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Review Article

New Insights in Cropping Patterns, Hydroponic Farming System and Roles in Crop Optimization through Advanced Technologies

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Abstract

Cropping pattern reflects the growing of genetically modified crops and ordinary crops in the different conditions of temperature and pH also affected the cultivation. It also advances the soil agro ecological measurement and climatic conditions. Monocropping patterns increase the mass crop production due to higher yields by controlling the attack of different pests and improving the soil microbe diversity. Crop rotation depends on different factors such as rotating series and applied frequency of certain crops that improved the functional properties of microorganisms growth. This approach can be helpful for targeting the soil-borne pathogens to maximize soil benefits. Proper irrigation system also another agricultural approach for enriching the ecosystem. It enables the original crop to strike again after harvesting and to raise another crop. Plants grown in in the hydroponic system shows high growth as compared to the conventionally field-grown plants also increase the chances of sustainable agricultural development through green technology where large number of plants can be grown in the nutrient medium. Cropping patterns to make farming more efficient that can be helpful to irrigate crops and more disease resistant varieties.

Keywords: Cropping pattern, agricultural crops, ordinary crops, optimum concentrations, harvesting.

INTRODUCTION

Cropping pattern is the main approach towards improving the yield of agricultural crops through advanced technologies. It also reflects the growing of genetically modified crops and ordinary crops in the different conditions of temperature and pH but only at optimum concentrations of the different fertilizers that usually affected the cultivation and overall yield in two ways [1, 2]. While on the other hand, low concentrations also significantly affected the growth of different parts and ultimately plant development. Various types of cropping system may be benefit for a community of plants which is managed by a farm unit to achieve various human goals [3, 4].

Increase in the concentrations of the fertilizers can disrupt the mineral composition that ultimately leads to the poor yield due to stunt growth. Only the optimum concentration of the applied chemicals or fertilizers can leads the balanced growth through maintaining the mineral composition that ultimately leads to the increase the yield. It also reflects the soil

agro ecological measurement and climatic conditions. Sometimes, climatic changes also inhibited the growth of young tissues that causes the insufficient balance between food chain and microorganisms. Applying too much fertilizer can be a problem because it leads to the release of greenhouse gases and eutrophication [5, 6].

Cropping systems are divided into the monocropping, crop rotation, and mixed cropping. The main types of cropping patterns follow the profitability and adaptability of crops through controlling the attack of different pests and larval growth thus reducing the risk of defined disease. Monocropping patterns increase the mass crop production due to higher yields by controlling the attack of different pests and improving the soil microbe diversity. Proper monocropping patterns lead the efficient production of crops through mutualistic association. While on the other hand, improper monocropping designing leads the poor production of crops that disturbed the natural ecosystems balance of mutualistic association. They are able to set, or modify, their nitrogen fixing patterns, so two farms with identical climates and soils may be managed with different aims to achieve a different mix of outputs of implicitly. It leads to result in higher yields. There are several advantages of monocrioing such as lowers the amount of extra land required that is efficient and more profitable to the farmer, reducing the risks of pollutes groundwater supplies [7-10].

Table-1: Shows the principles of cropping in Agricultural sectors

Agricultural Change/System	Major Significance	Influence Aspects	Ecological Significance
Climatic changes	Also inhibited the growth of young tissues that causes the insufficient balance between food chain and microorganisms.	Environmental aspects	It also cause the eutrophication
Monocropping patterns	Increase the mass crop production due to higher yields by controlling the attack of different pests and improving the soil microbe diversity.	Agricultural and foods	Natural ecosystems balance of mutualistic association
Mixed cropping	An agricultural approach for reducing the risk of crop failure due to environmental stress.	Agricultural and Environmental	That also increases soil fertility
Crop rotation	From the specific areas under land cultivations are excellent source for the growth of microbial agents	Agricultural and Environmental	That can be useful in the nitrogen fixation by means changing the type of crops grown in the field each season or each.
Hydroponic system	large number of plants can be grown in the nutrient medium	Agricultural, Growth and Environmental	as it enhance the growth room for germination and seedling production

Cropping patterns, roles in crop optimization through advanced technologies

The other type of cropping patterns is the crop rotation that maintains the soil biodiversity and controlling the attack of pests through the action of biological and chemical agents that ultimately leads to increasing the crop yields at certain level. Crop rotation depends on different factors such as rotating series and applied frequency of certain crops that improved the functional properties of microorganisms growth. This approach cans helpful for targeting the soil-borne pathogens to maximize soil benefits. It also helps to reduce the erosion, improving the soil's health, increase nutrients available for crops, improving the cyclic rotation of soil water movement, and providing a slow-release fertility source. Therefore, accurate balance can found in plants through establishing the cropping patterns in appropriate manner. There is need to establish the relationship among those microorganisms that fix nitrogen and maintain the soil biodiversity through food chain. They also acts a main routes for the supplementations of various nutrients to the other organisms in the food chain [11, 12].

Mixed cropping an agricultural approach for reducing the risk of crop failure due to environmental stress. In this approach, different species of the pants can be grown at the same tine in order to evaluate the growth of multiple tissues that depends upon on growth factors. In these conditions, plants compete mainly for water and nutrients, whereas competition for light can occurs for a moment but depends upon of light factors that can suppress or promote the growth. Temperature and precipitation also affected the growth in plant growing at the same time that may be more favorable to one over another species. It also reduces the risk of crop failure due to environmental stress through increases soil fertility [13-15].

Global gridded cropping system is the important type of cropping system for marinating the soil biodiversity conservation and climate mitigation through series of connective measures in order to control the prompt growth of microorganisms. Soil

biodiversity can be maintained through improving the entry of water into soil and its storage in the soil. It also improved the nutrient balance between plants and host tissues that can able to fix the tureens fixation without disruption of food supply. Climatic changes also major cause of loses of soil biodiversity that can through advanced cropping systems. Proper irrigation system also another agricultural approach for enriching the ecosystem [16-18].

There are different aspects of monocropping in the agricultural lands for increase the yields of genetically modified crops. Monocropping is potentially applied when the field is used to grow only one crop season after season. This type of cropping is not effective for the controlling the high rate of insects due to larger area that ultimately leads to decrease the overall yields. Sometimes, there is increase the attack of lethal insects and worms on the different crops that cam damage the soil structure. In order to control the attack of pests on crops, soil health crops are attracting increasing interest due to their ability to improve soil structure by breaking up compaction, improving drainage and helping raise the organic matter content of the soil. There are some strategies needed to design in the cultivating areas of agricultural lands that can increase the potential of different crops [19-22].

Crop rotation from the specific areas under land cultivations are excellent source for the growth of microbial agents that can be useful in the nitrogen fixation by means changing the type of crops grown in the field each season or each. It enables the original crop to strike again after harvesting and to raise another crop. The farmers can achieve the maximum benefits throughout the years through land farming and crop rotations in the semiarid areas. It also increase the nutrient source as beneficently for the prompting the growth promoting bacteria that can enhance the bacterial activities in the soils. While on the other hand, crop rotation can help to manage the soil properties and by promoting the soil fertility, reduce erosion, improve your soil's health, and increase nutrients available for crops [23-25].

Fig-1: Shows the principles of cropping in pest management

Role of Hydroponic technologies

Different technologies' have been used for growth of plants in order to control the attack of insects and achieving maximum benefits of nutrients medium in the available agricultural land. It also increase the chances of sustainable agricultural development through green technology where large number of plants can be grown in the nutrient medium with increase the supply of different types of minerals for promoting the growth of thin plants. Through the advances in hydroponics technology, plants able to use more efficient use of water and production increases twice as fast in a well managed hydroponic system. There are some measures for supplying the mineral in the right proportion to the soils. Adding right proration of quantity of materials such as organic compost, pine bark, composted leaves and gypsum to heavy clay can improve its structure and help eliminate drainage and compaction problems. While on the other hands, low quality of adding organic compost, pine bark, composted leaves and gypsum can cause drainage and compaction problems [26-28].

Lots of generally engineered crops can be produced twice as fast in a well-managed hydroponic system. Crops that have been grown or obtained from a conventional cropping system have low resistance to the environmental stresses that increase the chances of more insects. While on the other hand, less water consumption in right t proportion in the advocated cropping system leads the evolutionary measures to combat the environmental stresses. There are many advantages of plants growing in nutrient medium for germination purposes such as it enhance the growth room for germination and seedling production and the spacing of certain crops in the greenhouse decreases the average area needed per plant over conventional soil production [29, 30].

Crop production is affected by environmental factors, interest in alternative farm practices is increasing. Hydroponic farming serves as the major

source of growth promoting bacteria that offers resistance to the environmental stresses in those plants grown in salinity conditions. Organic bio fertilizers that have been used as supplementation or in terms of nutritional requirements for prompting the plant growth at optimum level that are highly variable in their nutritional compositions in terms of minerals and different chemical species. The plants grown in in the hydroponic system shows high growth as compared to the conventionally field-grown plants because the usage of water is drastically less as compared to the traditional methods that required heavy agricultural based machinery for land farming system [31, 32].

Hydrospace system is developed under the agricultural farming that flows the water/moisture, nutrients, and oxygen. These essential supplementation can increase the value of crops for resistance against insects. Many advances have been made in the hydrophilic system such as nutrient film technique, wick system, drip system. Nutrient film technique is a hydroponic technique that containing dissolved nutrients required for plant growth that is important for the survival in nutrients deviancy. Drip Irrigation is also effective for the root zone system as a hydroponic growing system in which most efficient water and nutrient delivery system for growing crops. A wick system is also hydroponic growing system in which cotton or nylon wick absorbs water and nutrients from a solution and supplies that can maintain the nutritional balance among plants for their healthy growth [33-36].

Many of the advanced methods have been used to control the plant infections caused by nematodes, viruses and bacterial attack. The over attack of these microorganisms can causing the positioning that causes drastically harmful for human by damaging the digestive system. Cropping patterns as new ways to make farming more efficient that can be helpful to irrigate crops and more disease resistant varieties that can used for the human and organisms in biological chain for the ever-expanding global population with the decreasing freshwater supply. Resilient crops have been developed through genetic engineering approaches for suitable agricultural development in order to improve the crop resistance to pests. Cropping patterns following the modern agricultural sensors, machines, and information technology in order to combat the microbial attack as well as environmental stresses [1, 7, 9].

These advanced devices can leads to be more profitable, efficient environmentally friendly for host compatibility for gene transformation through designing of appropriate primers that helps in increasing agricultural efficiency and reduce the loss of natural resources. Supplementations of fertilizers to the agricultural land sometimes can cause serious hazardous issues due to excess quantities of applied fertilizers than appropriate limit. Effective application of fertilizers remains challenge in agriculture and can be solved through nanosensors. Crops sensors are widely used for applications of fertilizers to the subsequent crops through advanced agriculture machinery the amount of the resource that a given crop needs. It reduces the cost of materials untwisted for the farming and time following the different stages of sustainable agricultural management system [21, 29, 33].

Cropping patterns enables crops rotations through nutritional flow in the food chain that affected the environmental issues due to excess release of hazardous issues. It in order to control the environmental pollution, computers based designed crops as evolutionary advancements for controlling the rates of different climatic changes. Climatic changes also lengthening growing seasons and increasing carbon dioxide that impaired the growth of many plants due to activations of certain genes. Gene knockout in the agricultural systems for controlling the rates of infectious diseases can be possible through sustainable agricultural development. A major portion of covers also helps protect soil from the impact of raindrops through these systems but gene recovery and possible targets for discovery of nanosensors enables for increasing the yield and varieties [34, 35].

CONCLUSION

Cropping patterns as new advancement's in the agricultural systems leads to the sufficient growth and germination of many the crops. Through genetically modified organisms, many genes can be inserted in order to improve the host efficiency. It enables the gene transformation among the many low gene drift population for the genetic recombination's.

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