Ecofarming
e-Magazine for Agriculture and Allied Sciences
http://www.ecofarming.rdagriculture.in
e-ISSN: 2583-0791

Surviving the Off-season

Trianthema portulacastrum L. as a host plant of *Spoladea recurvalis* F.

1. **P. Manikandan**
Department of Entomology, Faculty of Agriculture, Annamalai University, Chidambaram-608 002, Tamil Nadu
2. **R.Rengalakshmi**
Division of Eco technology, M.S. Swaminathan Research Foundation, Chennai- 600 113, Tamil Nadu.
Email: rudhran323@gmail.com

Received: February, 2024; Accepted: February, 2024; Published: April, 2024

Horse purslane, *T. portulacastrum* is one of the important weed species belonging to the family Aizoaceae, commonly known as the ice plant family. It is distributed throughout tropical and sub-tropical regions such as West Asia, Africa and tropical America. This weed plant was reported as a serious weed in India and distributed throughout the country. It is an annual herb forming a prostrate mat or clump with stems up to a meter long with a tap root system. It is green to red, hairless except for small lines of hairs near the leaves, and fleshy. The leaves have small round or oval blades up to 4 centimeters long borne on short petioles. Solitary flowers occur in leaf axils. The flower lacks petals but has purple, petallike sepals. The production of flowers and seeds of *T. portulacastrum* starts 20-30 days after germination of the seeds. Each plant produces 52,000 seeds in its lifespan (Kirtikar and Basu, 2003). It is reported as a weed in many agricultural and horticultural crop ecosystems. Especially in soybean, tomato, cotton, amaranthus beetroot etc., it can cause considerable yield reduction in main crops it may reach up to 50-80% when left untreated. Apart from the croplands it can survive on roadside landscapes, bunds of rivers and wasteland areas (Hazra *et al.* 2011; Kaur and Aggarwal, 2017).

The amaranthus leaf webber, *Spoladea recurvalis* (F.) (= *Hymenia recurvalis*) is an important pest of amaranthus belonging to the family Pyralidae, order Lepidoptera. Moths lay the pale spherical eggs in batches or single on the lower surface of the leaves. The caterpillar has undergone five instar stages and the colour widely varied between instars. The pupa was reddish yellow in the early stage and turned dark brown. The complete life cycle lasted for 3-4 weeks, with egg, larval and pupal stages of 3-4, 12-15 and 8-11 days, respectively. The caterpillar feeds on the epidermis and palisade tissues of the leaves which are webbed with silvery threads (Bhattacherjee and Menon, 1964). The incidence of *S. recurvalis was* reported on many host

plants beetroot, amaranthus, cotton, soybean and maize and weed host plants such as weedy amaranthus and horse purslane (Kedar and Kumaranag, 2013). Amaranthus cultivated as a leafy vegetable will be infested by *S. recurvalis* it needs to be managed by non-chemical measures or the pesticides are less effective on non-targeted organisms (Manikandan and Kannan, 2019; 2020).

The research aimed to study the major defoliator insects associated with amaranthus in the farmer field in the Vallampadugai village, Kumaratchi block of the Cuddalore of Tamil Nadu in 2017. The survey was conducted in the morning (8.30-9.30 am). The twenty-five random plants per location representing North, South, East and West of the amaranthus field were selected and the selected plants were examined for pest incidence. The incidence of leaf webber, *S. recurvalis* was recorded by counting the number of larvae present both on the leaves and within the webbed leaves. While recording the *S. recurvalis* incidence on amaranthus plants, we observed the *S. recurvalis* incidence on the weed plants present in the amaranthus field. After the first observation, we started to record the *S. recurvalis* larva incidence on horse purslane, *T. portulacastrum* located within and near the field for the year including the lean or off-season of amaranthus. Kedar and Kumaranag (2013) also reported the outbreak of *S. recurvalis* on *T. portulacastrum* present in different crops in Haryana.

Variation in the incidence of the number of larvae recorded on horse purslane, *T. portulacastrum* throughout the year. A population ranging between 0 to 5.5 larvae per plant was observed during the survey. During two amaranthus growing seasons, the *rabi* season 1st to 17th Standard Meteorological Week (SMW) 2017 the population ranges between 0.0 to 1.01 larvae per plant and in the *Kharif* season 27th to 38th SMW the incidence range between 0.0 to 1.17 larva per plant. During the amaranthus lean or off-season, from mid-April to June 2017 the incidence of *S. recurvalis* ranges between 2.19 to 5.51 larva per plant. Incidence was comparatively high in the lean/off-season of the amaranthus which indicated that during the absence of the main host (amaranthus), the leaf webbers were attracted towards the alternate host (Horse purslane). This finding is supported by Manikandan et al. (2019) who reported the high incidence of hadda beetle on its alternate hosts during the off-season of Brinjal.

The above observations show the potential of horse purslane as an attractive weed host of the *S. recurvalis* during crop and off-season. The *S. recurvalis* incidence can be reduced by removing the alternate host horse purslane during off-season and also the alternate host plants may be included as trap crops in the integrated pest management practices after further research. Isaianbu and Manikandan (2020) reported the trapping efficacy of alternate host plants of brinjal hadda beetle.

The weed plants are one of the major problems in agricultural and horticultural ecosystems. The weed competes with economically valuable crops for critical resources such as water and nutrients also can indirectly affect the crops by acting as alternate host plants for the pests of economically important crops. Especially it supports the off-season survival of crop pests (Manikandan and Rengalakshmi, 2023). On another hand weeds, play a major ecological role in the conservation of natural enemies such as predators and parasitoids (Ayyamperumal et al. 2020).

The weed flora in the ecosystem supports diversified pollinators groups during the off-season of main crops (Manikandan et al. 2023), also the floral diversification during the crop season may increase the abundance and diversity of the pollinators (Dhandapani et al. 2023). The decision on the management of the alternate hosts during the off-season should be location-specific and should be economically viable and benefit to the farmer.

Figure 1. The weed plant *Trianthema portulacastrum*

Figure 2. Larva of *Spoladea recurvalis* on Amaranthus

Figure 3. Moth of *S. recurvalis* on *T. portulacastrum*

References

1. Kirtikar, K.R. and Basu, B.D. (2003). Indian medicinal plants with illustrations. 2nd ed. Dehradun, India: *Oriental Enterprises,* 5:1640.
2. Hazra, D.T., Das, K. and Yaduraju, N.T. (2011). Interference and economic threshold of horse purslane (*Trianthemaportulacastrum*) in soybean cultivation in northern India. *Weed Biology and Management,* 11: 72–82.
3. Kaur, M. and Aggarwal, N.K. (2017). *Trianthema portulacastrum L.*- the noxious weed and its control. *Advances in Plants & Agriculture Research*, 6: 62–64. DOI: 10.15406/apar.2017.06.00213
4. Bhattacherjee, N.S. and Menon, M.G.R. (1964). Bionomics, biology and control of *Hymenia recurvalis* (Fabricus) (Lepidoptera: Pyralidae). *Indian Journal of Entomology,* 26: 176-83.
5. Kedar, S.C. and Kumaranag, K.M. (2013). Report on outbreak of *Spoladea recurvalis* (Fabricus) on *Trianthema portulacastrum* L. and its parasite from

Haryana, India (2013). *Journal of Entomological Research,* 37: 149-151.

6. Manikandan, P. and Kannan, R. (2019). Efficacy of an insect growth regulator on Amaranthus leaf caterpillar *Spoladea recurvalis* (Fab.) (Lepidoptera: Crambidae). *Pest Management in Horticulture Ecosystem*, 24: 241-246.
7. Manikandan, P. and Kannan, K. (2020). Evaluation of Novaluron 10 EC against Amaranthus leaf caterpillar *Spoladea recurvalis* (Fab.) for their feeding, growth and development. *Pestology,* 44: 29-33.
8. Manikandan, P., Saravanaraman, M., Selvanarayanan, V. and Suguna, K. (2019). Incidence and Host Preference of Brinjal Hadda Beetle *Epilachna vigintioctopunctata* (Fabricius) (Coccinellidae: Coleoptera) on Different Solanaceous Weed Hosts. *International Journal of Advances in Agricultural Science and Technology*, 6:1-13.
9. Isaianbu, A. and Manikandan, P. (2020). Trap cropping efficacy of an alternate host *Physalis angulata* against brinjal hadda beetle *Epilachna vigintioctopunctata* (Coccinellidae: Coleoptera). *Journal of Entomology and Zoology Studies*, 8: 712-715.
10. Manikandan, P. and Rengalakshmi, R. (2023). The first record of leaf-twisting weevil *Apoderus tranquebaricus* Fab (Curculionidae: Coleoptera) on the Indian butter tree, *Madhuca longifolia. Ecofarming,* 3: 318-320.
11. Ayyamperumal, M., Manikandan, P. and Suguna, K. (2020) Conservation biological control (CBC) – Tool for natural pest Control. *In*: Organic Farming for Sustainable Agriculture. Suthinraj, and Muthukumaran (Eds.). *JPS Scientific Publications,* India, pp: 198 – 211.
12. Manikandan, P., Malarvannan, S., Ranjith, R., Willcox, B. K., Rengalakshmi, R., and Deepa, S. (2023). Weed flora in field margins: An essential off-season resource for insect pollinators in Moringa (Moringa oleifera Lam.). *Global Development Conference 2023-Biodiversity and Sustainable Development, Universidad San Francisco de Quito (USFQ), Quito, Ecuador*, October 31 – November 01. Global Development Network.
13. Dhandapani, S., Pakkirisamy, M., Rajaraman, R., Garratt, M. P. D., Potts, S. G., Raj, R., Subramanian, M. and Senapathi, D (2023). Floral interventions enhance flower visitor communities and pollination services in moringa plantations. *Journal of Applied Ecology*, *00*, 1–13. https://doi.org/10.1111/1365-2664.14532.