



## Screening of natural enemies on *Trianthema portulacastrum* - a noxious weed of Andhra Pradesh

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*Trianthema portulacastrum* L. (horse purslane), a member of Aizoaceae, is indigenous to South Africa but it is widely distributed in tropical and subtropical areas as a noxious weed. It is considered as a major weed in various agricultural and vegetable crops, such as mustard (*Brassica* spp.), corn, pigeonpea, soybean, tomato, potato, onion and cotton. In India, horse purslane has been reported in the states of Uttar Pradesh, Punjab, Haryana, Rajasthan, Tamil Nadu and Andhra Pradesh and considered as a number one problematic terrestrial weed by virtue of its severe infestation in various agricultural and vegetable crops. Horse purslane is a strong competitor, reducing the yield of mung bean by 50-60% when left untreated. Significant losses in maize, soybean, and peanut yield are also attributed to this weed. Up to 60-70% infestation of this weed has been reported in pigeon pea and soybean fields and 80-90% in maize and brassica fields.

### METHODOLOGY

A systematic epidemic study was attempted for the screening of natural enemies of the weed plant. From the infected portion of the

weed, mycoflora were isolated and various pathenensis of fungal isolates was confirmed by Koch's postulates primarily and the host specificity of the isolates tests on green house plants by spore treatment.

### RESULTS

The mycoflora namely *Alternaria alternata* (Fr.) Keissler., *Colletotrichum capsici* (Syd.) E.J. Butler & Bisby., *Bipolaris maydis* (Y. Nisik. at C. Miyake) Shoemaker., *Curvularia lunata* (Wakker) Boedijin., *Curvularia tuberculata* Sivan. And *Gibbago trianthemae* E.G. Simmons was isolated from highly infected portions of the weed. Among the isolates, *Gibbago trianthemae* was highly aggressive to weed and it was considered as potential biocontrol agent (mycoherbicidal agent).

### CONCLUSION

Among the isolates, *Gibbago trianthemae* was highly aggressive to weed and it was considered as potential biocontrol agent (mycoherbicidal agent).

## Effect of *Zygomma bicolorata* and different fungal isolates on *Parthenium hysterophorus*

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*Parthenium hysterophorus* also known as Congress grass, is a prolific weed belonging to Asteraceae family, and has now become one of the world's seven most devastating and hazardous weeds. Approximately two million hectares of land in India have been infested with this herbaceous menace. It can only be managed effectively by developing an integrated approach involving many options in combination.

The biological control of *Parthenium* has been explored through beetle *Z. bicolorata* as well as different fungal isolates at Baru Sahib, Himachal Pradesh. Beetles morphology, different life stages and their egg laying capacity per day were investigated in a 2l beaker containing 10cm layer of soil with *Parthenium* plant.

One pair of beetles laid about 650-700 eggs in 20-22 days (max. 80 and min. 25) in lab conditions. The laid eggs hatched after 36 to 72 hrs, depending upon the moisture content inside the beaker. The larvae feed on leaves for 12 to 16 days and having 4 instars. After 4<sup>th</sup> instar, it enters the soil and pupates below (upto 3-5 cm depth). The beetles emerged after 8-10 days and completed their life cycle in 25-28 days. Both the adults and larvae were capable of feeding on the *Parthenium* leaves but not on the flowers. So floescence remains intact

which is one of the major limitations of beetles. Secondly, it was observed that *Z. bicolorata* is having different natural enemies (*Rhodoliacardinalis*, *Perillusbioculatus*, *Gryllus*, etc.) that feed on the eggs and larvae of beetles, so the population of beetles was not increasing in the natural environment. Therefore our second approach included the biological control through 5 different strains of fungi, viz. two *Alternaria* sp., two *Fusarium* sp., and one *Cladosporium* sp. Isolated strains' pathogenicity wastested individually as well as in combination (both in lab and field) against *Parthenium* with different control plants. In another approach disc plate technique was used to know the spore germination time and penetration route of fungus. All the strains were showing defoliation of leaves, but two species were completely effective on flowers, whereas one species was infecting both inflorescence and stem inside lab conditions. Out of all, only one *Fusarium* species was showing total defoliation of inflorescence after 25-28 days of spores sprayed in field conditions. Large level of fungal inoculum preparation and spray over the *Parthenium* in the field will be further explored, as well as studies are also underway to know the effect of *Fusarium* spp. on nearby vegetation.