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The Effects of Transplanting (Planting) Dates on Incidence of Crop Pests. Min Review

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Abstract: The main review purpose this paper provides updated information on the effect of different transplanting (planting) dates on the infestation of crops insect pets were carried out at different areas by different investigators. The results different trials conducted in different agro ecological zone revealed that the damage was higher and yield decrease were recorded in late planted cops and the damage was gradually yield increase in early planted crops in season. Management systems for different crop insects' pest involving variations in different planting date were compared to evaluate their influence on insect pests' damage and yield of crops. The results the data from transplanting (Planting) time helped to formulate projects on management of insect pests based on their damage and economic threshold levels. The data will also help in developing a forecast model for major pests of crops which in turn will help in taking timely management practices. Early transplanted (planted) crops compared with late transplanted (planted) significantly increase yield, growth parameters and decrease insect pest damage incidence. Different trials studies indicated that transplanted (planted) has pronounced positive effect on management of insect pests and growth of crops.

Keyword: Crops, Transplanting date, Green leaf yield, Insect damage

1. INTRODUCTION

Crop pests, including insects, weeds, nematodes, and plant disease organisms are the major causes of crop yield losses around the world and pest management plays a critical role in providing food security and farming income (Zhang et al., 2018). This uncontrolled pest can outcompete crops for water, nutrients, and sunlight, causing producers economic losses. Pest management is a complex process because producers must contend with numerous pest species at any given time. The Integrated Pest Management (IPM) approach associations chemical control when necessary, with cultural and biological practices to form a comprehensive program for managing pests. IPM emphasizes maintaining pests below the economic threshold while applying the minimum amount of chemical necessary for control.

Considering the potential impact of climate change on the ecology of insect pests, different planting dates were investigated as farm-level adaption to control insect pests of crops and improve productivity. Therefore, there is a need to find out the suitable date of transplanting for different crops at different agroecological zones, which may help the crop in escaping from the attack of insect pests. Considering these facts, the present review investigate different experiments were carried out to show the effect of transplanting dates of different crops on incidence of pest.

2. MATERIALS AND METHODS

As a methodology the main source for this systematic literature reviews were different publication journal publication year 1987-2017. Different journal articles used to review from these peer reviewed data. Through searching results 26 papers were retrieved and by reading abstract, key work and conclusion parts of these paper were identified that meet the objective of this report. Then, country of origin, year of publication, publisher, journal name, focus areas of the

paper, methodology and findings of the paper were considered and analyzed

2.1. Research Result on Effect of planting dates for control of insect pests of different crops

Several studies have also been reported in the literature indicated that adjusting planting dates of cabbage can sometimes help to avoid certain insect infestations and reduce the need for chemical control (Dey et al., 2017). Study has also been carried out in Karnataka the effect of planting date of cabbage on the extent of damage diamond back moth and cabbage butterfly by (Viraktamath et al., 1994) observed highest per cent leaf damage (98.83) in the crop planted in the 1st week of January followed by the crop planted in the 1st week of December (48.18) and no heads were marketable in either case. However, the lowest rate of leaf damage (16.87%) and highest average yield per plot (12.2 kg) were recorded in the crop planted in the 1st week of October. Cabbage butterfly, *Pieris brassicae* for the control trial conducted by (Pankaj, 2007) at Himachal Pradesh indicated that Higher incidence of P. brassicae was recorded in the cabbage transplanted in the beginning of the season i.e. last week of April (up to 243 larvae per ten plants and 28% plants with egg masses) and first week of May (up to 172 larvae per ten plants and 22% plants with egg masses) and in the mid- season i.e. last week of May (up to 202 larvae per ten plants and 30% plants with egg masses).

Planting date is a good candidate as a management tool for thrips because the window of susceptibility of cotton thrips is only a few days long under favorable conditions for cotton growth. Authors have noted the use of planting date as a cultural practice that is potentially useful to avoid peak populations of thrips (Slosser,1993: Parajulee,2006). In a study in Texas, cotton planted in late June had lower numbers of thrips infestations compared with cotton planted in April (Slosser, 1993). In another study, thrips were more prevalent in cotton planted timely (second week of May) than in late-planted (second week of June), but the findings did not indicate whether the thrips infestations resulted in damage or yield loss (Parajulee,2006).

An experiment was carried out at the Bangladesh Institute of Nuclear Agriculture (BINA), Mymensingh, Bangladesh in order to investigate the effects of rice variety and planting date on the incidence of insect pests and natural enemies result indicate that occurrence of insect pests and their natural enemies on rice is influenced by variety and date of planting (Magunmder et al., 2013). Similar findings of reduced pests and diseases in early maturing variety and early transplanting date have been reported by Litsinger et al. (1987) moreover low incidence of pest and diseases in early planting rice is also reported by Moniperumal (1989). In early transplanted crop when the infection stage of pest and microbes are over, the inoculums would be finding a place in a late transplanting crop (Rani and Pillai, 2012). In the case of late transplanting the surrounding crop might have completed their susceptible growth stages and the entire pest inoculums would be feeding or confining to the late transplanted crop (Rani and Pillai, 2012). This might be the reason for higher insect pests' incidence for delayed transplanting. Varying the planting time of crops works as a means of cultural control by creating asynchrony between crop phenology and insect pests' phenology which can retard the colonization (Ferro, 1987).

Effect of date of transplanting on the incidence of green leaf hopper (GLH), *Nephotettix virescen*s (Distant) & *N. nigropictus* (Stal) in rice field, Jharkhand experiment conducted by (Munna et al., 2018) results revealed that the appropriate transplanting dates may influence green leaf hoppers from these experimental results, it may be concluded that the 1st transplanting date (1st July) can minimize green leaf hopper attack. Therefore, in Jharkhand, a thorough study on rice, the early transplanting time is very essential for building up a successful pest management system. The finding of the present field studies was found to be in accordance with the results of (Prasad, (2015); Kumar & Prasad (2018) and anonymous (2014 & 2016).

The effect of three dates of planting viz 1st November, 15th November and 30th November on pest and leaf curl virus incidence of bell pepper var Indra was studied in a farmer's field at North 24 Parganas district in West Bengal for two consecutive seasons (2015-16 & 2016-17) result concluded that 1st November planted crop reveals in lower incidence of aphids, thrips, whitefly and fruit borer and leaf curl virus except mites. Such low level of insect pest caused a less crop injury which resulted in enhancing the yield of bell pepper. Pest and leaf curl virus incidence was moderate on 15th November planted crop. Therefore, planting of bell pepper should be completed within 1st week of November in Southern district of Bengal basin with proper protective measure against yellow mite during seedling and early vegetative growth stage (Mousumi et al, 2017)

The sowing date and planting stage of maize are among the most important factors that affect infestation levels of stem borers, which in turn affect the percent of yield losses. The results suggest by Pitamber et al, (20 18) that higher damage was observed in April (58.2%) and the damage month of gradually decrease toward the month of January/February (13.2 to 25.6%) and November / December (13.3- 16.5%). In other study, effect of sowing date the population thrips, aphid and stem borer conclude that the three insect pests were significantly correlated with their associated predators, which

could be utilized to minimize pest insect populations in maize ecosystem. This result in agreement with results of Mohamed (2011), who studied the effects of four squash seed planting dates in April and May. Furthermore, Bereś et al. (2013) reported that when sweet corn was sown in the last week of April, thrips began infesting the corn plants from the first or second week of May with large populations observed in the second week of July. Kerns et al. (2019) also reported that the lowest population size of thrips occurred when cotton was planted after May 15 rather than in April or June.

Muhammad et al. (2014) Investigations made on insect and mite pests were carried out from the beginning of chili growth period till the crop maturity, at kunari, District Mirpur Khas conducted indicated five study insect pests including aphids (*Aphis gossypii* Glover), thrips (*Scirthothrips dorsalis* Hood), mites (*Polypha gotarsonemus* latus Banks) whiteflies (*Bemisia tabaci* Genn) and fruit borer (*Helicoverpa armigera* (Hubner) were monitored and the effect of plant dating was investigated on chilli green pod production. As reported by Berke and Sheih (2000) that one of the practical means of increasing chilli production is to minimize losses caused by major sucking pests, the most important among them are green peach aphid (Aphis *gossypi* Glover), thrips (Scirtothrips dorsalis Hood) and yellow mite (*Polyphagotarsonemus latus* Banks). The yield losses due to these pests are estimated to be 50 per cent (Ahmed et al., 1987; Kandasamy et al., 1990). The loss caused by the thrips is reported to range from 50 to 90 per cent (Borah, 1987) and fruit borers is to an extent of 90 per cent (Reddy and Reddy, 1999).

CONCLUSION

The review articles concluded that the need for demonstrations on the use early transplanting dates of effective insect pests control methods, and all found effective in management of pests in agriculture they need to be validated scientifically

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