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TERMIGRADATION OF THE WEED *SOLANUM ELAEAGNIFOLIUM*

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ABSTRACT

The present work addresses the attempts to develop process for assimilative disposal of the weed – Solanum elaeagnifolium (silver leaf nightshade) - one of the most exceedingly awful weeds in agricultural on a worldwide basis by termigradation. Trails were used to attract larger number of termites in a shorter time thereby the efficiency of the termireactors may be enhanced. The termites consumed upto 30 kg of the substrates in 3 different termireactors with and without trails upto 52% in 100 days.

Keywords: Solanum elaeagnifolium, Termites, Termigradation and Termireactors.

I. INTRODUCTION

Solanum elaeagnifolium (silver leaf nightshade), originally from America, was inadvertently distributed in all other continents. It is considered one of the most invasive weed in the world. They reduce the yield of the other crops through competition [1]. It grows in the off-season due to the food reserves in its well-grown root system. The roots of the weed are deeper than the linked agricultural crops. These characteristics may give an important over agricultural plants, with alfalfa, wheat, peanuts, sorghum and cotton [2], [3]. In additionally the spiny leaves and coarse stems of these weed may reduce the quality of the hay taken from polluted areas [2].

II. ENVIRONMENTAL IMPACTS

S.elaeagnifolium is a toxic weed to livestock. It contains harmful alkaloids, which form glycoalkaloids with sugars, and then hydrolyze into alkamines or alkalids which are nerve poisons [2]. Cattle that consume 0.1% to 0.3% of their body weight of ripe fruit exhibit mild poisoning, causing rapid, difficult breathing; salivation and drooling; runny nose; discoloration of the skin; lack of coordination; weakness; muscle tremors in his hind legs; anemia; and increased heart rate[4]. It is reported that goats are affected and sheep are not affected [2]. It may also conceal the plants against pests such as lygus bugs, potato beetles, and leaf spot [3].

The thistles, spines, and glandular hairs of the weed, on the stems and leaves can secure plants against herbivores. Also, plants can deliver poisons that ensure against herbivores. *S. elaeagnifolium* is the most problematic weed in cotton cultivation. It reduces the height, boll size, fiber quantity and quality in the cotton plant [5].

S. elaeagnifolium is a substitute host for plant feeding insects and plant diseases, like root rot in *Rhizoctonia solani* Kuehn, wilt Verticillium albo-atrum Reinke, Berth and tomato thrips [6].

In this research work, study on the termigradation [7], [8], [9] of the weed *Solanum elaeagnifolium* is detailed.

III. MATERIALS AND METHOD

S. elaeagnifolium was acquired from in and around Pondicherry University and also from the boundary area of Pondicherry regions. Six termireactors were utilized for the study. Each reactor was stacked with 5kg of the weed (dry weight basis). Active termite mounds were identified in various places within the University campus and termireactors were placed near these active mounds. Of the six reactors, three reactors were supported with trails. In order to lure significant number of termite towards the weed, so that the processing of the weed will be quicker, baits were used as trails from eight directions towards the mound. These baits would increase the number of termites towards the reactors, thereby causing quicker assimilation of weeds. The trails were made by paper waste, cardboard and saw dust of 5 meter length and an inch thick from the substrate in eight directions at equal distance from each other. The reactors were observed everyday and the termite species processing the waste was noted. The substrate consumption rate was assessed once in every 15 days.

The rate of substrate consumption was calculated once in every 15 days. During assessment, the termireactors were removed and the substrates were separated from termites, soil particles and other impurities and were quantified. All calculations were made on dry weight basis.

IV. RESULTS AND DISCUSSION

In the termireactor with 5kg of *S. elaeagnifolium* and without trails, the termite consumed about 7.5% in the first run and the substrate consumption was increasing in following runs, second run (14.7%), third run (21.6%) fourth run (27.9%) and the fifth run (33.9%). By 100 days, 40 % of substrate was consumed. *Hypotermes obscuriceps* was observed from the termireactors. Table 1.1 gives the rate of consumption of *S. elaeagnifolium* (5kg) weed by termites in each run without trails.

There is no work reported on composting, vermicomposting or anaerobic digestion of *S. elaeagnifolium* weed presently. So, the utilization of *S.elaeagnifolium* weed by termigradation is the first attempt towards its disposal by biological methods.

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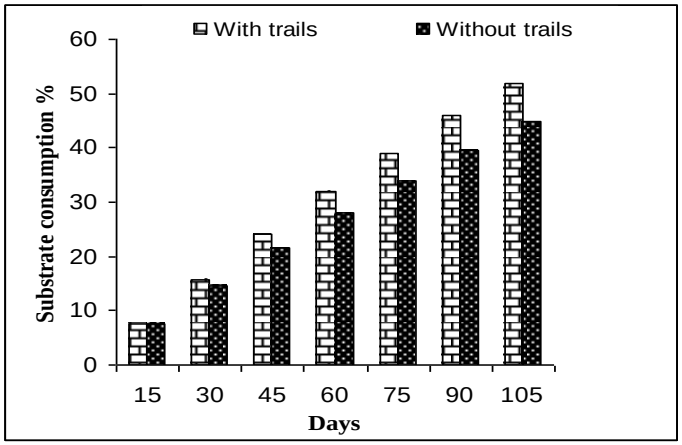

FIGURE 1.1 Cumulative consumption of *S. elaeagnifolium* %, in termireactors with 5 kg of weed

The average substrate consumption percentage (Fig 1.1) in termireactors with trails was 7.6% in first run and the substrate consumption was increasing in following runs, second run (15.7%), third run (24.0%) fourth run (31.9%) and the fifth run (39.1%). By 100 days almost 52 % of substrate was consumed. The student's't- test' was applied to see the difference in the termigradation rate in the reactors with and without trails with *S. elaeagnifolium* as feed (Table1.1). *Hypotermes obscuriceps*, the dominant species of the study area[10] was noted in these reactors.

TABLE 1.1 Extent of termigradation (%) of *S. elaeagnifolium* weed (5 Kg) at 15-day intervals

Days	Reactors without trails					Reactors supported by trails					Increase(I) or decrease (D) in termigradation by use of trails, significant to confidence level
	A	B	C	During each run	Cumulative	A	B	C	During each run	Cumulative	
15	7.2	7.5	7.8	7.5 ± 0.30	7.5 ± 0.30	7.3	7.7	7.9	7.6 ± 0.3	7.6 ± 0.31	I,~80%
30	7.0	7.2	7.5	7.2 ± 0.25	14.7 ± 0.55	7.8	8.0	8.4	8.1 ± 0.3	15.7 ± 0.60	I, <98%
45	6.5	6.8	7.2	6.8 ± 0.35	21.6 ± 0.90	8.0	8.2	8.7	8.3 ± 0.36	24 ± 0.95	I, <99%
60	6.1	6.2	6.7	6.3 ± 0.32	27.9 ± 1.21	7.7	8.0	7.9	7.9 ± 0.15	31.9 ± 1.0	I, <95%
75	5.8	6.3	6.1	6.1 ± 0.25	33.9 ± 1.35	7.0	7.2	7.5	7.2 ± 0.25	39.1 ± 1.30	I, <95%

90	5.2	6.0	5.8	5.7 ± 0.42	39.6 ± 1.68	6.4	6.8	7.0	6.7 ± 0.3	45.9 ± 1.60	I, <95%
105	5.0	5.6	4.8	5.1 ± 0.42	44.8 ± 1.71	5.9	6.0	6.5	6.1 ± 0.32	51.9 ± 1.90	I, >50, <80%

V.CONCLUSION

The work was started with 5 kg of *S. elaeagnifolium* with and without trails, and it was found that termite consumed the weed upto 52 % in 100 days. So this process is viable and highly recommended. Comparison between termireactors with trails and without consumption rate was high in reactors with trails.

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