

## First report of *Withania somnifera* (L.) Dunal, as a New Host of Cowbug (*Oxyrachis tarandus*, Fab.) In Plains of Punjab, Northern India

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**Abstract:** During February-June 2009-10, cowbugs were found on aerial apical parts of Ashwagandha (*Withania somnifera*) plants in the Amritsar District of Punjab. The cowbugs fed on apical portions of the stem, making them rough and woody in appearance, brown in colour that gradually dried and apical leaves were shed off. These cowbugs were identified as *Oxyrachis tarandus* [1] (Hemiptera: Membracidae). To the best of our knowledge, this is the first report of *Withania somnifera* (L.) Dunal as a new host for *O. tarandus* in Punjab province of Northern India.

**Key words:** Ashwagandha • Cowbug • Pest • *Oxyrachis tarandus*

### INTRODUCTION

*Withania somnifera* (L.) Dunal, commonly known as Ashwagandha, is a high value medicinal plant, which is extensively used in Ayurvedic, African and Unani Systems of medicine [2]. This is cultivated in some parts of central and northern India as a rather non-conventional medicinal plant crop. Leaves and roots of this plant are widely utilized in preparations of various herbal drugs or home-made remedies for its anti-cancerous, anti-proliferative, anti-oxidative, anti-inflammatory, anti-arthritis, anti-bacterial, anti-diabetic and anti-genotoxic properties [3, 4, 5]. The leaf extract of Ashwagandha have been reported for the selective killing of cancer cells [5]. Of critical concerns are the diseases [6] or pests [7] infesting the leaves of Ashwagandha which in turn affects its aesthetic and medicinal value. Present study is aimed at identifying various pests infesting *W. somnifera* in Punjab, under natural conditions of temperature and humidity. To best of our knowledge, the present investigation is the first report of *Withania somnifera* (L.) Dunal as a new host for *Oxyrachis tarandus* from Punjab province of Northern India.

### MATERIALS AND METHODS

*W. somnifera* plants were grown in the earthen pots in a screen house (74°49'23" East longitude, 31°38'12" North latitude and 221 meters above the sea level) of the

Department of Biotechnology, Guru Nanak Dev University, Amritsar, Punjab, India. Each earthen pot (26 cm in diameter) was filled with about 7.0 kg soil mixture (soil: sand: cow-dung manure:: 2: 1: 1) and in total 120 pots were maintained in natural conditions of temperature and humidity. Irrigation was done on daily basis to achieve soil-water field-capacity and the earthen-pot management was done as per regular agricultural practices. All parts of the plant especially leaves, were regularly observed for any pest infestation or disease symptoms for more than two years (February, 2009 to June, 2011). To study the life-cycle of this pest, the insects were cultured on cut twigs (tender shoot with growing apices) of *W. somnifera* in laboratory conditions at 25±5°C in cylindrical glass-jars (20 × 15 cm<sup>2</sup>) covered with muslin cloth. Images were taken using Sony cyber-shot DSC W350 and Olympus Stereo-microscope (Olympus corp., Japan) coupled Magnus image capturing device.

### RESULTS AND DISCUSSION

In March-April (average minimum temperature 16°C, average maximum temperature 31°C), cowbugs were found on Ashwagandha plants feeding on the shoot apices. All stages of the cowbugs were observed on the various aerial parts of the plants (on tender apical parts of twigs, pedicels of the leaves and tender branches). The insects emerged from the eggs laid by the female on the young

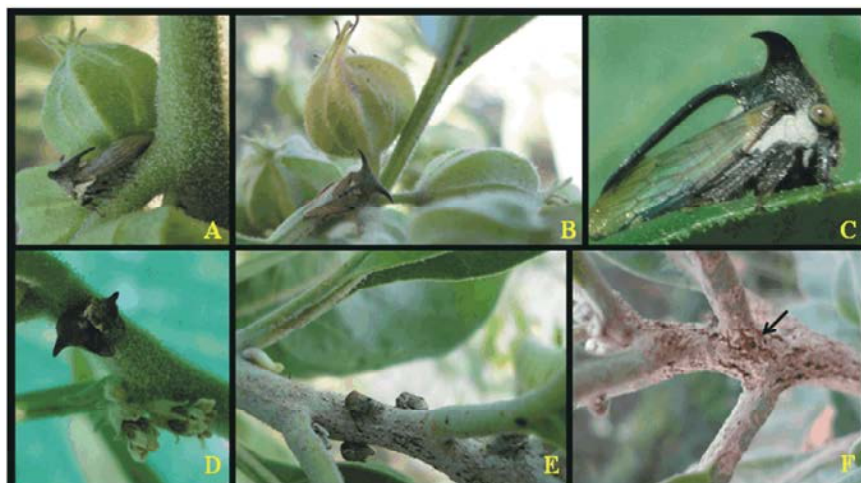


Fig. 1: *W. somnifera* plant infested by Cowbug (*O. tarandus*)

- A. Lateral view of *O. tarandus*
- B. Dorsal view *O. tarandus*
- C. Close up view *O. tarandus*
- D. Mating *O. tarandus* insects
- E. Young *O. tarandus* insects feeding on stem
- F. Highly damaged area of stem after heavy infestation by *O. tarandus* (corky damaged area is shown by arrow)

stems, in groups, from where the nymphs emerge. Further, the nymphs (green in colour) and adults of these cowbugs were attended by a large number of black ants, for honey dew secreted by them. All the stages of insect pest were collected from infested shoots (larvae and adults) during March-April, 2010. Besides this, cowbugs were also recorded on Ashwagandha plants grown in shade during relatively warmer and dry periods of the year (May-June). The cowbugs feed on the apical part of the stem and during the periods of heavier infestations they feed extensively on young apical stems, gradually making them rough and corky in appearance with the characteristic feeding marks (Fig. 1F). They apical portion of stem may dry up and shed off on heavier infestations, whereas on moderate infestations the apical growth ceases and the leaves undergo wilting.

*O. tarandus* (Hemiptera: Membracidae) is 4-7 mm long, yellow eyed, winged insects with three pairs of legs two curved horns like projections on the thorax and it look like a miniature cow (Fig. 1A, B, C, D). A black long protrusion extended along its back (Fig. 1C). During heavier infestations periods (March-April) 20-30 bugs/twig were recorded. Nymphs develop a dense cluster around stem's apex and underside of apical leaves. The adult bugs are very active and shy in nature, they move to other side of the stem if they see somebody watching. These *O. tarandus* nymphs secrete a sugary

substance called 'honey dew' which serves as food for ants and bees. These cowbugs can be easily recognized by pronotum which takes characteristic ornamental shape in Cow bugs. The pronotum of *O. tarandus* is extended backward over abdomen. They have a pair of mesopleural processes. The wings are large and is concealed by pronotum. Besides *W. somnifera*, it has previously been recorded on mulberry in India [8, 9].

However, *Withania somnifera* is prone to various pests [7] and pathogens [2, 6]. The present study highlights its new pest in Punjab province of Northern India, doing moderate to severe damage to its foliar parts that may deteriorate its pharmaceutical potential and aesthetic value. However not much study has been undertaken on the management of the pests in India, the present report highlights the need of such studies on medicinal plant crops like *W. somnifera*.

## CONCLUSION

With the growing interest of public in herbal medicine, the cultivation of this medicinal plant gained momentum. Our group is working on the pests and pathogens associated with this a rather unconventional medicinal plant crop in Northern India. This crop is a new host for *O. tarandus* in the region, damaging apical parts and hence the plant biomass, thereby reducing its

medicinal and aesthetic value. Regular monitoring of this voracious pest in relation to crop damage to *W. somnifera* plants will help in designing a viable integrated pest management strategy for this medicinally important crop in the Punjab region.

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