

## A Preliminary Survey of Harmful Date Palm Fauna in D.I.Khan

### ABSTRACT

A survey was conducted to find out date palm fauna in D.I.Khan on the variety "Dhakki" in the months of June to September, 2014. The observed insects including *Rhynchoforus ferrugineus*, *Palaminus simony*, *Palaminus nilgiriensis* (Staphylinidae), *Sparostes striatulus* (Carabidae), *Coccinella septempunctata* (Coccinellidae), *Cleroda apicicornis* (Lygidae), *Monomorium indicum* (Formicidae) and *Blata orientalis* (Blattidae). All the three stages (larva, pupa and adult) of *Rhynchoforus ferrugineus* were collected from within the palm and it was found as the major insect. Among the pollinating insects; beetles, bees (honey bees and bumble bees) and flies were observed and collected. In addition to above mentioned insects, myriads of arachnids viz. *Peucitiaprasina*, *Acanthodancrassus*, *Acanthodan fortis* and snails viz. *Monoca obstructa* were also collected from the leaves and stem, respectively. All the insects had no effect (harmful or useful) on the date palm, except Red Palm Weevil (RPW)

**Key words:** Date palm, Dhakki variety, Red palm weevil, Fauna

### INTRODUCTION

In Pakistan, date palm (*Phoenix dactylifera* L.) is the most important fruit tree (Rizk and Sharabasy, 2007). It is exported to the Middle East, USA, India and Europe. Dhakki date is grown in the nearby village of Dhakki, 49 Km away on chashma road from D.I.Khan (KPK) to Mianwali (Punjab).

The cultivation of edible date palm (*Phoenix dactylifera* L.) was started 8000 years ago. It plays an influencing role in flourishing of civilization in arid areas (Khattak, 2002).

In 2012, total production of date palm was 600 thousand tons in Pakistan which made it its 5<sup>th</sup> largest producer worldwide (FAO, 2014). Date is nutritive, economical and most important fruit of D.I.Khan. It is an ideal food commodity with enormous benefits for human health due to its essential nutrient contents (El-Hadrami and Al-Khayri, 2012). On percentage basis it contains 2.3-5.6% proteins, 6.4-11.5% dietary fibers, 0.2-0.5% fats and 44.88% of soluble sugars (Zeeshan *et al.*, 2017). Dhakki is high yielding cultivar and has best drying quality. Presently Dhakki date is one of the major export items of our country. Many insects pests attack date and adversely affect its quality and quantity, however, borers are the major pests of date.

Among the borers, the Red Palm Weevil (RPW) is the most harmful one which has expanded over a large geographic area since 1980s. In 1985, it reached UAE and Saudi Arabia from where it spread to Egypt and Middle East. In

Israel, Jordan and Spain, its presence was confirmed in 1994, while it was detected in Palestine in 1999, Italy in 2004, Canary Islands in 2005, Greece, France and Balearic Islands in 2006, and Turkey in 2007 (Malumphy & Moran 2007).

It completes its entire life cycle inside the trunk of date palm tree. About 300 eggs are deposited by the female in different holes or injured sections of the trunk. The legless grubs hatch from these eggs after 2-5 days which readily start boring the interior of the trunk by feeding on the soft tissues and discarding the entire fibrous material. The larval stage may range from 1 to 3 months. In pupa stage, it makes a fibrous cocoon around itself, while after 14-21 days of pupa stage, an adult weevil emerges (Hussein *et al.*, 2010).

Abdullah and Latif (2002) described morphology, life cycle and control of red palm weevil in D.I. Khan, Pakistan.

In a survey conducted by the date palm institute of Khairpur, 219 date palms i.e. 5.81% out of the selected 46 orchards were found to be infested with RPW (Al-Saoud, 2010).

Considering that Phoenix plays an important role in increasing employment and capital income shortage, the date palm biodiversity requires a more comprehensive knowledge in order to solve its insect pest problems. So it is necessary to elaborate a strategy of preservation to protect its production, adaptation and resistance.

## MATERIALS AND METHODS

A survey of fauna attacking on date palm orchards in Paharpur Tehsil, District Dera Ismail Khan (KP), Pakistan was carried out during June to September 2014. Several date palm growing locations were inspected for insect infestation. At any selected location, date palm trees with their offshoots were carefully examined. Inspection covered roots, stem, leaflet and leaf midrib. Sample per orchard ranged between 40-50 palms.

**The quantitative description of the fauna is as under;**

**Red palm weevil:** 2-20 per orchard

**Ants:** Numerous on each tree in all the selected locations

**Rove beetles:** 5-40 per orchard

**Spiders:** Gregarious colonies on all trees in each orchard.

**Mites:** 200-500 on average

**Snails:** 50-100 on average

**Lady bird beetles:** Numerous

**Bees:** 20-70 on average

## RESULTS AND DISCUSSION

A survey was carried out from June to end of September from cultivated orchard of *Phoenix dactylifera*. 12 species i.e. red palm weevil, rove beetle, ground beetle, lady bird beetle, bug, ant, spider, cockroach and snail were

recorded. The maximum infestation by weevil was noted during fruit ripening season (July, August).

Keeping in view the economic effects and previous literature, the insect pest of date palm fall in to following categories.

#### MAJOR PEST:

Red palm weevil (RPW), *Rhynchophorus ferrugineus* Olive (Curculionidae: Coleoptera) is the most common and economically important insect pest on date palm in D.I.Khan. It is also called Asian palm weevil. It was observed in each collection during June, July and August. About 300 eggs are laid by the female, which hatch normally after 2-5 days. The larvae feeds on the soft tissues of the trunk and make it hollow. Larval stage prevails for 1-3 days and then the pupa emerges which makes a fibrous cocoon around itself. After 2-3 weeks of the pupa stage an adult is formed. *Rhynchophorus ferrugineus* grub mine their way in to stem from bases and as a result palm becomes hollow inside. Initially, the weevil affects the fruit production but later on the attacked orchards are killed.

According to local orchard owners, none of the available insecticides are effective against it. They further reported that the attacked plants never recover completely. *Rhynchophorus ferrugineus* remained on trees throughout the year,

with its population reaching the peak during the rainy season. RPW, besides date palm, is also a serious pest of coconut palm and royal palm.

The pest had been reported in Asia, Australia, Philippine and Thailand as early as 1962 (Mathen and Kurian, 1962). Lever advocated that the origin of RPW is tropical Africa, while Abraham *et al.* (1975) claimed that its origin was India. Later on the weevil was reported in Srilanka, Burma, Indonesia and Pakistan. Cox reported this pest from United Arab Emirates in 1985, in Saudi Arabia in 1987 and Egypt in 1992.

#### FREQUENT PEST:

The insects of frequent occurrence on date palm were ants (*Monomorium indicum*) and rove beetles (*Palaminus simony* and *P. nilgiriensis*).

The ants (*Monomorium indicum*) were collected from the roots of the date palm trees, where they were found in greater density. These were found in every tree but no harmful effect was seen.

The rove beetle was also observed in huge number during the fruiting season only in fallen fruits. Two species were identified as *Palaminus simony* and *P. nilgiriensis*.

#### OCCASIONAL PEST:

In addition to above mentioned major and frequent insects pests, some occasional insects were also observed in the study area.

Lady bird beetle (*Coccinellaseptumpunctata*) was collected from leaves of tree in orchard having Berseem fodder. It belongs to the family Coccinellidae which has six sub-families, out of which five are predacious while one sub-family is phytophagous in nature (Ullah *et al.*, 2012). About 90% of the 4200 species of Coccinellidae family are predators of insects like, aphids, scale insects and phytophagous mites etc. which are harmful for several agricultural and forest plants.

Ladybird beetles lay eggs on leaves, stems and sometimes on the trunk of palm tree as well. Larvae are usually brightly colored which pupates on the leaves by attaching the body to leaf surface. The life cycle is completed in one month, depending on the temperature and location. Adults can be seen in winter mostly in sheltered locations such as tree holes (Majerus and Kearns, 1989).

Ground beetle *Sparostesstriatulus* was another specie collected from the trunk at two localities. Two specimens were found, one in each of the June and September collection. It had mandibular mouth parts.

One bug specimen as *Cleradaapicornis* was collected from trunk of palm tree. Although it had sucking mouth parts, it still cannot be considered as a pest owing to its solo appearance in the collection.

A female *Blataorientalis* was also collected from date palm tree. Roaches are commonly found in household localities.

#### FREQUENT POLLINATORS

Frequent pollinators of date palm included ladybird beetles, bees and flies. However, beetles constitute the most important group of pollinators in palms, followed by bees and flies.

#### OCCASIONAL POLLINATORS

Occasional pollinators include mammals like bats.

#### GENERAL REMARKS

Apart from the insects, some other arthropods and mollusks were also observed on date palm trees.

Three species of spiders; *Peucitiaprasina*, *Acanthodoncrassus* and *A. fortis* were collected from leaves. Spiders were present in gregarious colonies in all localities. Each leaf contained at least one spider. Spiders are carnivorous in habit and are present as one of the major predators. Spiders spin web on the leaves that may indirectly affect the photosynthesis process.

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A specie of snail, *Monachaobstructa*, both mature and immature forms were found in large number on the palm trees. In fact all the trees were occupied by snails.

## CONCLUSION

The population of insects, other arthropods and mollusks collection was affected by environmental factors, insecticide residues and presence of other crops in the date palm field.

It can be concluded from the survey that all the date palm varieties are susceptible and cannot withstand the attack of red palm weevil, except dhakki variety which showed resistance towards this pest.

Special attention should be paid to control red palm weevil (RPW).

Agriculture research institutes should focus on the following strategies;

- Application of integrated pest management program.
- Taking great care during the plantation to avoid infested suckers.
- An understanding of biology and behavior of *R. ferrugineus*.
- Taking accurate control measures using effective insecticides.

From agricultural point of view it is an important export item, keeping in view the significant goodness of date variety (dhakki), it is a task for Biotechnologists to produce pest resistant varieties, as the complete control is justifiably difficult.

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#### **REFERENCES**

Abdullah, K. and A. Latif. 2002. Red palm weevil and its eradication. A brochure by entomology section, Agriculture development program, RattaKulchi, D.I. Khan.

- Abraham, V.A., K. M. Abdullah, Koya and C. Kurian. 1975. Evaluation of seven insecticides for control of red palm weevil, *Rhynchophorus ferrugineus*. FABR J. Plantation Crops., 3: 71-72.
- Al-Saoud, A. H. 2010. Effect of Red Palm Weevil *Rhynchophorus Ferrugineus* (Coleoptera: Curculionidae) aggregation pheromone traps' height and Colors on the number of captured Weevils. In IV International Date Palm Conference 882 (pp. 419-429).
- El-Hadrami, A. and J. M. Al-Khayri. 2012. Socioeconomic and traditional importance of date palm. Emirates J. Food Agric., 24: 371-385.
- FAO. 2014. Food and Agriculture Organization of the United Nations. Food and agricultural commodities production for Pakistan for 2012. Pp. 36-37.
- Khattak, A.W. 2002. Successful cultivation of date and its superb varieties. Project for the development of horticultural Frontier Province. (In Urdu).
- Hussein, W.B., M.A. Hussein and T. Becker. 2010. Detection of the red palm weevil (*Rhynchophorus ferrugineus*) using its bioacoustics features. Int. J. Animal Sound Rec., 19: 177-194.
- Majerus, M. and P.K. Kearns. 1989. "Lady Birds". University of Cambridge. Richmond Publishing Co. Ltd. P.O. Box 963, Slough, SL 23 RS, England. pp. 1-101.

Rizk, R.M. and S.F.E.L. Sharabasy. 2007. Descriptors for date palm (*Phoenix dactylifera* L.) characterization and evaluation in gene banks. *Pl. Genet. Resource News L.*, 150: 42-44.

Ullah, R., F. Haq, H. Ahmad, M. Inayatullah, K. Saeed and S. Khan. 2012. Morphological characteristics of ladybird beetles collected from District Dir Lower, Pakistan. *Afr. J. Biotech.*, 11 (37): 9149-9155.

Zeeshan, M., S.A. Saleem, M. Ayub, M. Shah and Z. Jan. 2017. Physicochemical and sensory evaluation of dhakki dates candy. *J. Food Processing Technol.*, 8 (3): 1-4.

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