



## Research Article

# Insect Pest Associated with Tomato in Local Vegetable Markets of Sindh, Pakistan

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### Abstract

The study was carried out on “Insect pests associated with tomato in local vegetable markets of Sindh, Pakistan” during November and December 2018. The insect pests’ infested-tomatoes are also sold in local vegetable markets and consumed by people in Sindh, Pakistan. In present study was seen that the tomato fruit borer (caterpillar) fed symptoms, it had holed and bored, starting where the stem is attached to the fruit and these were ripped tomatoes and red colour. Insect infested tomatoes were collected; the thickness, length, the holes and inner fruit (interior) portions of the fruit damaged by the larvae were also measured and examined. A random selection of 30 vegetable vendor shops was selected in each city of Sindh. The largest pest infested tomato fruit was 30,120, the minimum was 2, 2 from the stock of 5, 5 kg, and 4, 7 green vegetable vendor shops there no pests found in tomato fruits. Overall, 243,995 insect-infested tomatoes were found in 305,515 kg, 30, 30 vegetable vendor shops in Qasimabad and Shahdadkot. The maximum and minimum mean thicknesses and lengths of tomato fruits recorded from Qasimabad and Shahdadkot were 3.73, 3.31 cm, 3.06, 2.82 cm and 5.19, 4.75 cm, and 2.98, 3.7, respectively. The overall maximum and minimum thickness and tomato fruit length were 2.77, 3.83 cm and 2.47, 3.51 cm, respectively. The maximum and minimum mean of tomato fruit hole and depth (internal feeding part) infested by insects were 0.73, 0.94 cm<sup>2</sup> and 0.43, 0.61 cm<sup>2</sup> and 1.07, 1.01 cm<sup>2</sup> and 0.4, 0.38 cm<sup>2</sup>, respectively. While, the Overall total average hole diameter depth of the insect-infested tomato fruit was 0.51, 1.12 cm<sup>2</sup> and the total depth was 0.75, 0.55 cm<sup>2</sup> of the Qasimabad and Shahdadkot recorded respectively.

**Keywords:** Tomato fruit borer; infested tomatoes in market; Insect associated with tomato; tomatoes in local green market.

### Introduction

Tomato (*Lycopersicon esculentum*) belongs to the Solanaceae family and originated in Peru in South America. It is the most important and very popular vegetable crop

after potatoes and onions in Pakistan. It is widely used in salads and cooking. The popularity of tomatoes and their products is increasing because it contains a lot of vitamins A and C (Ramzan, 2017). Three main seasons, Pakistani

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tomatoes are planted. Main season tomato crop nursery is sown in mid-November, transplanted in February and the crop is harvested in May-June. The nursery is planted from July to August, transplanted in the field from August to September, and harvested in November and in mid-season crop, the nursery is planted in September, transplanted in October, harvested in December/January (Khan, 2012). Tomato Fruit comes from single harvest, conducted in the second half of September (Rozek et al. 2011). Tomato plants are subject to infest by the sucking insects, whiteflies and cotton aphid. American bollworm attacks the pre-ripped and ripped fruits. Fruit borer is a serious pest of tomato, the larva feeds on the leaves and then holes in the fruit and it reduces yield by up to 40% (Masood et al. 2013). In the present study, insect-infested tomatoes are used as damage checks under market conditions. Therefore, current research on "Insect pests associated with tomato in local vegetable markets of Sindh, Pakistan" will help us determine whether the infested Tomatoes are also sold in two different cities in Sindh, Pakistan.

### Materials and Methods

Shahdadtot is located on the north side of Sindh, near the Sindh Balochistan border (also known as the Upper Sindh area) at 27.85 latitudes and 67.91 longitudes. It is located at an elevation of 50 meters above sea level. Qasimabad is the town on the western side of Hyderabad in Sindh, Pakistan. Many green vegetable shopkeepers are poor the vegetables sold mainly include tomatoes, potatoes, onions, carrots, eggplants, spices, radishes, peas, okra and other towns in Sindh. Tomatoes are also sold mainly in these two localities (Shahdadtot and Qasimabad).

Data collection through questionnaires, formatted and printed using MS Office Word for vegetable vendor's interview and insect pests infested tomato fruits were recorded in randomly selected total 60 vegetable vendor shops based on their availability

fresh tomato fruit stock in town green markets of two localities Shahdadtot and Qasimabad. Ten visits were made over one month (November) during 2018, to thirty shops in Shahdadtot. Similarly, ten visits were also made over one month (December) during 2018, to thirty shops in Qasimabad. Within 30 small and 30 large vegetables vendor shops were randomly inspected for insect pest symptoms and numbers.

Samples were taken and complete inspected from each selected store (9 am to 12:30 am) at the time of stock delivery and placement of the sales counter. Insect infested tomato fruits (from the surface and inside) were easier to spot and collected based on mode of damage on the surface and boring into and feeding on the inside of the fruit.

The initially collected insect pests infested the tomato fruit and were taken to a plastic shopping bag and brought to the Department of Entomology, Sindh Agriculture University, Tando Jam and each tomato's ball was measured one by one with vernier caliper. The holes made by the insects were measured, then the infested tomato bolls were cut, and the inside of the bolls and the depth of the holes were also measured by the scale.

### Results and Discussion

The data in Fig.1 Shows that the maximum insect pest-infested tomato fruits was 30 of the 5 kg stock and minimum 2 were found in 5 kg of tomato stock available in Qasimabad local market's vegetables vendor shops. Similarly, the maximum insect pest-infested tomato fruits were 120 of the 5 kg stock and minimum 2 were found in 5 kg of tomato stock available in Shahdadtot local market's vegetables vendor shops. In Qasimabad, there are 30 stores that have found four green vegetable vendor stores, without tomato fruit pests. Similarly, 30 stores have found seven vegetable vendor stores, and there are no pests in the tomato fruit of Shahdadtot.

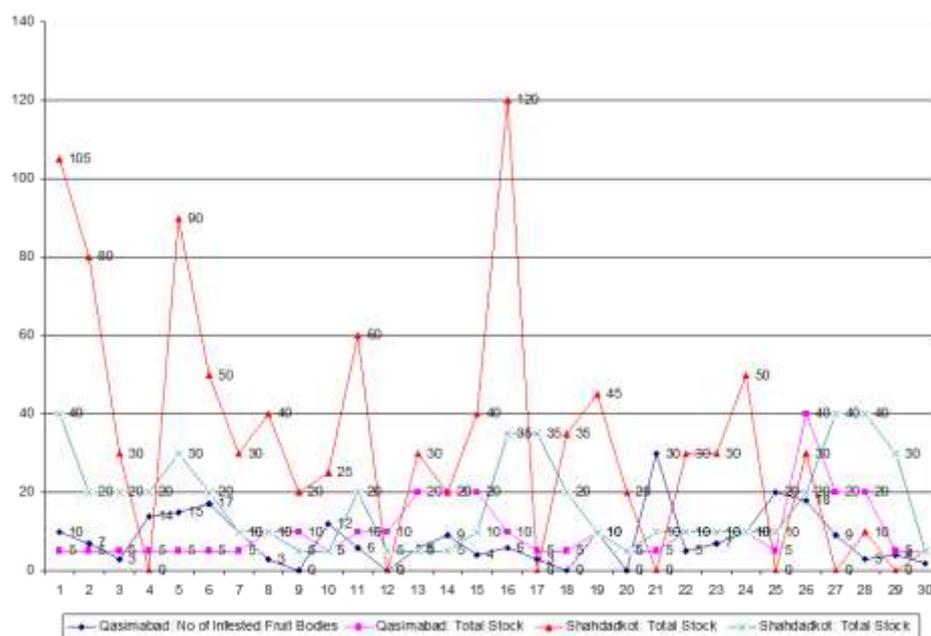


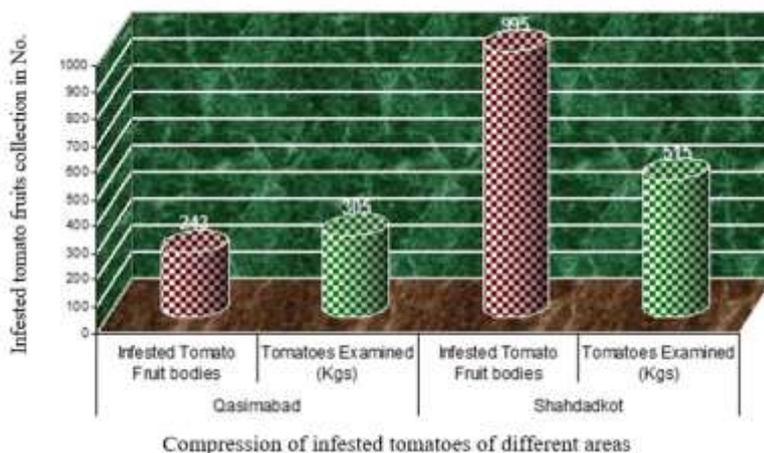
Fig. 1: Total Nos. of Insect- infested Tomato Fruit bodies in Stock (Kg) collected from Qasimabad and Shahdadtot local green market vegetables shops

The data in Fig. 2 shows that total 243 insect-infested tomato fruits were found from 305 kg stock of 30 vegetables vendor shops in Qasimabad local green market. Similarly, total 995 insect-infested tomato fruits were found from 515 kg stock of 30 vegetables vendor shops in Shahdadt local green market.

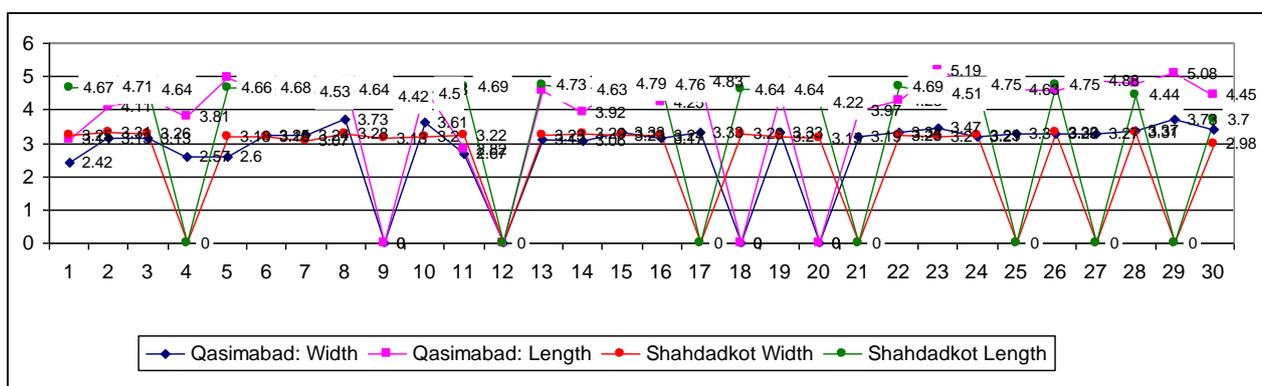
The data in Fig. 3 Shows that the maximum average thickness of tomato fruit was 3.73cm and minimum was 3.06cm and the maximum average size of length of tomato fruit was 5.19cm and

minimum was 2.82cm in Qasimabad. Similarly, the maximum average thickness of tomato fruit was also 3.31cm and minimum was 2.98cm and the maximum average size of length of tomato fruit was 4.75cm and minimum was 3.7cm in Shahdadt.

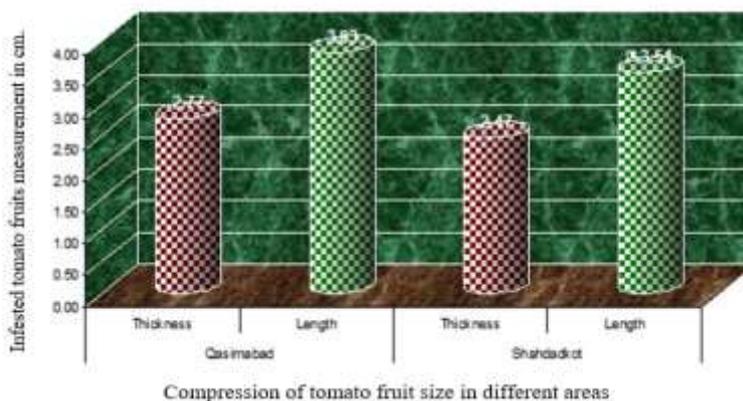
The data in Fig. 4 Shows that the total average thickness of tomato fruit was 2.77cm and the total length was 3.83cm in Qasimabad. Similarly, the maximum total average thickness of tomato fruit was 2.47cm and the total length was 3.51cm of Shahdadt.



**Fig. 2:** Total No. of infested Tomato Fruit bodies in Total Stock (Kg) collected from Qasimabad and Shahdadt local green market's vegetable shops



**Fig. 3:** Average size (cm) of infested tomato fruits collected from Qasimabad and Shahdadt local green market's vegetable shops



**Fig. 4:** Total average size (cm) of infested tomato fruits collected from Qasimabad and Shahdadt local green market's vegetable shops

The data in Fig. 5 Shows that the maximum hole of insect-infested tomato fruit average size was 0.73cm<sup>2</sup> and minimum was 0.43cm<sup>2</sup> and the maximum average size of Depth of insect-infested tomato fruit was 1.07cm and minimum was 0.61cm in Qasimabad local green market's vegetables vendor shops' tomatoes. Similarly, the maximum hole of insect-infested tomato fruit average size was also 0.94cm and minimum was 0.4cm and the maximum average size of Depth of insect-infested tomato

fruit was 1.01cm and minimum was 0.38cm in Shahdadkot local green market's vegetables vendor shops' tomatoes.

The data in Fig. 6 Shows that the total average hole size of insect- infested tomato fruit was 0.51cm<sup>2</sup> and the total Depth was 0.75cm<sup>2</sup> in Qasimabad. Similarly, the total average hole of insect-infested tomato fruit was 1.12cm<sup>2</sup> and the total Depth was 0.55cm<sup>2</sup> of Shahdadkot.

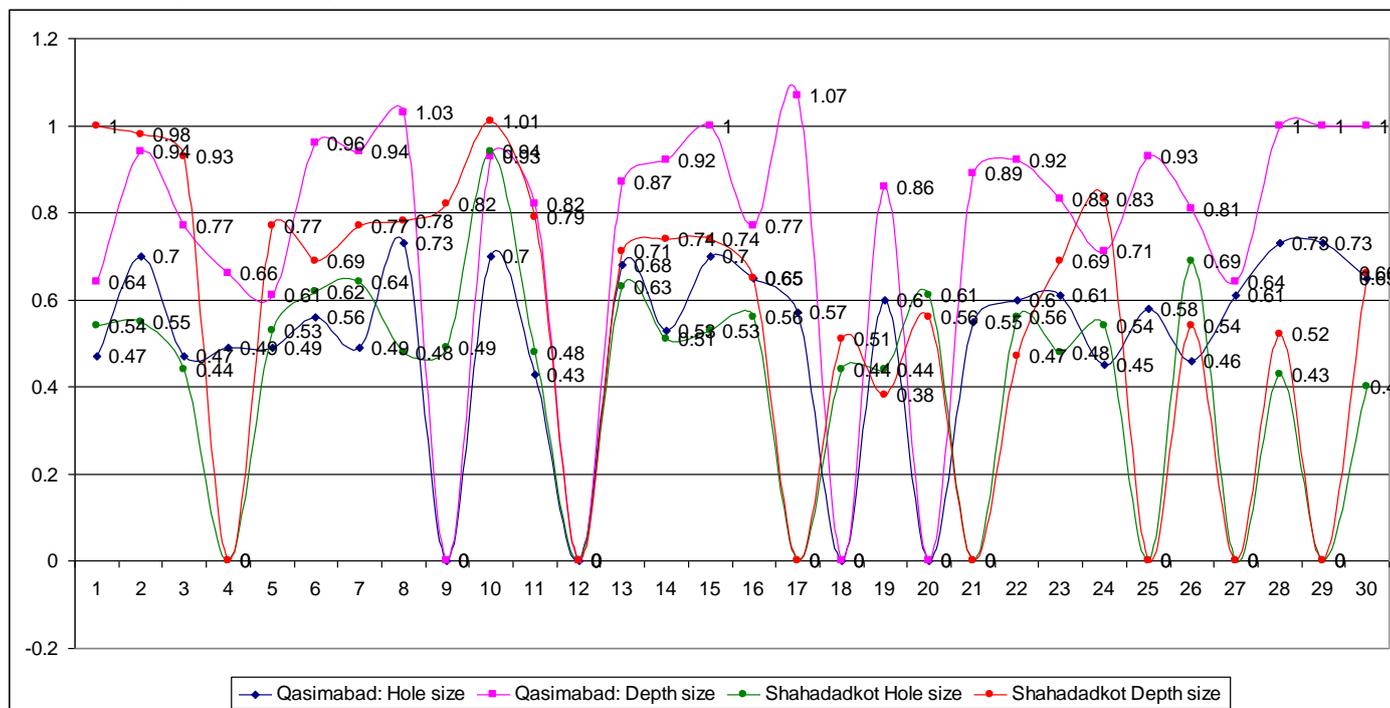


Fig. 5: Examination of average size (cm<sup>2</sup>) of Tomato fruit bodies infested by tomato Fruit Borer collected from Qasimabad and Shahdadkot local green market's vegetable shops

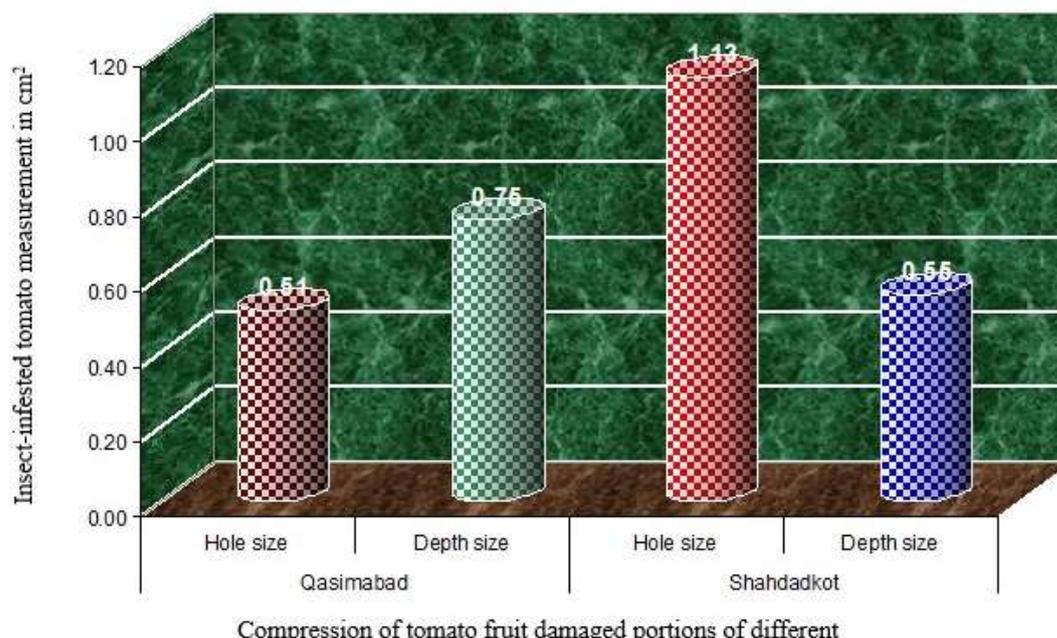


Fig. 6: Examination of infested Tomato fruit bodies' total average size (cm<sup>2</sup>) infested by tomato Fruit Borer collected from Qasimabad and Shahdadkot local market's vegetable shops

Insect-infested tomatoes are used as morphological characteristics damage checks under market conditions. Insect infested tomatoes were collected, the thickness, length of the fruit were measured, the holes and inner fruit (interior) portions of the damaged fruit by the larvae were also examined by in Department of Entomology, Sindh Agriculture University, Tando Jam. The number, size and damaged tomato fruits of Shahdadkot were greater as compared to Qasimabad. A random selection of 30 vegetable vendor shops was selected in each city of Sindh. The largest pest infested tomato fruit was 120, the minimum was 2. 4, 7 green vegetable vendor shops there no pests found in tomato fruits. Overall, 243 and 995 insect-infested tomatoes were found in 305,515 kg, 30, 30 vegetable vander shops in Qasimabad and Shahdadkot. The maximum and minimum mean thicknesses and lengths of tomato fruits were 3.73, 3.31 cm, 3.06, 2.82 cm and 5.19, 4.75 cm, and 2.98, 3.7, respectively. The overall maximum and minimum thickness and tomato fruit length were 2.77, 3.83 cm and 2.47, 3.51 cm, respectively. The maximum and minimum mean of tomato fruit hole and depth (internal feeding part) infested by insects were 0.73, 0.94 cm<sup>2</sup> and 0.43, 0.61 cm<sup>2</sup> and 1.07, 1.01 cm<sup>2</sup> and 0.4, 0.38 cm<sup>2</sup>, respectively. While, the Overall total average hole diameter depth of the insect-infested tomato fruit was 0.51, 1.12 cm<sup>2</sup> and the total depth was 0.75, 0.55 cm<sup>2</sup> of the Qasimabad and Shahdadkot recorded respectively.

The present study agrees with those of Degri and Zainab (2013) Investigated pests of dried fruits and vegetables in the north-eastern part of Nigeria, which were obtained from market men and women and six state markets. Twenty of the infested levels in each of the dried fruits and vegetables were initially evaluated, and each sample was evaluated

monthly to understand the number of infested and un-infested. Tomatoes (*Lycopersicon esculentus* Mills) were severely infested and cause loss of quantity, quality and market value.

The present study also partially agrees with the Fontes *et. al.* (1990) an experiment was conducted to determine the fruit size. Tomatoes sizes were observed for double extra-large diameter > 60 mm, extra-large 56 to 60 mm and large 52 to 56 mm fruit.

This study is agreed with those Masood *et. al.* (2013) described that the Fruit borer is a serious pest of tomato, the larva holes in the fruit to reach the size of the peas and it reduces yield.

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