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**Naziya P Pathan**

Department of Crop Protection,  
College of Horticulture,  
Sardarkrushinagar Dantiwada  
Agricultural University,  
Jagudan, Gujarat, India

**RS Jaiman**

Department of Crop Protection,  
College of Horticulture,  
Sardarkrushinagar Dantiwada  
Agricultural University,  
Jagudan, Gujarat, India

**AU Amin**

Department of Crop Protection,  
College of Horticulture,  
Sardarkrushinagar Dantiwada  
Agricultural University,  
Jagudan, Gujarat, India

**BG Prajapati**

Department of Crop Protection,  
College of Horticulture,  
Sardarkrushinagar Dantiwada  
Agricultural University,  
Jagudan, Gujarat, India

**Correspondence**

**Naziya P Pathan**

Department of Crop Protection,  
College of Horticulture,  
Sardarkrushinagar Dantiwada  
Agricultural University,  
Jagudan, Gujarat, India

## First report of *Rodolia fumida* Mulsant (Coccinellidae: Coleoptera) as a predator of scale insect (*Perisopneumon ferox* newstead) in aonla (*Emblica officinalis* Gaertn.) from Gujarat, India

**Naziya P Pathan, RS Jaiman, AU Amin and BG Prajapati**

### Abstract

A field study was undertaken on aonla (*Emblica officinalis* Gaertn.) during 2018 at College of Horticulture Farm, Jagudan, Gujarat. *Rodolia fumida* Mulsant found as potential coccinellid predator of aonla scale insect (*Perisopneumon ferox* newstead). It belongs to the Coccinellidae family of order coleopteran. Morphological characters of *R. fumida* include length 4.08-4.56 mm and width 3.36-3.66 mm. Form robust, elongate oval, narrowed towards apex in posterior half, dorsal side densely pubescent. Larva is robust, ellipsoidal in outline and white in colour. Pupa is dark reddish brown. Therefore, the present study is the first ever report of *R. fumida* as a predator of scale insect (*P. ferox*) infesting aonla from Gujarat, India.

**Keywords:** *Rodolia fumida*, *Perisopneumon ferox*, *Emblica officinalis*, Coccinellidae

### 1. Introduction

Aonla (*Emblica officinalis*) or Indian gooseberry is indigenous to Indian sub-continent. Aonla is mostly cultivated in the states of Uttar Pradesh, Maharashtra, Gujarat, Rajasthan, Andhra Pradesh, Karnataka, Tamil Nadu, Himachal Pradesh etc. The fruit is a good source of vitamin C. The fruit is having medicinal values. It has acrid, cooling, diuretic and laxative properties. Dried fruits are useful in haemorrhages, diarrhea, dysentery, anaemia, jaundice, dyspepsia and cough. Aonla is used in the indigenous medicines viz. trifla and Chyawanprash. Fruits are commonly used for preservation in form of murabbas, pickles, candy, jelly and jam. Besides fruits, leaves, bark and even seeds are being used for various purposes. In Gujarat, it is being cultivated in area of 8,540 ha with an annual production of about 85,350 tonnes and productivity of 9.99 MT/ha [2]. Though, it is considered to be a hardy fruit crop, not less than 30 insect and mite species have been recorded feeding on this tree from different places, mostly from India [6]. Among them, scale insect (*Perisopneumon ferox* newstead) was reported as emerging pest of aonla in Gujarat [9]. Coccinellidae (Coleoptera) comprises magnificent insects that are commonly known as ladybirds or lady beetle. Mostly they are predaceous on numerous phytophagous insects. They vary in size from a few millimetres to almost square-inch with fabulous colours. These beetles are economically important because the phytophagous members cause severe damage to the agriculture products whereas, carnivorous members predate on aphids, coccids, plant mites and other soft bodied insects. *Rodolia* species have a semi-spherical body, covered with dense, short hairs. They are reddish-purple, with or without black spots. Adults of *Rodolia* species feeding on females of cottony cushion scales (*Icerya* sp.). *Rodolia* species regularly feed on aphids and small mites, which makes them good as biological control agent [3]. There was no report regarding the *Rodolia fumida* as a predator of scale insect (*P. ferox*) in aonla from Gujarat, India.

### 1.1 Distribution

In India, *R. fumida* was recorded from Assam, Bihar, Delhi, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Punjab, Uttar Pradesh, West Bengal and Tamil Nadu [5].

## 2. Materials and Methods

The present study was conducted during 2018 at College of Horticulture Farm, Jagudan in Gujarat, India. Coccinellid predator (*R. fumida*) as a predator of scale insects (*P. ferox*) was observed in aonla (*E. officinalis*). Coccinellids were collected and preserved in 70 per cent ethyl alcohol. Specimens were sent for identification to the Principal Scientist, ICAR-National Research Centre on Banana, Trichy.

## 3. Results

In the present study, infestation of *P. ferox* was observed on aonla (*E. officinalis*) field in the month of May and June. Simultaneously, occurrence of their predator of coccinellids (*R. fumida*) was recorded during the months of June and July. Grub as well as adult of *R. fumida* both are predatory in habit on scale insect, *P. ferox*.

*Perisopneumon ferox* was the first time noticed to feed on aonla plants. This pest was naturally parasitised by *R. fumida* in Gujarat. Therefore pest and predator both are first time found and reported from Gujarat, India.

### 3.1. Morphological characters

Eggs are orange to reddish in colour. Early instar grubs are black in colour later on, change into white. Grub is robust, ellipsoidal in outline and white colour. Pupa is dark reddish brown in colour. Adult, length 4.08-4.56 mm, width 3.36-3.66 mm. Form robust, elongate oval, narrowed towards apex in posterior half, dorsal side densely pubescent. Dorsal side

more or less uniformly reddish-brown, elytra sometimes with ill-defined darker patches. Antenna short and eight-segmented.

### 3.2. Feeding potential

Grub can eat away 2-3 scale insect/day. Its grub prefers to feed on early instars of scale insect (*P. ferox*). One mature predatory grub takes 4-5 hours to feed one scale insect. After 4-5 hours, scale insect completely shrinks out and ultimately they died. Adult also feeds on scale insect but feeding potential less as compared to grub stage of *R. fumida*.

## 4. Discussion

*Rodolia fumida* was reported as a predator of *Aphis craccivora* [7], *Drosicha stebbingi* Green [8], *Icerya purchasi* and *Phenacoccus solenopsis* [4]. *Rodolia fumida* recorded as bio-control agent of mealybug and its peak activity was observed during the months of April to September [10].

### 4.1. Prey associated habitat

*Aleurodicus dispersus* Russell, *Drosicha mangiferae* Green, *Perisopneumon ferox* new stand, *Perisopneumon tamarindus* (Green), *Perisopneumon* sp. collected from sugarcane, mango, citrus, guava, erythrina, tamarind, palmyra palm and ornamental plant such as *Acalypha* sp [11].

*Rodolia fumida* was recorded to feed on *P. ferox* in aonla during investigation. There was no any report on this predator in past and therefore; it is the first report from Gujarat.

### Life cycle of *R. fumida*



Eggs



Grub



Pupa



Adults

### Predatory activity of *R. fumida*



Grubs of *R. fumida* feeding on *P. ferox*



Adults of *R. fumida* feeding on *P. ferox*

#### 5. Conclusion

The present investigation was the first ever report of *Rodolia fumida* Mulsant as a coccinellid predator of scale insect (*P. ferox*) from Gujarat, India. Infestation of *P. ferox* was recorded on aonla (*E. officinalis*) and simultaneously, population of coccinellid predator was also observed for the first time at College of Horticulture Farm, SDAU, Jagudan of Mehsana district, Gujarat.

#### 6. Acknowledgement

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