

## Studies on *Edales pandava* Horsfield of family Lycanidae (Lepidoptera) infesting on plants of family Cycadaceae from Punjab, India

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**ABSTRACT:** A butterfly species i.e., *Edales pandava* Horsfield belonging to the family Lycanidae infesting on plants of family Cycadaceae from different district/localities of Punjab have been reported. The details on the biological studies, sexual dimorphism, and other aspects are also provided.

**Keywords:** *Edales pandava* Horsfield, Lepidoptera, infesting on plants, Punjab

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### INTRODUCTION

Cycads are known to be among the oldest plants on earth, unchanged for millions of years, native to various areas of Southern Japan. It is the only genus recognized in the family Cycadaceae with about 95 species. Cycads are dioecious plants, or in other words, there are separate male and female plants. The female plant produces the seeds, and the male produces cones with pollen in them. *Cycas revoluta* is called "the living fossil" because its origin can be traced back to the ancient flora of the early Mesozoic era i.e. 200 million years ago.

Cycads are found across much of the subtropical and tropical parts of the world. The best-known species is *Cycas revoluta*, widely cultivated under the name "Sago Palm" or "King Sago Palm" due to its palm-like appearance although it is not a true palm. The generic name comes from Greek *Koikas*, and means "a kind of palm". The genus is native to the Old World, with the species concentrated around the equatorial regions. It is native to eastern and southeastern Asia including the Philippines with 10 species (9 of which are endemic), eastern Africa (including Madagascar), northern Australia, Polynesia, and Micronesia. Australia has 26 species, while the Indo-Chinese area has about 30. The northernmost species (*C. revoluta*) is found at 31°N in southern Japan. The southernmost (*C. megacarpa*) is found at 26°S in southeast Queensland, Australia.

Its unique shape and texture provide interest in both the landscape and indoors. It is a very symmetrical plant with fronds growing in a circular pattern creating a rosette. It is usually a single trunked, very slow growing palm with dark green leaves having glossy, stiff and pointed leaflets. Sago palm is relatively easy to grow and that lends a real sense of the tropics to any environment. It grows best in sandy, well-drained soil, preferably with some organic matter. It is fairly drought-tolerant and grows well in full sun or outdoor shade, but needs bright light when grown indoors. It can also handle full shade with no ill effect. It is also a cold hardy and can tolerate temperatures up to 15<sup>0</sup>F. Propagation of sago palms is either by seed or by removal of basal offsets. The plant takes several years to grow; sexual reproduction takes place after 10 years of exclusive vegetative growth.

*Cycas revoluta* has become a very popular landscape plant and is the most common cycad used in landscape today. Being a symmetrical plant, it is a characteristic feature of almost all formal gardens. It is an excellent plant used as a specimen plant for its appearance in the garden, container plant for use outdoors and in the home. In Japan the sago is also used as a bonsai plant. The sago is most attractive when the new leaves appear in late spring or early summer. It is a great plant for entryways or by the patio. The glossy metallic leaves are harvested and used as a florist green in bouquet making, flower arrangements and wreaths.

## MATERIAL AND METHODS

In the present investigation, authors regularly visited the various sites of Department of Floriculture and Landscaping, where a large number of *Cycas* species plants were planted. The sample of the different immature stages were collected from various localities of district Ludhiana, Patiala, Amritsar, SBS Nagar, Moga, Ferozepur, Jalandhar, Hoshiarpur and Kapurthala along with PAU Campus and nearby botanical gardens and residential landscapes. The immature stages (egg, larvae, pupa) were collected from the infected plants in different rearing jar. The later place in the natural condition of the taxonomy laboratory of the Department of Entomology. The photographs of each stage were taken with the help of Leica MZ 16 and with Nikon D200. After critical examination from various literature and by Comparison at National Pusa Collection, which is housed at division of Entomology, IARI, New Delhi the species was identified as *Edales pandava* (Horsfield) belonging to family Lycanidae of order Lepidoptera.

## RESULTS

The detail scientific classification of the identified species is given below:

Kingdom: Animalia  
 Phylum: Arthropoda  
 Class: Insecta  
 Order: Lepidoptera  
 Superfamily: Papilionoidea  
 Family: Lycanidae  
 Subfamily: Polyommatae  
 Genus: *Edales* Swinhoe, 1910  
 Species: *pandava* Horsfield

### Genus: *Edales* Swinhoe, 1910

*Edales* swinhoe, 1910, in Moore *Lep. Indica* :37.

Type-species: *Edales pandava* Horsfield

**Distribution:** W Palaearctic, Afrotropical, New Zealand, E palaearctic, Malagasy, Nearctic, Oriental, Australasian and Neotropical (www.nhm.ac.uk)

**Dignosis:** Forewing : Female with forewing elongated, triangular, costal nervure extending to nearly half length of the margin, first subcostal nervule free from costal nervure but running along its end, emitted beyond one-half before the end of the cell, second subcostal at one-third, third subcostal at one-sixth, fourth subcostal at one-half from third, and terminal before the apex, fifth sub costal, upper discoidal from the end of the cell; disco-cellular nervules slightly oblique, nearly straight, radial, lower discoidal from their middle, discoidal cell long, extending to more end of the cell.

### *Edales pandava* Horsfield, 1829- Plains Cupids

*Lycaena pandava* Horsfield, 1829, *Cat. lepid. E.I.C*: 84, n.19.

*Lycaena* Swinhoe, 1910, *Lep. Indica* 8:37, types of *Edales*

**Distribution:** India, Sri Lanka, Burma, Andamans, Nicobars, Nepal, East Pakistan and Mauritius to Myanmar, Thailand and the Sundaland (Wynter-Blyth, 1957), south east Asia including Thailand, Vietnam, China, India, Singapore, Sumatra, Borneo and probably Burma, Cambodia and Laos (Kumar and Bhardwaj, 2009).

**Habitat:** Forest fringe, secondary growth and gardens.

**Larval Food plants:** Caterpillars feed mainly on the emerging leaves of ornamental *Cycas* species, such as, *Cycas revoluta* (Sago Palm), *Cycas rumphii*, *Cycas micronesica* (Fadang) and *Cycas sphaerica*, etc. Larvae are attended to by ants that protect them from parasites and predators, while at the same time feeding on the sugary liquid exuded from the caterpillars' backs. *Cycas revolta* Bedd. (Cycadaceae) (Bingham, 1907); *Xylia dolabriformis* Benth. (Leguminosae) (Wynter-Blyth, 1957); *Cycas circinalis* Linn. (Seki *et al.*, 1991).

### Description:

**Egg:** Its pale green-colored eggs are laid singly on newly emerging fronds that are circinate coiled (Plate-1, a).

**Larva:** The early instar larvae are colored purple but subsequently change to green in later stages. Larva on dorsal side reddish where as larva on ventral side greenish red. The caterpillars feed on tender emerging shoots of Cycad palms that have not yet hardened, thus destroying the potential beauty of these slow-growing ornamentals. The larvae feed on the tender and young leaves of *Cycas* (Tang and Oberprieler, 2006) (Plate-1, b,c,d).

**Pupa:** Pupation takes place in the soil and reddish in colour (Plate-1,e).

**Adult:** (Wing expanse: Length 1.5 to 2.0 cm; Width: 3.0cm). Blue butterflies are really very tiny and diminutive, seen in a group of 3-5 adults, sexual dimorphism take place in adults (Plate-2, a-d), body small, short, palpi slender, porrect, second joint long, projecting two-thirds beyond the head, attenuated at its tip, clothed with long adpressed scales, third joint very long, naked; legs slender, antennae with a stout grooved club. Underside with base colour greyish brown with white and darkish-brown markings that are beautifully patterned. Hind wings with some small black spots encircled in white, with 2 larger black spots that are inwardly crowned with orangy-yellow at lower end and has a short white-tipped tail. Upperside with softly toned lavender-blue, hence aptly given one of its common name, the Cycad Blue Butterfly (Plate-1).



(a) Egg



(b) Larva



(c) Larva (ventral view)



(d) Larva (dorsal view)



(e) Pupa



(f) adult

**Plate-1.** Biological studies of the species *Edales pandava* Horsfield.



(Upperside)



(Underside)



(Upperside)



(Upperside)

**Plate -2.** Sexual dimorphism of the species *Edales pandava* Horsfield.

**Material Examined:**

**Punjab:** Ludhiana, Patiala, Amritsar, SBS Nagar, Moga, Ferozepur, Jalandhar, Hoshiarpur and Kapurthala (Present study).

**Remarks:** Horsfield (1829), placed under genus *Lycaena* and later Kumar and Bhardwaj (2009) places this under genus *Chilades* and in the present communication under the genus *Edales*. The species has identified as *Edales pandava* (Horsfield) which was placed under *Chilades panadava pandava* (Horsfield) by Kumar and Bhardwaj in 2009. The variations in length of forewing, maculation, costal spot on undersurface of forewing, which has been lacking in some adults have been reported. The species was also reported on Cycads in Andhra Pradesh in India (Raju *et al.*, 2009), Guangdong province of China (Guang Hua *et al.*, 2003) and Reunion Island of France (Rochat, 2010).

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