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The Role of Intercropping in Insect Pest Management

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ABSTRACT

Intercropping is one of the important cultural practices in pest management and is based on the principle of reducing insect pests by increasing the diversity of an ecosystem. Because there is no biodiversity to mitigate these effects, the insect pests can easily obtain food and multiply, which leads to the infestation of entire monoculture. In order to deal with the infestations, more insecticides are used to control the pest populations. These insecticides have tremendous effects on environment, biodiversity, human and animal health. These negative impacts of insecticides have provoked growing interest in the adoption of multi-function agricultural biodiversity that promote pest management. One of the agro-biodiversity strategies that improve the sustainability of crop production along with pest management is intercropping. Intercropping produces the benefits of on-farm diversity, increased productivity, resource distribution balance, farm risk reduction, weed and insect pest control. There are indications that intercrops may add additional income to the farmers apart from reducing the loss by pests through produce of intercrops. Intercrop not only helps in pest management but also plays a vital role in weed management, disease management, and nematode management besides conserving the biodiversity. As a result, this paper concluded that, it can be rightly fitted in the integrated crop management for the improvement of farming community.

Keywords: Intercropping, Farmers, Insecticide, Biodiversity, Resource concentration

INTRODUCTION

Monocultures are acres of the same plant that attracts the same types of insect pests which lead to the quicker buildup of pest infestation. Because there is no biodiversity to mitigate these effects, the insect pests can easily obtain food and multiply, which leads to the infestation of entire monoculture. In order to deal with the infestations, more insecticides are used to control the pest populations. These insecticides have tremendous effects on environment, biodiversity, human and animal health. These negative impacts of insecticides have provoked growing interest in the adoption of multi-function agricultural biodiversity that promote pest management. One of the agro-biodiversity strategies that improve the sustainability of crop production along with pest management is intercropping

Intercropping

Intercropping is the agronomic practice of growing two or more crops in the same field at the same time [2]. Crops may be planted without regard to rows (mixed intercropping), in alternating rows, or with different crops alternating within the same row. Relay intercropping refers to the planting of one intercrop species before another so that their life cycles partially overlap [4]. The broader term "polyculture" includes intercropping but also encompasses combining crops and weeds intentionally and combining crops with beneficial non-crop plants, such as cover crops or nursery crops [1]. Perrin and Phillips [5] included mixtures of crop cultivars in their definition of intercropping, because such combinations may possess some of the advantages associated with conventional intercropping. Intercropping produces the benefits of on-farm diversity, increased productivity, resource distribution balance, farm risk reduction, weed and insect pest control.

Hypotheses of Insect Pest Management in Intercropping System

Intercropping is one of the important cultural practices in pest management and is based on the principle of reducing insect pests by increasing the diversity of an ecosystem. [6] demonstrates that intercropping saves the target crop using two hypotheses. They are Resource Concentration Hypothesis and Enemies Hypothesis

Resource Concentration Hypothesis

The Resource Concentration Hypothesis, concerns the movement and reproductive behavior of the pest insects themselves. Visual and chemical stimuli from host and non-host plants affect both the rate at which insects colonize habitats and their behavior in those habitats. The total strength of the attractive stimuli for any particular pest insect determines what is called resource concentration and it is the result of the following interacting factors: the number of host plant species present and the relative preference of the insects for each, the absolute density and spatial arrangement of each host species, and interference effects from non-host plants. The lower the relative resource concentration, the more difficulty a pest insect will have in locating a host plant [5]. Relative resource concentration also influences the probability that a pest insect will leave a habitat once it has arrived. For instance, a pest may tend to fly sooner or farther after landing on a non-host plant than a host plant, which results in a higher emigration rate from polycultures than monocultures.

Enemies Hypothesis

The Enemies Hypothesis predicts greater numbers of insect predators and parasites in polycultures than in monocultures, which in turn better control pest populations. Polycultures supply better conditions for predators and parasites, reducing the likelihood that they will leave or become locally extinct [1]. These conditions include: greater temporal and spatial distribution of nectar and pollen sources, both of which attract natural enemies and increase their reproductive potential; increased ground cover, which is especially important to some nocturnal insect predators; and more species of herbivorous insects that provide alternate prey when other prey are scarce or at inappropriate stages of their life cycles.

Categories of Crops used in Intercropping for Insect Pest Control

Brion [3] proposed three types of crops in intercropping for insect pest control. They are trap crops, repellant crops and push-pull crops.

(a.) Trap crops: A system that uses an attractant crop planted close to the production crop is called trap cropping. The plant that is used as an intercrop (trap crop) is more attractive than the production crop to the insect, so the insect is drawn to the trap crop. In conventional systems, insecticides can be applied to the trap crop alone, reducing the need for pesticide use on all acres. Eg:- In cotton marigold is used as a trap crop for Helicoverpa armigera.

(b.) Repellant crops: An intercrop that has a repellent effect can also be used for insect pest control. This often requires more rows of the intercrop to be planted than in a trap crop system. In this system, the repellent intercrop masks the production crop from the insect pest, deterring the insect from its host crop [3]. Whether the repellency is due to chemicals emitted by the plant or due to the physical structure of the intercrop is unknown. Eg:-Basil repels house flies and mosquitoes.

(c) Push-pull crops: A combination of repellent and attractant crops can be used in an intercropping system for insect pest control. In this system the attractant crop draws the insect in (acts as the "pull") and the repellent crop deters the insect (acts as the "push"). Eg:- The push-pull system that was developed in Africa protects corn from stem boring moth larvae by planting a grass that is more attractive to the moths, Napier grass, as a border and planting a repellent crop, Desmodium (a legume), in between the rows of corn.

CONCLUSION

Intercropping can be rightly fitted in the integrated crop management for the improvement of farming community. This is because there are indications that intercrops may add additional income to the farmers apart from reducing the loss by pests through produce of intercrops. Hence, intercrop not only helps in pest management but also plays a vital role in weed management, disease management, and nematode management besides conserving the biodiversity.

REFERENCES

[1]. Andow, D. (1991). Vegetational diversity and arthropod population response. Annual Review of Entomology. 36: 561-86.

[2]. Andrews, D.J. and Kassam, A.H. (1976). The importance of multiple cropping in increasing world food supplies. pp. 1-10. In R. 1. Papendick, P. A. Sanchez, and G. B. Triplett [eds.], Multiple cropping. Special Publication 27. American Society of Agronomy, Madison, WI.

[3].Brion, G. (2014). Controlling Pests with Plants: The power of intercropping. UVM Food Feed. https://learn.uvm.edu/foodsystemsblog/2014/01/09/controlling-pests-with-plants-the-power-of-intercropping/
[4]. Kass, D.C. (1978). Polyculture cropping systems: review and analysis. Cornell International Agriculture Bulletin. 32, Cornell University, Ithaca, NY.
[5]. Perrin, R.M. and Phillips, M. (1978). Some effects of mixed cropping on the population dynamics of insect pests. Entomologia Experimentalis et Applicata. 24: 385-393.
[6]. Root, R.B. (1973). "Organization of a plant-arthropod association in simple and diverse habitats: the fauna of collards (Brassica oleraceae)".Ecological Monographs.43: 94-125.

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