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CROP ROTATION PRODUCTIVITY WITH CEREALS AND LEGUMES: A SHORT REVIEW

Elpiniki SKOUFOGIANNI*, Kyriakos D. GIANNOULIS, Dimitrios BARTZIALIS, Georgios CHARVALAS, Nicholaos G. DANALATOS
University of Thessaly, Department of Agriculture, Crop Production & Rural Environment, Volos, Greece

Abstract

Crop rotation is considered to be an instrument of sustainable cropping system assisting in varying the set of soil nutrients. Thereby reducing the likelihood of soil erosion, building soil organic matter, increasing carbon sequestration, improving soil quality, water holding capacity, nutrient availability, soil structure and minimizing greenhouse gas emissions. Crop rotation is an agricultural practice of growing different or non-similar crops on the same farmland in different seasons. Legume crops could play an important role by delivering multiple services in line with sustainability principles. Crop type can impact soil temperature and water content by affecting shade intensity and evapotranspiration

Introduction

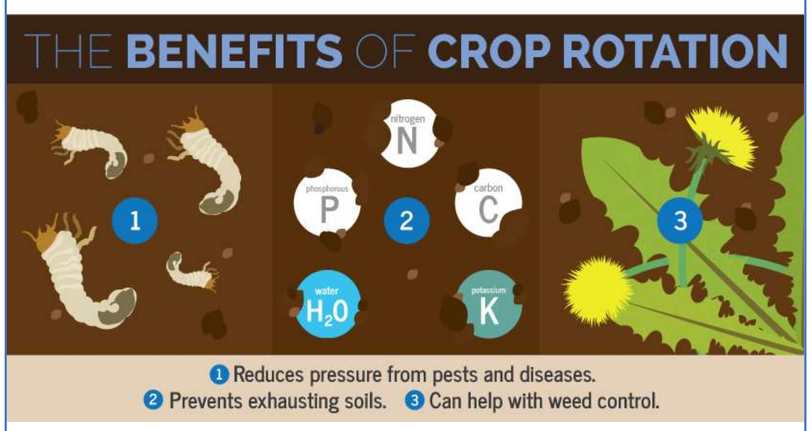
Rotations are an important part of any sustainable agricultural system. Yields of crops grown in rotations are typically 10% higher than those of crops grown in monoculture in normal growing seasons even when both are supplied with plentiful amounts of nitrogen, and as much as 25% higher in droughty growing seasons. Research in Iowa found that even using 270 kg of N per hectare when growing corn after corn, yields were not as good as corn grown following alfalfa with little or no N applied. It is known that 75% of the nitrogen contained in legume biomass comes from conventional nitrogen sequestration [1,2].

Field pea and faba bean accumulate about 130 and 153 kg Nha^{-1} in their aboveground biomass, respectively and significant quantities (30–60% of the accumulated total N) may also be stored in belowground biomass. Faba beans can contribute large amounts of nitrogen to the soil [3].

Advantages

The advantages of such a farming system are related to:

- Maintaining or increasing soil fertility, which is achieved through more efficient use of soil nutrients, increased organic matter and nitrogen (N), erosion protection and preservation or improvement of the physical composition of the soil.
- The fight against plant pests, which in combination with other factors combat weeds, pets and plant diseases.
- Increasing performance, qualitatively and quantitatively.
- Addressing economic and technical problems [4,5].



Picture1 : The benefits of Crop Rotation [6].

Conditions of successful crop rotation

- The adaptability of plants to the soil and climate conditions of each region, as well as the economic and technical conditions determining.
- The competitiveness of crops (product prices, cost, demand for products, allocated production facilities and capital).
- The existence of water resources and their better management.
- The presence of pests (weeds, enemies and diseases).
- The possibility of dealing with them.
- The existence and distribution of working hands and mechanical equipment.
- The effect of one crop on the next [8].

Examples of crop rotation

A simple rotation of a broadleaf and a narrow-leaf is

Two-year

Potatoes - Winter rye

Sugar beet - Summer barley

Cotton - Winter wheat

Tobacco - Winter wheat

Under certain conditions of the regions we can make three-year, four-year and five-year crop rotation, consisting of a broad leaf and two consecutive narrow-leafs:

Three-years

Corn - Winter wheat - Winter barley

Cotton - Winter wheat - Oats

Sugar beet - Summer wheat - Winter barley

Four Years

Potatoes - Winter wheat - Winter barley - Oats

Corn Corn - Oats - Winter wheat - Summer Barley

Potatoes - Potatoes - Winter wheat - Winter barley - Oats - Winter rye [9].

Conclusions

Continuous monocultures have led to a reduction in soil organic matter. If this situation remains the same in the coming years there will be a sharp decline in crop production leading many countries to a food crisis.

In order to improve the situation, we need to turn to more environmentally friendly and productive farming systems such as crop rotation.

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