



# Olive trees intercropped with chickpeas

Increasing income from your  
olive grove

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## Why chickpeas?

Chickpeas (*Cicer arietinum* L.) are valued as a high quality food for humans. They are also an excellent source of protein for animal feed. They are easy to cultivate, requiring little management and, in general, have low treatment costs. They have high monetary value, so a farmer can gain considerable additional income from cultivating chickpeas among trees.

One of the important characteristics of chickpeas is their low water demand. This makes them ideal for intercropping with trees of similar water economy in Mediterranean and other dry ecosystems.

Another important feature of chickpeas is the nitrogen they provide to the soil by the symbiotic relationship of their roots with nitrogen fixing bacteria. This benefits the farmer by reducing the need for expenditure on nitrogen fertilizers, which also protects the soil and water from nitrogen contamination.



Olive production was similar in the plots of mineral fertilization to those intercropped with chickpeas  
Ref: Dimitris Kitsikopoulos



Olives intercropped by chickpeas Ref: A. Pantera

## Where and how to plant

A trial was conducted in Molos, Central Greece, in a 67 year-old olive grove of "Kalamon" and "Amphissa" varieties. Tree spacing between the trees was 10m. The trial involved three treatments with three replications: olive trees + chickpea, olive trees + oregano and olive trees alone as a control.

A 0.2 ha area was cultivated with chickpeas and a smaller one with oregano. Another 0.2 ha of the orchards contained olive trees and other tree species and the rest only olive trees. This was used as control. The rows where chickpeas were cultivated were 5 m x 60 m wide. A local variety of chickpeas named "Amorgos" was used. This variety was developed by the Hellenic Research Institute and is resistant to fungus infections. The seed quantities were 80 kg/ha. In 2015, crop sowing was delayed until the first week of April due to the wet spring period. Oregano was sown in spring of 2016. The trial was repeated over three years (2015, 2016 and 2017).

The best timing for seeding is between late February and March for lower altitudes. However, at higher altitudes, it can be sown up to late April.



Olive production is expected to be high in the intercropped plots in 2017. Ref: A. Pantera

## Advantages

Pruned branches can be used as fodder and, when the trees have matured, as fuel wood.

Olives and olive oil are traditional products with high economic value. Additional products, such as olive paste, can be produced and sold separately.

Olive trees can reduce local wind speed and protect soils from erosion. The chickpeas contribute to soil nitrogen content and reduce the need for chemical fertilizers. Consequently, they also contribute to reducing chemical contamination in soil and water, such as nitrification.



Chickpeas are sold at the shop of the farmer, contributing additional income  
Ref: D. Kitsikopoulos

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## Olive oil, edible olives and chickpeas production

In 2015, olive production was low on the farm in Molos due to the unfavourable weather conditions during the blossoming stage. The yield from the olive trees was effectively the same in the olives and chickpeas treatment (which received no fertilizer) and the control olive treatment which received N fertilization.

The level of chickpea production was also very low. Although germination reached approximately 90%, the rain during the spring affected flowering, and there were additional losses due to rodent damage.

However, in 2016, the yield of the chickpeas was very successful with production reaching 2600 kg/ha. Oil production and quality was excellent and it was the same for edible olives. Similar results were reported in another olive grove where the experiment was repeated. Here the farmer reported being pleased with the results: saving money from reduced fertilizer applications, and also earning income from the production of organic chickpeas.

## Other species for intercropping: Oregano

Oregano did not do well, but this is maybe due to the late date of establishment and the limited water it received after planting. The plants that survived the first year after establishment are now doing well, but there are too few to draw clear conclusions.

## Conclusion

In short, intercropping chickpeas saves money from fertilizer cost but also protects the environment from soil contamination caused by leaching nutrients from fertilizers. It is a win-win situation!

## Further information

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