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Jasminum sp as Refuge and Forage Plant for Gastropods

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***Abstract* – The Observations during Kharif 2013 on jasmine (*Jasminum sambac and J. multiflorum*) cultivated in half acre plots each at Hessaraghatta, Bengaluru North Taluk, Bengaluru Urban District is reported. Of the 43 *J multiflorum* plants probed, *C. bistrialis* was recorded on 24 plants, *C. semirugata* on 9 and *A.fulica* on one plant. Of the seven *J. sambac* plants counted seven *C. semirugata* and three *R. punctata* were counted, the highest number of the former was 3 and the latter 2 per plant. The aggregation of gastropods was high in *J. multiflorum* compared to *J. sambac*, this was reflected in the foliar damage of 30% in the former and up to 5% in the latter.**

***Keywords* – Refuge, Forage Plant, Gastropods, Jasmine.**

I. Introduction

Pestiferous snails and slugs cause serious economic damage if established and have been regarded as the second greatest threat to biodiversity, next only to habitat loss (Barrett and Richardson, 1986; Hausdorf, 2002). Endemic malacofauna are reported to co-exist and form a pest complex, along with *Achatina fulica* (Mead, 1961). Raut and Ghose (1984) reported that the dispersal, distribution and survival of pestiferous snails were influenced by local environment in different parts of India. According to Raut and Ghose (1984), nearly 90% of the plants cultivated in India are acceptable to *A. fulica* and *Macrochlamys indica*, 70% to *Ariophanta solata, Cryptozona semirugata, C. bistrialis* and 80% to *Bensonia monticola* causing considerable economic hardship to the growers particularly in the areas with a rather heavy snail population. *C. semirugata* is reported as a horticultural pest in different parts of India *viz.*, Giraddi *et al*. (1996) have reported it causing damage to capsicum, sunflower, okra, soyabean, cotton and groundnut seedlings. Balikai (1999) recorded incidence of *C. semirugata* in Karnataka, during September and October in 1998 on *Clerodendrum inerme*, *Beta vulgaris* var. *bengalensis*, *Solanum melongena*, *Luffa acutangula*, *Trigonella foenum-graecum*, tomatoes, chillies and *Tagetes erecta* and *Hibiscus rosa-sinensis*. Balikai (2008, 2009) reported it on palak, aubergine, methi, ridge gourd, tomato, potato, chilli marigold and *Ziziphus mauritiana*. Avhad *et al.* (2013) recorded *Rachis punctatus* as pest on mulberry plant.

Jasmine known as "Queen of the Night" is one of the oldest fragrant flowers cultivated by man for its multiple purposes *viz.*, making garlands, bouquet, decoration, religious offering etc. The present report details the incidence and foliage damage caused by two endemic snails on Jasmine plants in Bengaluru, Karnataka and also using the plants a s refuge. Thorough literature survey revealed lack of information on incidence of gastropods on Jasmine, hence the present observations were undertaken.

II. Materials and Methods

The Observations were made during Kharif 2013 on jasmine (*Jasminum sambac and J. multiflorum*) cultivated in half acre plots each at Hessaraghatta, Bengaluru North Taluk, Bengaluru Urban District. Based on preliminary visual observations a detailed count was undertaken to quantify the damage and number of gastropods on each plant.

III. Results and Discussion

Of the 43 *J .multiflorum* plants probed, *C. bistrialis* (Figure 1) was recorded on 24 plants, *C. semirugata* (Figure 2) on 9 and *A.fulica* on one plant (Figure 3). Of the seven *J. sambac* plants counted seven *C. semirugata* and three *R. punctata* were counted, the highest number of the former was 3 and the latter 2 per plant. The aggregation of gastropods was high in *J. multiflorum* compared to *J. sambac*, this was reflected in the foliar damage of 30% in the former and up to 5% in the latter. The gastropods collected were carefully transferred to laboratory to record their morphometry, *C. semirugata* (N= 12) (Table 1) and for *C. bistralis* (N= 40) (Table 2).

In addition to the foliar damage caused by the gastropods, leaf webber (*Nausinoe geometralis*) damage was also recorded. Eriophyid mite (*Aceria jasmine*) causing velvet like hairy growth on the leaf surface and tender stems was observed. Damage to buds by Budworm (*Hendecasis duplifascialis*) was also intense during the observation period.

The mucus trails on plant surface were traced to adjacent plots thus indicating the movement of the gastropods to the neighboring plots and thereby choosing jasmine as a resting/ refuge plant. Snails are important in the conversion of plant matter (often in the form of algae, fungi, or plant detritus) into animal material. Thus, constitute an important trophic level as food to carnivorous or omnivorous fauna in natural and cultivated ecosystems. Occasionally, snails and slugs feed on higher plants, becoming pests of crop and ornamental plants. In the present observations three endemic snails (*C. bistrialis, C. semirugata* and *R. punctatus*) and an invasive global snail, *A. fulica* are reported on Jasmine plants. Due to this composite incidence of native and invasive species, knowledge of behavioral differences between invasive and native species will be crucial for a better understanding of the mechanisms underlying invasion success and to predict the spread of invasive species. Additionally such pivotal information would throw light on the impact of invasive species on native gastropods as well.

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IV. Conclusion

The present observations are a first record of the gastropods on two different species of the ornamental plant jasmine (*Jasminum sambac and J. multiflorum*) from the region. Future studies incorporating host diversity and availability will enable concerned authorities to initiate suitable management measures in the aftermath of excessive breach of ETL's.

Fig.1. *C. bistrialis on J. multiflorum.*

Fig.2. *C. semirugata* on *J. multiflorum*

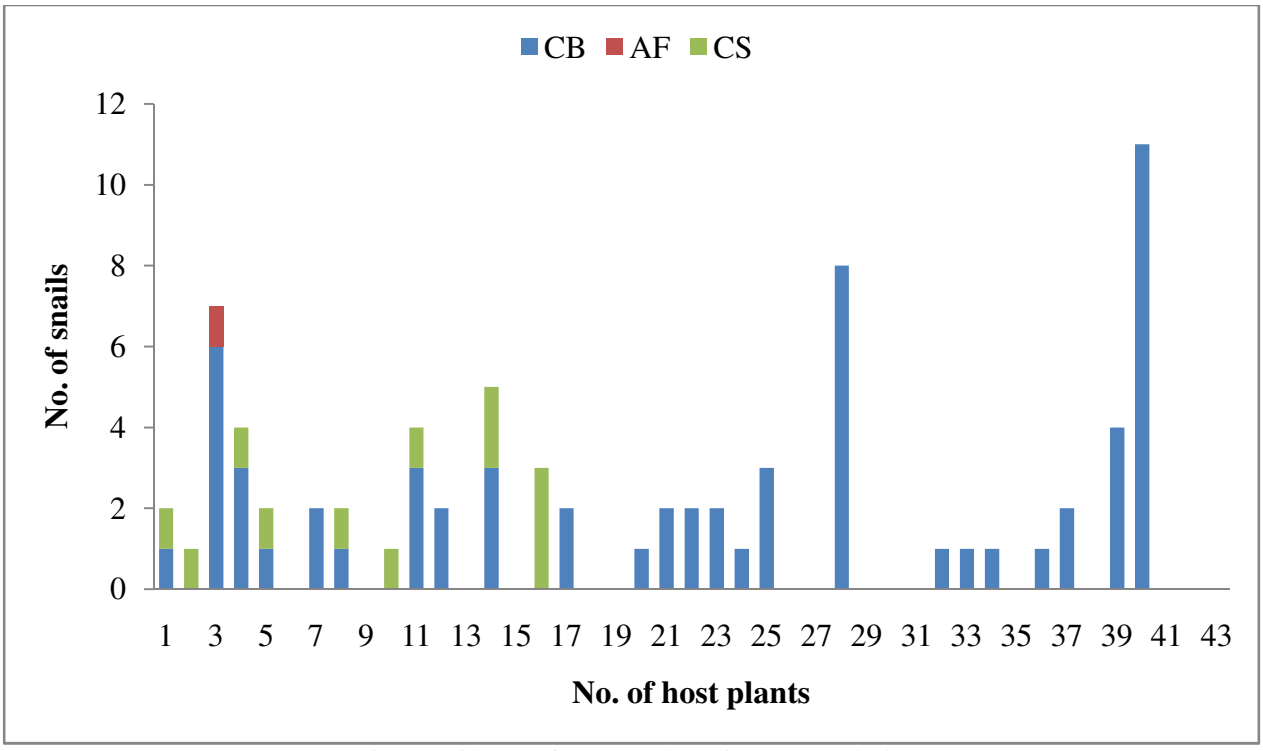

Fig.3. Incidence of gastropod species on *J. multiflorum*

Table 1: Descriptive statistics of *C. semirugata* sample (N=12).

	Minimum	Maximum	Mean± SD
Length (mm)	10.10	16.44	14.0267 ±1.71847
Width (mm)	13.33	20.78	18.4483±2.08491
Aperture length (mm)	7.89	10.92	8.9450±.94073
Aperture width	8.18	12.08	9.5800±1.24277
Live weight	.82	1.95	1.3758±.35697

Table 2: Descriptive statistics of *C. bistrialis* sample (N=40).

	Minimum	Maximum	Mean± SD
Length	9.36	16.75	13.1380±1.90223
Width	11.33	27.73	21.1188±4.19041
Aperture Length	6.98	27.23	12.5530±4.58378
Aperture Width	7.40	17.27	12.1836±2.34300
Live Weight	.66	6.45	3.3640± 1.7203

REFERENCES

[1] Avhad, S. B. Shinde, K. S. Hiware, C. J. 2013. Record of molluscan pests in mulberry gardens in Aurangabad district of Maharashtra State, India. Indian Journal of Sericulture;. 52(1):29-33.

[2] Balikai, R. A. 1999. Incidence of snail, *Cryptozona semirugata* (Beck) on some horticultural crops in Northern Karnataka. *Pest Management in Horticultural Ecosystems*. 5(1):70-71.

[3] Balikai, R. A. 2008. Potential of snails as crop pests in Northern dry zone of Karnataka. *International Journal of Agricultural Sciences*. 4(1):394-396

[4] Balikai, R. A. 2009. Insect pest status of ber (*Ziziphus mauritiana* Lamarck) in India and their management strategies. *Acta Horticulturae*. (840):461-474.

[5] Barrett, S. C. H. and Richardson, G. J. 1986.Genetic attributes of invading species. In Groves, R.H and Burdon, J.J (eds) Ecology of biological Invasions: An Australian perspective Australian academy of science. *Canberra*, 21-33.

[6] Giraddi, R. S. Kulkarni, K. A. Manjunath, M. 1996. Outbreak of snail, *Cryptozona semirugata* (Beck) on field crops. *Karnataka Journal of Agricultural Sciences*. 9(3):533-534.

[7] Hausdorf, B. 2002. Introduced land snails and slugs in Colombia. *Journal of Molluscan Studies,* 68: 127-131.

[8] Mead, A.R. 1961. The Giant African Snail. *The University of Chicago Press*, 257.

[9] Raut, S.K. and Ghose, K.C. 1984. Pestiferous Land Snails of India, *Z.S.I. Tech. Monog.* 11: 151. Zoological Survey of India, Calcutta.