the area is classified as semi-arid. The mean annual rainfall is 300 mm, and the mean annual temperature ranges from 5 to 45°C.



Core Ideas

- ✓ Cover crops improve soil quality.
- ✓ Mulching with cover crops can improve soil health by increasing soil organic matter, soil porosity, permeability, and crop yield.
- ✓ Soil physical characteristics improve faster in mulching than no cover crop systems.
- ✓ Mineral nutrients are retained in mulch soils compared to cover crops.
- ✓ Use of a cover crops expedited soil health regeneration compared to other treatments.

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Results

Cover crops and mulching impacts



Fig. Examples of cover cropping strategies and experimentation conducted in Borj El Amri, Tunisia

ECONOMIC IMPACT

- **Yield :** The study showed the positive impacts of mulches on the grown of olives and overall performance of crop plants in relation to un-mulched treatments, mulching is favorable for maximum yield with very low input resources
- **Income:** When we use mulches, there will be no cost on pesticide purchasing that increases farmer income and enhances performance of crop growth and development.

ENVIRONMENTAL IMPACTS

- **Soil and nutrients:** Mulches conserve the soil moisture, enhance the nutrients status of soil, control the erosion losses, suppress the weeds in crop plants, and remove the residual effects of pesticides, fertilizers, and heavy metals.
- **Water:** Mulches can reduce the irrigation requirement of olives plants, some organic mulch act as sponge and retain rainfall and irrigation water thus protecting the runoff and provides water at the time of crop requirement.
- **Biodiversity:** Mulch is used for weed and pest control, to avoid herbicide and pesticides use, as well as for improving water and heat retention in the soil.

SOCIAL IMPACT

Mulching with cover crops are not so costly as compared to other synthetic materials in terms of soil health and the overall performance of crop plants.

Conclusion

Mulching could potentially serve the purpose by reducing soil evaporation, conserving moisture, controlling soil temperature, reducing weed growth, and improving microbial activities. Additionally, mulches could provide economical, and environmental advantages to agriculture in Tunisia. Therefore, the properly managed mulching strategies could compensate the water requirement of crops in water deficit/drought conditions.