



PARTHENIUM HISTEROPHORUS EFFECTED

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Many type weeds are present in agriculture some are discomfort, some are allergenic, some are poisoning and Some specific weeds in particular area like crop fields create more problem because of their eradication and adversely affect the human being. Weeds are also known source of an array of allergenic bio particulates disseminating them into the ambient atmosphere during their life span.

It becomes indispensable to eradicate weeds and ruderals from our surroundings and particularly from our crop lands in the larger interest of growing human population.

Several control measures have been adopted by farmers since the very beginning of means endeavour to grow desired species of plants. However, one of the oldest methods being practiced even today is hand picking of weed and undesired plants. Besides this agriculture scientists have suggested numerous ways and means of crop weed management including chemical, phylaetic and biological control measures. Most commonly adopted practice now – a – days rests on chemical used as effective herbicides.

However, their residues left in the soil and air have been reported to cause serious damage to associated crops as well as other organism including man, animals birds and beneficial microbes. Such chemicals have been incorporated into the biological systems through food chains and webs and have consequently affected our ecosystem.

Several control measures have been suggested by the workers to eradicate weeds which include foliar application of the numerous inorganic and organic chemicals in the form of the herbicides, weedicides and growth inhibitory substance depicting various approaches made in this direction.

The biological measures which have harnessed with the objective of weed control would broadly be divided into two groups involving :-

- (i) Cropping and competition, and
- (ii) Parasite, predators and pathogens.

Cropping and competition is concerned with divergent growth habits, adaptabilities and competitive ability of the crop and its varieties to minimize weed stabilization. Whereas, in case of biological weed control, the natural enemies of the plants like insects and plant pathogens along with their toxic metabolites are employed.

The organism, which have been used for biological control weeds, insects have required more diligence. Insects that were found effective against the various upto some extent mainly belong to Lepidoptera, Hemiptera, coleopteran, Diptera, Hymenoptera, Thysanoptera etc. Other than those groups of insects, mites have also proved effective.

During present investigation an attempt has been made to control the weeds by induced cytological changes and decreased seed germination by using chemicals, like antibiotics viz. streptomycin and ampicillin and culture filtrates obtained from *Rhizoctonia solani* and *Fusarium odum*. An abnoxious newly introduced exotic weed like *Parthenium Hysterophorus* has been selected as target plant during present endeavour. The chromosome number of the plant has been reported to be as $2n = 18$ (Hankko - 1963).

Antibiotics have been also used by the agriculture scientist (Agrious- 1969, None - 1971) for controlling downy mildews, powdery mildews and rust diseases of our crop plant. Antibiotics have been frequently used to observe the cytological changes of the somatic and reproductive cells as various plant.

It was aimed during present investigation to observe the effect of easily available cheap antibiotics like streptomycin and ampicillin on % seed germination, its root/shoot ratio mitotic cycle of freshly germinated seeds treated with the different concentrations of these antibiotics for at least 7 days under laboratory conditions. Besides there, 2 months old plants were sprayed foliarly with the different concentrations of the selected antibiotics, with a view to observing the effect on overall growth of the weed plant as well as cytological variations occurring in the laterally developed roots under potting conditions. This may suggest some new devices for controlling the weed under reference.

Culture filtrates as selected soil born pathogens such as *Fusarium odum*, *Rhizoctonia*. Culture filtrates as selected soil born pathogens such as *Fusarium odum*, *Rhizoctonia solani* and *Sclerotium rolfsii* including a good number of saprophytic soil fungi have been observed to inhibit % seed germination of weeds as well as crop plants.

The observation made by above workers may possibly be applied for controlling the spread of weeds associated with our crop plants provide it is done at large scale in the condition. It has been also aimed during present endeavour to ascertain the inhibitory effect of the culture filtrates of selected soil borne pathogens like *Fusarium odum* and *Rhizoctonia solani* at the % seed germination and root shoot ratio. Besides it was also thought proper to observe simultaneous cytological changes occurring in root cells of pre-soaked germination seeds, keep in different culture filtrates at least for 120 hours under lab. conditions culture filtrates of the soil borne plant pathogens were also sprayed foliarly on 2 months old.

Parthenium hysterophorus plants to observe morphological changes as well as cytological build-up of the laterally formed as well as cytological build-up of the laterally formed root tip cells after 7 and 14 days of treatment with view to finding out the possibility of controlling the weed as suggested above

Cytological abnormalities so development may be heritable and give rise to a new generation of *P. hysterophorus* possible with less resistance and vigour in the very next generation or, in due course of time. This may serve as indirect method of control measures of this abnoxious weed in future.

However, possibilities of negative results cannot be ruled out but it does not mean that attempt made with affirmation would be fruitless.

The present investigation has been under taken as mentioned below :-

- (1) Survey and collection of *parthenium hysterophorus* in and around us.
- (2) To study the effect of various concentrations of some selected antibiotics and fungal filtrates on seed germination of the test

- plant.
- (3) Mitotic studies of germinated seeds treated with various concentrations of fungal filtrates and antibiotics.
 - (4) Cytological studies of the test plant after foliar application of culture filtrates of selected Fungi and some antibiotics.
 - (5) Statistical analysis of the data obtained during investigation.

An abnoxious nearly introduced exotic weed Parthenium Hysterophorus. (Asteraceae) has been selected as a test plant during present endeavour. An attempt has been made to control this weed by using chemicals like antibiotic viz. Streptomycin and Ampicillin as well culture filtrates obtained from Fusarium Udim and Rhizoctonia Solani. It was aimed during present investigation to observe the effect of said antibiotics and culture filtrates on % seed germination, seedling root growth as well as morphological and cytological variations.

ANTIBIOTICS -

Effect of streptomycin on % seed germination and seedling root growth was observed which was found to decrease significantly with increasing concentration of this antibiotic. It was further observed that when the same set of treated germinated and ungerminated seeds were kept in sterile distilled water for another same period of recovery phase exhibited persistent inhibitory effect even during this antibiotic free period.

Effect of streptomycin was also observed at the cytological level of the root tip cells collected from treated seedling of each concentration and their respective control. Marked decrease in the value of mitotic index was observed with the increasing concentration of streptomycin. They have also been observed to check the spindle and cell plate formation resulting into C-Metaphase, binucleated cells. Cells with 3 daughter nuclei and sticky metaphase. Thus, it reveals the effectiveness of the streptomycin which may account for its antimitotic and cytotoxic activities. However, It was interesting to note that some of the root tip cells treated with higher concentration of this antibiotic even after 7 days of recovery phase could not show any sign of growth and they were ultimately perished in due course of time under laboratory conditions.

Morphological variations were also recorded after foliar spray of streptomycin at the interval of 7 days.

Phytotoxic response, such as gradual necrosis, chlorosis, epinasty wilting of the leaves and finally after 2nd foliar spray complete damage to the two month old seedling of the test plant was observed with increasing concentrations as compared to their respective controls.

The effect of streptomycin was also observed at the cytological level on the lateral root tip cells collected after 1st and 2nd foliar spray. A marked cytological variation with typical precocious movement of chromosomes was recorded.

Studies of the effect of ampicillin, the second test antibiotic perceived almost similar trend like streptomycin treatment as regards its effect on % seed germination, seedling root growth as well as morphological and cytological variations. However in comparison of streptomycin treatment lesser phytotoxic and cytotoxic effect was observed in case of ampicillin treatment.

CULTURE FILTRATES -

Effect of the culture filtrate of the selected soil borne fungal pathogens viz. F. Udim and R. solani was observed on the test plant and % seed germination seedling root growth and cytological variations were recorded as observed earlier with antibiotics. A marked inhibitory effect was observed in % seed germination following different hours of treatment with each culture filtrate and their respective control. They have also been observed to be detrimental for the root/shoot elongation. Roots were found to be

more sensitive to toxins present in the culture filtrates. However, during recovery phase also the seed germinated previously under different culture filtrates and respective distilled water control could exhibit statistically insignificant difference between themselves with an exception to CZP medium.

Effect of both cultures at the cytological level of the root tip cells collected from treated seedling were observed to exhibit much reduced mitotic index value as compared to their respective control. However the root tip cells treated with culture filtrate of F. Udim depicted marked cytological abnormalities, such as gradual nuclear deformation and effected cytoplasm as well as abnormal free nuclear with prominent covering and decayed cells debris after a fixed interval of time. This was interesting, that no mitotic division was observed till 72h of recovery phase and after 96h of this phase fresh lateral roots developed from the same seedling which could show abnormal cytological variations. This cytotoxic action of the culture filtrate of F. Udim was further ascertained by the bioassay experiment showing similar results.

The cytological variations obtained in case of R. Solani treated root tip cells depicted similar action as observed in streptomycin treated cells. However, during its recovery phase abnormalities like telophase with micronuclei was observed.

Effect of freshly collected 10 days old culture filtrates of F. Udim and R. Solani observed more or less similar morphological changes such as chlorosis, epinasty necrosis and defoliation of the potted plants. Finally the death and decay of the entire plant was observed after 1st and 2nd foliar spray as compared to their respective control. However the lateral root tips. Collected after 1st and 2nd foliar spray showed normal cytological behaviour.

U.r spectrography of the two antibiotic as well as both culture filtrate were done which could show almost equal I – max values. This further ascertains the similar chemical action of the active ingredients present in antibiotics and also in the culture filtrates.

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