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Effect of different pests on the crop of *Brassica Oleracea* (Cauliflower) in Faisalabad

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Abstract

Plants are the primary producers on which all the living organisms depends. Most important vegetable is *Brassica Oleracea* (Cauliflower), not only eaten by the people of Faisalabad, Pakistan but also famous in neighboring countries including India and Bangladesh. When a pest attacks on cauliflower crop, it damages plant leaves that results in decreases rate of photosynthesis hence results in low yield of crop. Major pest of cauliflower are *Pieris brassicae* (American Sundi). *Pieris brassicae* (American Sundi) damages the leaves and fruit of *Brassica Oleracea* (Cauliflower) by boring holes. Total estimate damage on crop production must be studied through survival study.

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Introduction

Herbivores including humans cannot survive without plants. Plants are the more diverse group on which almost every organism depend. Plants are the important component of ecosystem because they produce oxygen for us, responsible for rain and for cleaning our environment by absorbing carbon dioxide. We get precious and valuable things from plants like wood, oils, gums and use their leaves for curing disease.

Begin herbivore we depend on vegetables to get variety of food including cauliflower. Green leave vegetables provide us calcium, potassium, minerals and nutrients required by our body. Cauliflower is full of nutrients it almost has zero cholesterol. These crops are the most valuable source of proteins, fats, minerals and vitamins. Some vegetables contain fibers which are helpful in proper functioning of intestine and stomach.

Brassica Oleracea (Cauliflower) is vegetated in Faisalabad during the start of winter season. It is very delicious when cooked with proper ingredients. Cauliflower is consisted of three parts: head, leaves and stalk. Its head is used for eating while its stalk and leaves are considered as a great source of manure for plats. Cauliflower is grown in different villages of Faisalabad i.e. 204 R.B, 208 R.B, 209 R.B, 200 R.B. The soil of these villages is very fertile, moister holding and has proper nutrients which are required for better growth of this vegetable.

Brassica Oleracea (Cauliflower) grown best on the soil of PH ranging between 6 to 6.5 (Girish *et al.*, 2010). Cauliflower have low contents of cholesterol, saturated fats while have high contents of vitamin A, vitamin C, vitamin K, vitamin B6, Calcium, Iron and magnesium (Mochiah *et al.*, 2001; PK Baidoo *et al.*, 2011). Cauliflower contains natural antioxidants due to their high levels of phytochemicals (Murillo G, Mehta RG., 2001). Cauliflower is useful in reducing ratio of brest, lung and colon cancer (Liu X, Lv K., 2012). Cauliflower also prevents cancer from reoccurring (Murillo G, Mehta RG., 2001).

No studies have been done so far on pests that can be found in the field of cauliflower in the district Faisalabad. Pakistan is an agricultural country that is developing its status in many field of life science but most importantly agriculture. Most of the food items and food products are dependent on agricultural crops, as in case of cauliflower. People of Pakistan love to eat this delicious vegetable. If the crop of this vegetable attacked by pests the importing of cauliflower to other countries my effect the economy of Pakistan.

During their season of vegetation many fungal, viral and bacterial diseases attack on the fields of cauliflower. Many insects and pests also attack on the newly grown as well as old plants of cauliflower. These insects and pests attack on plant is due to getting food and completing their reproductive cycle. This results in economic loss of many farmers.

The organisms which affect plants, vegetables and try to compete with humans in any respect is termed as pest. Most of the pests show a phenomenon during their developmental stages called as metamorphosis. It means pest change shape and form during its developmental stages. Larval stage of any pest is crop damaging stage because during this stage larva must eat as many as it can. This over eating process lead to the change in shape of lava to pupa. As the international trade increase, it also increases the chances of introduction of exotic pests that affect economic loss in agriculture. Hundreds of types of pests are responsible for damage of vegetables (Bhat Deen Mohammad *et al.*, 2011).

This study highlights the major pests that are responsible for damaging the cauliflower crop, which results in economic as well as food loss. The study identified two major pests (*Pieris brassicae* (American Sundi), grasshopper) that are highly responsible for crop damage. The attack of these two pests can be seen easily during early vegetation period, when the plant is germination and developing fruit in its flower.

Material and method

Area of study

We started our study from visiting the fields of cauliflower in our selected study areas. We selected 204 R.B village, 208 R.B village, 209 R.B village and 200 R.B village of Faisalabad.

District due to its fertile soil and large production of cauliflower in these areas Fig. 1. Out of these areas, 204 R.B village is famous to produce delicious cauliflower.

Due to its delicious taste the cauliflower of 204 R.B is famous worldwide and exported out of country especially Saudi Arabia.

This study includes the information collected through samples and by interviewing farmers. Farmers use different techniques, pesticides and insecticides to reduce the damage of pests on the vegetated crop of cauliflower.

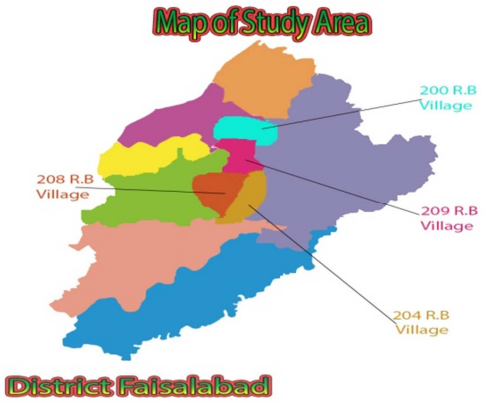

Fig. 1. Map of study area (District Faisalabad).

Collection of samples

A unique sampling technique is used to collect samples from different fields of cauliflower by inspecting leaves, stems and head of cauliflower thoroughly. We collected most of the samples from 204 R.B village. Fig. 2. After collection, samples are brought in the laboratory of department of Zoology, Wildlife and Fisheries, University of Agriculture Faisalabad for the identification of pests by expert entomologist Fig. 3.

Fig. 2. Effected leaves and Head (Fruit) of cauliflower.

Fig. 3. *Pieris brassicae* (American Sundi) attached with leaf of cauliflower (Right Picture) while grasshopper attached with stalk of cauliflower (Left Picture).

Material of study

Our focus is to study the effect of pests on cauliflower field. There for our study material is *Brassica Oleracea* (Cauliflower) Fig. 4.

Fig. 4. *Brassica Oleracea* (Cauliflower).

Observations

This field study was done in the village 204 R.B of Faisalabad district during the vegetation season of cauliflower from the start of September to the mid October. Samples are collected in the morning, noon and evening time respectively. As the pest is more active in the morning and evening as compare to noon because at that time temperature is relatively low. Larva damage leaves primarily by eating the green part of leave and leave veins of leaf as it is. Secondly larva entered the fruit of cauliflower which results in damage of crop. The size of larva is small and round. When larva start eating it make tiny holes in the host leaves Fig. 2**.**

Most of the damage in the crop of cauliflower is observed during early developmental stages of plant. This damage reduces the rate of plant growth as well as its fruit production capacity. When we see the geography and climate conditions of 204 R.B village, it seems that the environment is favorable for the growth and reproduction of different pest especially *Pieris brassicae* (American Sundi) and grasshopper. Their effect can be controlled by proper monitoring especially during the early growth of plant. Farmers use insecticides and pesticides during early growth of plant. They scheduled in such a way that in every month they sprayed 3 times on crop of cauliflower to prevent the production of pest larva. The recorded observations are mentioned in the Table 1.

Table 1. Observed pest in the crop of cauliflower.

Crop	Pest observed	Effect on crop
Brassica Oleracea (Cauliflower)	1. Grass hopper 2. *Pieris brassicae* (American Sundi)	1. Grasshoppers eat fruit of cauliflower from different places leaving hole in fruit see Fig. 2. 2. American sundi eat leaves and leave just veins and make holes in it see Fig. 2.

Results and discussion

Fresh and affected samples of cauliflower were collected from the field during the vegetation season. We identified two major pest that are responsible for damage in the cauliflower fields. These pests are *Pieris brassicae* (American Sundi) and grasshopper. These pests affect crop in various ways see Fig. 2. These pests damage seedling and head formation in cauliflower. The presence of larva in the crop field cause low production of cauliflower.

The pests associated with cauliflower crop have a complicated network of interactions. In this present study we found out that *Pieris brassicae* chew cauliflower leaves and grasshopper eat stem of cauliflower which results in the decrees of growth as well as yield production rate. The observed relation between plant attacked part and feeding method with effect is mentioned in Table 1.

Pieris brassicae is an important pest of cruciferous crops and particularly cabbage and cauliflower (Shahzad *et al*., 2017; Kumaranag *et al*., 2014; Davi N *et al*., 1995). The major pest in the crop of cauliflower is *Pieris brassicae* (Sharma *et al*., 2008; Kumar *et al*., 2007; Badenes Perez and Shelton, 2006; Bhatia and Gupta 2003; Bhatia and Verma, 1994; Gupta, 1990; Butani and Jotwani, 1984; Nair, 1970). Damaging of crops by pests is also reported (Hutchison *et al*., 2011). *Pieris brassicae* bore holes in the leaves of cauliflower which results in decrease rate of photosynthesis (Clementine *et al*., 2009; Obeng-Ofori *et al*., 2003). Therefor they yield low fruit ratio Fig. 2.

This is the first indigenous study carried out in the district Faisalabad, Pakistan. No previous study has been done so far in this study area, although there are some studies in the province Khyber Pakhtunkhwa, Pakistan by Shahzad *et al*. (2017). They studied about development of *Pieris brassicae* larva during the season of cauliflower crop.

Conclusion

From our field study in villages of Faisalabad district, we noted that the crop of cauliflower of these villages facing problems with pests.

We found, cauliflower is attacked majorly by *Pieris brassicae,* secondly by grasshoppers. To determine the total damage on the crop by these pests needs detailed survival study.

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