

Parthenium Weed- An Alarming Threat to Coconut

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The notorious weed *Parthenium hysterophorus*, commonly known with its generic name –Parthenium– was not of great concern in cropped area of Kerala and southern Tamilnadu. It was mostly noticed in and around railway goods-yards and along the waste lands adjacent to roads and railway tracks. As a weed of waste lands it was infamous due to its dangerous properties. Only rare efforts were attempted here and there to control the weed. The presence of this weed fastly spreads to cultivated land now, and coconut which is the primary homestead crop in Kanyakumari District and in Kerala is facing an alarming threat from this dangerous weed. The pity is that when people of a locality recognize the dangerous ill effects of the presence of this weed in their locality the weed might have sprawled its population to the level of mostly ineradicable levels. Parthenium is now fastly spreading from the south Agastheswaram taluk towards north Kalkulam and Vilavancode taluks of Kanyakumari district and

Parthenium a highly dangerous weed

Parthenium produce the allergens - sesquiterpene lactones. It is 15-carbon molecules made of a sesquiterpene linked to a lactone ring. The allergenicity of sesquiterpene lactones is increased by the presence of an α -methylene group attached to the lactone ring. Sesquiterpene lactones are present in fresh plants, pollen, and in particles from dried plants. The physical contact to the plant creates the eruption of the exposed skin surface resulting in itching and contact dermatitis. Sesquiterpene lactone-induced dermatitis affects men more than women. The pollens float in air causes eczematoid dermatitis and bronchitis. The allergic reaction develops cracks over the sole. Creates chronic lichensified eczema of the exposed skin surfaces. Sore throat and bubbles in the mouth specific to allergic papules develops. This turns to severe dermatitis by loss of scalp, body hair and ridging on nails. The affected person suffers from itchy, red irritated and weepy skin, peeling of skin,



A coconut garden thickly inhabited with blooming Parthenium



Young Parthenium weeds beside a private coconut nursery. Purchase of seedlings from these sources increases the chance of spread of the weed to new locations

proceeds to southern Kerala covering their presence in cultivated area including coconut. The days ahead are the best opportunity period in adopting all possible care to prevent the further spread of Parthenium to cultivated area and to prevent its movement to the north.

puffy eyes, general swelling, fatigue and weight loss. The enormous quantity of allergic pollen creates hay fever, and severe respiratory problems in human beings. The pollens cause asthma, especially in children and elderly people. Besides making the environment highly polluted and unhealthy to human



A cow grazing in an uncultivated land where Parthenium engulfed the entire surface



Luxuriant Parthenium growing in coconut homestead

habitat with allergic pollen it creates much indirect havoc to life by its effect on livestock and agriculture. The grazing cattle in Parthenium inundated area unknowingly feeds on this toxic weed gets fever, dermatitis, eye irritation, inflamed udder and rashes on the skin. Acute and chronic toxicity of Parthenium leads to ulcers in mouth and digestive tract, esophagus and abdominal folds. Necrosis of kidney and liver develops, and eventually results in death of the animal. The cows and goats when they eat this weed the milk production decreases and the taste of milk becomes bitter, eventually consumption of it turns to be severely harmful and fatal. The pollens of the weed shed flowers of vegetables such as tomato, chilli and brinjal. It inactivates nitrogen fixing bacteria in pulses by secretion of the chemical *sesquiterpene lactones*.

Botanical description of Parthenium and the ecological advantages making it a potential threat to coconut:

The weed is of American origin and got introduced accidentally to the other continents in the last century. The plant belongs to the order *Asterales* and family *Asteraceae* with generic name *Parthenium* and species name *hysterophorus*. It is known under different names in different locations and the mostly referred common names are Parthenium, White top, Santa Maria Fever few, Congress grass, Gajar ghas, Bitter weed, Carrot Grass, False Ragweed, Ragweed, and Escoba amarga. At sprouting stage cotyledons are rounded paddle shaped 3-4 mm long, born on short stalks 1-2 mm long. The first leaves are egg shaped and covered with fine white hairs. Older leaves become increasingly lobed and deeply divided. The young plants develop in to a rosette, with leaves of 80-200mm long 40-50 mm wide. The older plants are erect; stem highly branched, 30-150 mm high, with deep taproot. At this stage the leaves are

deeply divided and deeply grooved, and develop along the stem. The stems and leaves are covered with white hairs. Flowers are borne on short stalks arising from the leaf forks. They appear in clusters with white flower heads at top of stems. The flower heads are 4-10 mm across with five sided shape, containing long white florets. At maturity the flower heads turns hard and brown. Seeds are dark grey diamond shaped, striped and flattened with 2 mm length. The seeds have no dormancy and are frost tolerant. The weed is an aggressive invader of waste lands and cultivated fields with less tillage. It is a serious threat to annual crops and produces a wide range of toxins which affects other plants. The allelopathic potential of the weed by release of phyto-toxins such as parthenin, ambrosin, coronopilin, and ferulic, caffeic, vanilic, chlorogenic acids, which inhibit germination of several crops including rice, wheat, maize, and sorghum.

Parthenium gained entry to India only in 1956 as a casual contaminant through the Mexican wheat imported under PL480 scheme. Within this short period of 56 years it could reach the length and breadth of our country by taking advantage of its fast multiplication features such as prolific seed production, easy and fast dispersal of seeds, high germination ability through out the year, capacity to thrive adverse soil and climatic conditions in a wide range of habitats and ability to withstand commonly adopted control methods. A single Parthenium plant can produce over 15000 seeds. The seed can germinate, grow, mature and set seed within 4 weeks. The potential for multiplication in one year even under adverse conditions is unimaginable. The poor agronomic management being adopted for coconut paves the way for the entry and establishment of this obnoxious weed in coconut planted fields.

The preventive steps to thwart the impending



Seed dispersal is facilitated by *Parthenium* growing beside the roads



Under poor agronomic management *Parthenium* spreads fast in coconut gardens

tragedy to our crop lands and healthy environment

The best method of checking this weed is the prevention of its entry. Aware, and make others also aware of the weed's accidental entry when one purchase seeds and planting materials. Locate the nurseries where the weed is present. Avoid purchase of seed materials from such nurseries. Do not purchase seeds of intercrops like green manure from producers who do not comply with relevant seed acts. Utmost care should be taken to monitor the presence of this weed by the farmers. Manual removal at the first sight is the best way for elimination of the menace that threatens the environment. A concerted effort should be taken by farmer associations and resident associations to collect *Parthenium*; burn and destroy the collected material. The leaving off collected mature weeds or using it as manure will increase its population as drying and composting can not destroy the seeds due to its high longevity. Apart from sincere individual effort, collective action by volunteer groups will yield the desired results. Physical contact with *Parthenium* should be avoided by using gloves, nose covers and cloths as skin lesions appear where the plant has brushed against the skin, typically on the legs, thighs, hands and upper limbs. A healthy living environment is the prime requirement of man to day. If we want to achieve it, knowledge of the true danger and concerted, and collective action by all are the need of the hour to eliminate the imminent danger.

An integrated weed control approach to eradicate Parthenium:

The paramount way to contain *Parthenium* is manual method of its destruction. The plants should be uprooted (not cut or broken) before flowering and burnt. It is really effective and should be preferred and in small area like home gardens, and nurseries; nevertheless, it is to be done before buildup of population. This will successfully work by engaging

persons insensitive to parthenium allergy to uproot the plants. The scarcity of labour and high expense are the main lacunae in manual control of vast affected areas. Ploughing the field controls the weed population to some extent. There are many suggested chemical and biological control measures. The following chemical control measures are proven to give good results:

1. In non-cropped areas such as road sides and railway tracks spraying of 15-20% salt solution can control the weed. However, this should be repeated periodically till the entire population disappears.
2. In cereal cultivating field 2,4D 80% WP @ 2kg a.i./ha as post emergence spray is giving good control.

Efforts to identify insect and plant enemies to control *Parthenium* yielded some promising results. The moth *Epiblem strenuana* introduced from Australia has been reported as a good biological agent to control *Parthenium*. In introducing any exotic biological enemy to weed utmost care has to be taken to ascertain host specificity especially *Parthenium* being a quite hardy weed and resistant to pests and diseases. Certain species of cassia - an innocuous waste land weed (eg. *Cassia sericea*) - show very effective control in checking the spread of *Parthenium* by their aggressive growth smothering the manifestation of *Parthenium*. Awareness about the graveness of *Parthenium*-catastrophe and timely action against its spread are the most important needs to protect our crop and the environment. Prevention is better than cure, and here, cure is insurmountable.

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