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A survey of some coleopterans found in the cultivated vegetable lands of Madhepura, Bihar

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Abstract- Vegetables are an important element of the human diet and provides vital source of carbohydrates, vitamins, and minerals. Though it is grown throughout the world it faces extreme damage due to several pests. Some vegetables were grown in a specific area, whereas others have gained wide acceptance and have been transported to several continents where they are grown extensively. In the present study a survey have been conducted and different coleopterans such as blister beetles, flea beetles & Colorado potato beetles and their effects particularly on potato was observed. Two methods of trapping the insects were employed, namely hand capture for wingless insects as well as hand net for flying insects. Morphological identification of insects were also done using taxonomic keys, hand lens as well as light microscope for checking fine structures. One of the major drawbacks of such pests is the reduction in yield to such extent that it can incur huge losses. The entire potato plant can be affected by such beetles, which generally consume the leaves, roots & bore the tuber.

Keywords- Colorado potato beetle, tuber, blister beetles, flea beetles.

INTRODUCTION

Apart from staples like rice & wheat, potato a tuber, finds its place in almost every cuisine. In Madhepura potato cultivation covers almost 69000 hectares of area, when such large area is under cultivation any destruction caused by pests can adversely affect the economy of this place. The agricultural significance of pests on crop plant is the damage they cause which reduces the quality or quantity (or both) of yield. The colorado potato beetle is a major coleopteran that affects a variety of vegetables such as potato, tomato, brinjal etc. It is approximately 10 mm long with a bright yellow body along with five bold brown lines on its back. It has a strong association with the Solanaceae family. Both its larvae & adult relish on the potato plant causing 100% damage, if they infect before tuber formation. The most disappointing fact about this pest is that it is resistant to DDT & several other insecticides.

Potato (*Solanum tuberosum*) has great value in the Indian diet. It is a rich source of carbohydrates, (17%) cheap & easily available.[1] Insects can damage the crops by two ways either they damage the crops by biting and chewing their parts or by sucking the plant sap from different parts of plants.[2] Usually Orthoptera, Lepidoptera and mainly Coleoptera damages the crops by biting and chewing them & Hemiptera damages it by sucking the plant sap.[3] In this study we are discussing about the coleopteran infecting potato plants.

Though rare but the African black beetle (*Heteronychus arator*) also destroys the young plants of

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potatoes by chewing at or below ground level holes in tubers.[4] These beetles prefer clayey & loamy soil. It is generally 12-15 mm long and has shiny black colour and is oval in shape. *Epicauta funebris* Horn. is a margined blister beetle is also one of the coleopteran that affects potato a lot as it is native to North America but found in abundance here.[5]

MATERIALS AND METHODS

To determine the frequency of coleopteran species infesting the potato crop, random samples of infested plants were taken from different survey sites within Madhepura. The coleopteran were identified and segregated according to the species they belonged to. The coleopterans collected were kept under laboratory conditions providing them with proper food. Their life cycle was studies. Few farmers were interviewed and the impact of these pests on their financial conditions was studied. The sampling sites were usually between 10 km areas on the outskirt of North Madhepura. All the sampling areas were thoroughly studied. The parts that were affected were listed according to the preference of larvae and adults beetle.

Study area

The study was conducted on three irrigation sites within ten kilometers along the course of the Koshi River. The sizes of the farms studied ranged between 0.5 and 1.0 ha.

Sample collection

Each selected farm was divided into four quadrants and from each part four random plants were collected. After visualizing the insects on the plants they were captured and taken to laboratory for identification. Insects were collected with the help of swoop net for flying ones and forceps as well as hand picking for the larvae. Transparent containers and jars were carried for transference of insects to the laboratory. The plants were sampled at various stages of their growth such as seedling stage, vegetative stage, flowering stage, fruiting stage and finally harvesting stage.

CONCLUSION

The Colorado potato beetle was found to be the main reason of multiple crop failure in the area. Potato is a perfect crop that can be grown along with a variety of other crops (mixed farming) owing to its lower nutrient requirement. Though cheaper in rate compared to other vegetables its demand in market has never declined. Such coleopterans like Colorado beetle and the African black beetle has severe effects not only on potato cultivation but also on the other vegetables is grown along with potatoes.

The resistance against pesticides or insecticides which is the characteristic of such beetles further elevates the problem. The survey clarified the status of the potato crops damage and the financial lose of farmers which are usually caused by the outbreak of such coleopterans. They were advised to monitor their fields regularly specially during the initial stages of plant growth, to check any kind of pests attack. The result so obtained could be helpful for further research on control of insects pests in the affected areas and might be of great importance to both the farmers as well as the entire nation economically and for the purpose of food security.

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