Assignment #2: Crop Profile

Lentils (*Lens culinaris)*

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Introduction

Lentils are a pulse crop that has been used in agricultural production for a great deal of human history. There is evidence of human consumption of lentils dating back to roughly 10,000 years ago, and it has been indicated that they were among the very first crops domesticated by humans.

Lentils are known for their high nutrient content and health benefits in humans. They have the third highest protein content of any legume, at 30% of their calories. They are also a great source of carbohydrates and high in fibre. Furthermore, they are high in content of important minerals and vitamins such as iron and zinc. Lentils also include essential amino acids isoleucine and lysine, making them a cheap source of protein in developing countries (Callaway et al. 2004).

Not only are lentils an excellent source of proper nutrition, but there is also a growing body of information on how beneficial they are in regards to disease treatment, prevention, and overall health. Lentils have shown to have strong anti-oxidant properties, being more effective radical scavengers than other legumes such as peas. The crop has been shown as useful to people with diabetes, as it contains slow digesting starches which can be useful for controlling blood sugar levels. Cardiovascular health has been shown to improve due to lentil consumption through a reduction in hypertension and weight loss. Studies have found that the pulse decrease cancer rates, and is often prescribed as a food for patients during their cancer treatments, which is likely related to its anti-oxidant capabilities (Faris et al. 2013).

Overall lentils are one of the most nutrient rich and health benefiting crops that human beings have ever produced. They are an important crop in poorer areas of the world as a important source of daily nutrients and protein. This shows in the world market, since Canada is the worlds largest exporter of lentils, with Saskatchewan producing nearly all of exports. Just under half the world's lentils are produced in Saskatchewan (Government of Saskatchewan et al. 2014).

Identification

Lentils are a legume crop, and are often easy to identify at the field level. It is a short crop, only growing to roughly 15-75cm in height. It has is an annual, has a bushy growth habit, and is softly hairy. Lentil leaves are alternate in growth habit and are compound pinnate, usually made up of 10-16 leaflets and are oval shaped with entire leaf margins. Leaves usually end in a tendril, which leads to the crop developing a very dense, thick canopy as the tendrils will wrap around other plants. Flowers range in color, anywhere from blue, purple, white or pink, and can be in groups of 1-4 on the ends of racemes.

Figure 1:Picture of Lentils

http://en.wikipedia.org/wiki/Lentil

Lentil seeds come in a variety of colors and sizes. Overall the seeds are lens shaped leading to the plant name.Varieties range from green, red, yellow, black, petite golden, and masoor. Some colors, such as green for examples may come in different sizes as well like small, medium, or large. (Muehlbauer et al. 1997)

Adaptation

Lentils are known as a cool season legume, and are grown as a summer annual in Saskatchewan. They have been known to be grown as winter annual in subtropical climates. They are often the first crop to be planted during seeding. Lentils are often planted on lighter land and on south or east facing slopes that result in warmer soil temperatures. This leads to faster germination in the spring. Since lentils are often close to the ground when harvested, it is important to make sure that the field they are grown on is free of obstacles such as rocks that could inhibit harvest equipment. Overall lentils tend to have wide adaptations to moisture level, pH, and temperature. Since they are legumes, they fix their own nitrogen which reduces the need for fertilizer, and they have been known to improve soil quality (Pikul et al. 1997). They have been known to be salinity tolerant during germination, but seem to be further affected in later growth stages. Lentils are used in rotation with a variety of crops including wheat, barley, oats, and canola.

Cropping Considerations

In organic production lentils should be planted on loose, well drained soil. Optimal plant populations are 12 plants/ft^2, and seeds should be put down to a depth of 1-3 inches. In areas where rainfall is higher, it is appropriate to use wider row spacing to ensure that the canopy does not become too thick and result in higher rates of disease and lodging.

Lentils are able to fix their own nitrogen, but must be inoculated first. Innoculated lentils can fix up to 70% of their required nitrogen. This crop is good to have in a rotation, as these nodules on the roots can be incorporated into the soil after the growing season and increase the organic matter and nitrogen content of the soil. They are the more drought tolerant of legumes, but producers should be watch for rain once the pods begin to dry down, as a dose of moisture can lead the plants to begin growing again and delay harvest.

Lentils are a poorly competitive crop, especially against perennial weeds such as Canada thistle. A proper weed management program should take place with regards to the whole crop rotation. Early seeding is very important to make sure the crop has a competitive advantage. A possible in crop control method is tine harrowing when the crop is very small. Even though no herbicides are used in organic production, it should be noted that some herbicides can have adverse effects on lentils after being used in past years. When acquired new land, attention should be paid to what management has taken place on it in the past to ensure the health of the lentils.

Lentils are susceptible to a variety of diseases such as seedling blight, root rot, sclerotinia stem rot, and ascochyta. A good crop rotation can mimize the effects of disease, as well as making sure to plant seed that is not infected.

A few different insects can have negative effects on lentils. Early seedlings can be susceptible to cutworms, since cutworms often enjoy sandier warmer land. Lygus bug has been recorded to have negative effects on lentils at very high numbers. Grasshoppers generally do not prefer lentils, but if at high enough populations they may behind to target the axillary buds of the plants and reduce yield of the crop.

Summary

Lentils are a very important export crop in Saskatchewan, as well as highly nutritious and health beneficial. In organic production they can be an excellent addition to crop rotations if they are applied correctly, and can be used to improve soil quality. They can be a crop harvested early due to their tendency to germinate first, but their weak competition ability means that attention has to be paid to where they fall in rotation with other crops. Proper management can take care of any issues with disease or insects, and they have a wide variety of adaptations allowing their production to take place across a range of conditions. Lentils can make an excellent addition to any organic producers crop rotation.

References

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