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## First report of fig leaf roller, *Phycodes radiata* Ochseneimer on weeping fig in Gujarat

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**Abstract**

A heavy incidence of fig leaf roller (*Phycodes radiata* Ochseneimer) was observed on an ornamental shrub, weeping fig (*Ficus benjamina* L.) in Jabugam village of Bodeli taluka of Chhotaudepur district in Gujarat very first time. A survey was conducted in all six talukas of Chhotaudepur district in middle Gujarat during August-September 2020. The larval incidence of fig leaf roller per 10 shrubs of weeping fig was recorded during a survey. The larvae cause rolling of leaves and feed remaining inside by scrapping green matter leaving leaves as papery tissue which eventually get dried up. The highest (16.4 larvae/10 shrubs) was recorded from Bodeli taluka whereas, Naswadi was recorded with the lowest (3.4 larvae/10 shrubs) larval incidence.

**Keywords:** Fig leaf roller, *Phycodes radiata*, weeping fig

**Introduction**

In present time, whole world is suffering from air pollution which is a major risk to human health. It is not only prevailing outdoor but indoor also; each year, around 4 million people die prematurely from illness attributable to household air pollution from inefficient cooking practices which cause various health related issues [16]. People are well aware of their health and employing different measures to deal with household air pollution. One of the ways is to plant indoor shrubs and herbs that help reduce air pollution by their air purifying characteristics. Besides, these indoor plants can also help beautifying homes too. *Ficus benjamina* L. Is one of the most used indoor plants that have medicinal potential, antimicrobial, antinociceptive, antipyretic, hypotensive and anti-dysentery as well as insect repellent properties [1]. It belongs to moraceae family and commonly known as weeping fig tree, benjamina fig, golden fig, java fig, java tree, oval leaf fig tree, small leaf rubber plant and tropical laurel. Though *F. benjamina* can be grown easily, a number of insect pests attack on viz., whitefly, mealybug, spider mites, thrips, scales and leaf roller.

**Materials and Methods**

The present investigation was carried out during 2020 in all six talukas (Chhotaudepur, Pavijetpur, Kawant, Naswadi, Sankheda and Bodeli) of Chhotaudepur district of middle Gujarat. The survey on population of fig leaf roller (*P. radiata*) on weeping fig (*F. benjamina*) was carried out during August, September and October 2020. For that, extensive rapid roving survey was conducted to get clear idea of damage as well as larval incidence on weeping fig shrubs. From each taluka, larval population was recorded per 10 weeping fig shrubs. Larvae of fig leaf roller were collected during survey and brought to College of Agriculture, Jabugam, Bodeli, Chhotaudepur for further rearing. After laboratory rearing of larvae on weeping fig leaves, emerged adult moths were killed in KCN contained insect killing jar and then spread and pinned properly for photography and identification purpose.

**Results and Discussion**

Fig leaf roller (*Phycodes radiata* Ochseneimer) was very first time observed infesting weeping fig (*Ficus benjamina* L.) at College of Agriculture, Jabugam, Bodeli, Chhotaudepur, Gujarat in July 2020.

**Taxonomic tree** [12]

Domain: Eukaryota  
Kingdom: Animalia

Phylum: Arthropoda  
 Subphylum: Uniramia  
 Class: Insecta  
 Subclass: Pterygota  
 Order: Lepidoptera  
 Superfamily: Sesioidea  
 Family: Brachodidae  
 Subfamily: Phycodinae  
 Genus: Phycodes  
 Specie: *Phycodes radiata*

Fig leaf roller (*Phycodes* sp.) is a minor insect pest that had been found to cause damage to many of the *Ficus* species (*F. carica*, *F. religiosa*, *F. benghalensis*, *F. racemosa*, *F. tsiela*, *F. benjamina*, *F. sur*, *F. urceolaris*, *F. heterophylla*, *F. palmate*, *F. glomerata*), *Xanthium* sp. and *Paulownia* sp. from India, Sri Lanka, East Africa and oriental region [4] [2].

The genus *Phycodes* Guenee (1852) has many species in different regions of the world. Various species of genus *Phycodes* have been reported from different areas viz., *Phycodes celebica* Kallies, 1998 (Sulawesi, Indonesia), *Phycodes chalcocrossa* Meyrick, 1909 (Middle East, Arabia), *Phycodes chionardis* Meyrick, 1909 (Sri Lanka), *Phycodes maculata* Moore, 1881 (Assam, India), *Phycodes minor* Moore, 1881 (Punjab, Haryana, South and South East Asia), *Phycodes penitis* Diakonoff, 1978 (North Borneo, Malaysia), *Phycodes radiata* Ochsenheimer, 1808 (Pakistan, Afghanistan, Nepal, India, Sri Lanka, Iran), *Phycodes taonopa* Meyrick, 1909 (Assam, India; Vietnam) and *Phycodes tortricina* Moore, 1881 (South India) [5] [6] [8]. There are many more species, other than these, were identified and reported viz., *Phycodes mesopotamica* Rebel (1910), *Phycodes pseliota* Meyrick (1920), *Phycodes mochlophanes* Meyrick (1921), *Phycodes superbella* Rebel (1931), *Phycodes eucallynta* Meyrick (1937), *Phycodes morosa* Diakonoff (1948), *Phycodes hirudinicornis* Guenee (1852), *Phycodes seyrigella* Viette (1955), *Phycodes adjectella* Walker (1863), *Phycodes omnimicans* Diakonoff (1978), *Phycodes tertiana* Diakonoff (1978), *Phycodes limata* Diakonoff & Arita

(1979), *Phycodes bushii* Arita (1980), *Phycodes albitogata* Walsingham (1891), *Phycodes punctata* Walsingham (1891) and *Phycodes substriata* Walsingham (1891) [9].

In India, *Phycodes radiata* Ochsenheimer is widely distributed and has been found infesting various *Ficus* species in Solan, Himachal Pradesh as well as New Delhi [15]. It was also reported infesting *Mimusops elengi* L. in New Delhi [7].

The adult moths have ocellus usually prominent but rarely secondarily absent. The head, labial palpi and thorax are smooth scaled with large plate like scales of metallic iridescence. Head appears to be retracted into thorax. Forewing is truncated distally [3].

The female moth lays eggs singly under newly developed leaf surface. Elongated eggs are initially brown and later turn into blackish grey colour. Eggs generally hatch within around 6.82 days of laying. Newly hatched larva is yellowish brown in colour and feed gregariously. Later on the larva appears to be darker in colour. Total larval period is around 19.84 days. Last larval instar finds sheath between leaves where it starts forming silken cocoon and pupate inside of it. It usually requires 9.70 days for pupation till emergence of adult moths. Adult moth longevity is about 6 to 8 days. Generally it takes 42 to 44 days to complete its total lifecycle. Total four overlapping generations of *P. minor* was observed in Ludhiana, India during March to September months in the year 1974 [13].

The larvae fold leaf lamina with help of silken thread and feed by remaining inside the leaf tunnel. Only upper epidermis remains intact while, lower epidermis and mesophyll tissues are completely fed up by larvae. Infested leaves turn yellow and then totally dry out. Diurnal habit of adult moths was observed as the found to be feeding on flowers of bitter gourd and bottle gourd [6]. In Punjab, 70-80% leaf damage in fig was observed to occur by *P. minor* and *P. radiata* during July to September months [14].

*P. radiata* was found to be naturally parasitized by larval parasitoids *Parotis vertumnalis* Guenee, *Apanteles phycodes* Viereck [10] as well as *Antrocephalus hypsiphylae* Narendran and *Tetrastichus howardi* Olliff [11].

**Table 1:** Larval incidence of fig leaf roller on weeping fig in all six talukas of Chhotaudepur district of Gujarat

Plant No.	Chhotaudepur	Pavijetpur	Kawant	Naswadi	Sankheda	Bodeli
	Larval population/plant					
1	26	10	5	1	3	12
2	9	1	3	6	7	9
3	19	8	7	1	8	21
4	6	10	0	4	2	14
5	13	11	1	9	7	18
6	17	14	0	1	6	10
7	15	7	10	3	9	27
8	11	8	8	3	4	23
9	7	17	0	1	7	19
10	3	12	2	5	9	11
Mean	12.6	9.8	3.6	3.4	6.2	16.4

### Survey of *P. radiata* on weeping fig

The infestation of fig leaf roller was observed at College of Agriculture, Jabugam, Bodeli. In context of that, a survey was carried out in order to get clear idea of fig leaf roller infestation on weeping fig in all six talukas of Chhotaudepur district in middle Gujarat during August and September 2020. Randomly ten shrubs of weeping fig were selected from each taluka and observed critically for larval incidence.

The highest (16.4 larvae/10 shrub) mean larval incidence was recorded from Bodeli taluka followed by Chhotaudepur (12.6

larvae/10 shrubs), Pavijetpur (9.8 larvae/10 shrubs), Sankheda (6.2 larvae/10 shrubs), Kawant (3.6 larvae/10 shrubs), and Naswadi (3.4 larvae/10 shrubs). The highest (27 larvae/shrub) was recorded from Bodeli taluka.

### Conclusion

From the above results, it can be inferred that among different talukas, the highest mean larval incidence was recorded from Bodeli taluka followed by Chhotaudepur, Pavijetpur, Sankheda, Kawant and Naswadi. The highest (27

larvae/shrub) was recorded from Bodeli taluka. Since weeping fig is commonly utilized as an ornamental plant in indoor as well as outdoor conditions, management of the fig leaf roller becomes more important.

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