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IPM practices for insect pests of most important vegetable vegetation: An define

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Abstract

Vegetable production is one of the more dynamic sectors of agriculture in view of the monetary rate of the manufacturing. Greens are very important in each day of man or woman and to enhance our financial function thru developing greater veggies. Brinjal, okra, cabbage, cauliflower, tomato, beans and cucurbits are vital greens cultivated in India. Numerous biotic and abiotic elements restriction the productivity of veggies, especially illnesses and insect pests because of excessive susceptibility of vegetables to insects, farmers will be inclined to apply chemicals for protecting capabilities. The indiscriminate use of insecticides has disrupted the touchy balance among the insect pests and their natural enemies. The improvement of insecticide resistance in diamond decrease lower back moth (*Plutella xylostella*) in cabbage brinjal fruit borer (*Leucinodes orbonalis*), tomato fruit borer (*Helicoverpa armigera*) and serpentine leaf miner (*Liriomyza trifolii*) are a few examples. This has brought on risks to the surroundings and ecological consequences like destruction of herbal enemy fauna, effect on non-intention organisms, residues in consumable product and the health of clients and clients, in addition to important resistance issues. IPM allows to reduce the dependence on chemical pesticides and ecological deteriorations. IPM includes bio-pesticides, botanicals, predators and parasitoids and all conventional chemical method of pest control.

Keywords: Integrated pest management vegetables

Introduction

At some degree within the region, veggies are a important element of the human, imparting a important supply of carbohydrexcellents, nutrients, and minerals. some vegetables stay unique to particular cultures, on the equal time as others have received large popularity and have been transported to several continents wherein they will be grown extensively. because of growing urbanization and deforestation, most of the herbal resources are depleting and shrinking with a quick tempo. With the constrained land and depleting water belongings, India has to feed the burgeoning population without destroying the ecological balances. Vegetable production is one of the more dynamic sectors of agriculture in view of the economic price of the producing. Vegetables are abruptly turning into an important deliver of earnings for the agricultural populace. India is fortunate enough to have severa agro-climatic conditions determined at some stage in the period and breadth of the u.s. which permit to supply both tropical and tiptop notch veggies. over the last 50 years, there may be boom in vegetable manufacturing and consequently, India is the second largest vegetable manufacturer handiest next to china with an estimated production of approximately a hundred twenty five.89 million plenty from 7.80 million ha (Indian Horticulture information Base, 2008), India contributing thirteen.38 consistent with cent of standard international manufacturing of vegetable. India occupies first characteristic in cauliflower, 2nd in onion and 1/three in cabbage in global. The vegetable production scenario of the u.s.a., the kingdom-clever distribution of region below unique vegetable plants, the maximum region is in West Bengal determined with the aid of U.P., MP, Bihar & Gujrat. There are variations among notable states of the us with reference to productiveness of vegetable flowers. Potato, tomato, onion, cabbage and cauliflower account for round 60% of the complete vegetable manufacturing inside the U.S.

Indian vegetable export can be very low due to improved home requirement and other boundaries in crop production. The important proscribing trouble, encompass the large crop devastation because of progressed pest danger.

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In masses of times there may be one hundred in line with cent yield loss due to viral diseases vectored through bugs. The insect pests inflict crop losses to the song of 40 constant with cent in vegetable production (Srinivasan, 1993) [30]. The quantity of crop losses in greens varies with the plant kind, vicinity, damage ability of the pest involved and cropping season. Vegetables are more susceptible to insect pest and ailment mainly due to their tenderness and softness. At the identical time, vegetable cultivation is becoming extra because of the increasing use of bought inputs collectively with insecticides and fertilizers to hold production tiers.

Vegetable growers thru and large rely on chemical pesticides to counter the trouble of insect pests. It money owed for thirteen-14 consistent with cent of popular pesticides intake as in competition to two.6 consistent with cent of cropped area (Sardana, 2001) [21]. because of immoderate susceptibility of vegetables to insects, farmers have a tendency to use chemical materials for defensive functions. Additionally, their excessive profitability blended with a lack of information with the aid of way of the farmers has regularly caused incorrect use and take care of of artificial pesticides. Those inputs also are a purpose for trouble due to their deleterious impact on human health and the environment like destruction of natural enemy fauna, impact on non-target organisms, residues in consumable product and the fitness of clients and customers, similarly to serious resistance problems.

Changing Pest state of affairs and Yield Losses in Vegetable environment. With the arrival of excessive yielding types and hybrids vegetable seeds led to dramatic modifications in insect pest state of affairs foremost to minor pests assuming the repute of maximum crucial pests. The serpentine leaf miner (*Liriomyza trifolii*) attacks tomato, brinjal, melons, leafy vegetables and cucurbits on the identical time as the spiraling white fly harm okra. The mealy computer virus, *Coccidohystrix insolita*, and leafhopper, *Empoasca motti*, attack brinjal and bitter gourd, respectively (Balasubramanian, 2004) [2] cabbage leaf webber, *Hellula undalis* and pink spider mites on okra, brinjal and cucurbits. modern-day, the insect pests inflict crop losses to the track of 30-40 consistent with cent in vegetable manufacturing (Srinivasan, 1993) [30] and in hundreds of instances, there can be 100 regular with cent yield loss due to viral sicknesses vectored with the resource of way of bugs (Shivalingswami *et al.*, 2002) [24].

Most important Vegetable plants

Solanaceous veggies

That is the primary and economically crucial organization of greens along with Brinjal, tomato and chilli, appreciably cultivated in India.

Brinjal: Shoot and fruit borer (*Leucinodes orbonalis*), hadda beetle or leaf feeding beetle (*Epilachna vigintioctopunctata*), leaf hopper (*Amrasca bigutula biguttula*), aphids (*Aphis gossypii*) and crimson spider mite (*Tetranychus cinnabarinus*) are some critical pests of brinjal. Shoot and fruit borer has remained vital pest for the reason that a few years due to horrible herbal enemy complicated and large use of pesticides in brinjal. Crop losses in brinjal because of shoot and fruit borer degrees from 25.eighty -90 two.50% and yield discount of 20–60%. Hadda beetles devastate the crop in a few wallet, wherein

grownup beetles further to grubs feed on the foliage and genuinely skeletonise the brinjal plant. Some different key pest of brinjal is the stem borer, which tunnels in to stem and motive plant to wither and die.

Tomato: This plant is assignment to infestation via the sucking bugs, white fly (*B. tabaci*) and cotton aphid (*A. gossypii*), the cotton leaf worm (*S. littoralis*) in present day damages the summer season plant life. It causes defoliation, however moreover it can bore into and feed on interior of give up result. Leaf miner (*L. trifolii*) attacks moreover tomato leaves causing numerous losses. In tomato *H. armigera* is the key pest and it feeds on buds, vegetation and fruits inflicting on a median 46% yield loss. Chilli: Chilli is one of the most valuable spice flowers and it is implemented in India as a most essential issue of numerous curries and chutneys. The most vital pest of chilli consists of thrips, *S. dorsalis*; mite, *P. latus*; fruit borer, *S. litura* and *H. armigera*.

Malvaceous vegetable

Okra: Okra (*Abelmoschus esculantus* (L.) Moench) is crucial economically vital vegetable falling underneath this category. Okra flora are mission to assault thru White flies (*B. tabaci*), Jassids (*A. bigutalla bigutulla*) and Aphids (*Aphis gossypii*) are assault. Pods and plant life are number one goals of shoot and fruit borer (*Earias* sp.), while the caterpillar of the yank bollworm (*H. armigera*) prefers the reproductive elements of the Cruciferous vegetable

Cabbage and cauliflower: Cruciferous vegetable crop includes cabbage, cauliflower and knolkhol inside the course of the place. The horrible productivity of cruciferous vegetables due to which suffers from a number of insect pests. The crucial ones are: DBM (*Plutella xylostella* Linn.), leaf webber (*Crociodolomia binotalis* Zeller), stem borer (*Hellula undalis* Zeller), aphids, (*Brevicoryne brassicae* Linn, *Hyadaphis erysimi* Kaltentbach), stink laptop virus (*Bagrada cruciferarum* Kirkaldy), striped flea beetle (*Phyllotreta striolata* Fabr.), and mustard noticed fly (*Athalia lugens proxima* Klug). Ash + soil mixture and cow urine dung are used to protect the cabbage plant from insect pests (Lal and Verma, 2006) [8].

Cucurbitaceous crop

Cucurbits are an critical organization of vegetables, which incorporates sour gourd, ash gourd, pumpkin, snake gourd, melons, and cucumber and so on. Many insect pests infest the crop and affect the advent of marketable yield. The ones insect pests encompass purple pumpkin beetle (*Aulacophora foveicollis*); fruit fly (*B. cucurbitae*), hadda beetle (*E. vigintioctopunctat*) and leaf minor.

Onion: Onion is one of the maximum vital vegetable vegetation in this usa of america. The crucial pest consists of onion thrips, *T. tabaci* and onion fly, *Delia* vintage.

Included Pest manipulate

included pest manage is a systems technique to pest control that combines herbal, cultural, and unique alternatives to chemical manipulate with the realistic use of insecticides. The goal of IPM is to keep pest tiers beneath economically poor ranges at the equal time as minimizing unstable outcomes of pest manage on human health and

environmental resources. IPM is a dynamic and continuously evolving gadget wherein all of the proper control techniques and available surveillance and forecasting data are mixed right proper into a holistic manage programme introduced to the farmer at requisite c programming language as a part of the sustainable crop production generation. In some other phrases, IPM dreams at combining all to be had strategies or device of insect pest manipulate in a realistic manner that minimizes insecticide use and disturbance to the environment but turns into a multidisciplinary one. A broader definition become followed thru the FAO Panel of specialists (meals and Agriculture organization employer, 1975): "protected Pest manipulate is a pest manage machine that, inside the context of the related surroundings and the populace dynamics of the pest species, makes use of all appropriate strategies and techniques in as compatible a way as feasible and keeps the pest populace at degrees under those causing economic harm." This definition has been referred to frequently and has served as a template for others.

Incorporated Pest manages, or IPM, is a philosophy of pest control. It consists of the usage of several control techniques (e.g. bin cleanup, sanitation, facility repair, temperature manipulation, and plenty of others.) used together to reduce pest infestation ranges below monetary thresholds. An monetary Threshold is a given stage of insect infestation which triggers a preventive treatment, which includes an insecticide. The economic Threshold is the extent of insect infestation in which remedy has to stand up to save you the populace from developing to the monetary harm level (or EIL). The EIL is that degree of infestation wherein the price of remedy equals the cost of manipulates measures. as soon because the EIL is exceeded, the farmer loses money. In greens, insect pests cause top notch loss thinking about the above statistics, it's far desired to to govern vegetable pests. Because of the easy accessibility and affirm motion in competition to pest, farmers prefer to use chemical substances to manipulate the pest populace. We consume 13-14% of basic pesticides to manipulate pest in vegetables in competition to 2.6% of cropped area of vegetables. This immoderate and out of control use of chemical substances is not simplest major to destruction of natural enemies but moreover unstable, as greens are susceptible to maintain pesticide residues. The indiscriminant use of chemical substances isn't always ideal in vegetables as the ones are harvested in shorter interval and prepared duration can not extended due to perishable nature of vegetables. those kinds of complexities ought to be stored within the mind while we plan "IPM technique" for veggies.

Techniques for IPM in greens

Cultural practices: The sports activities sports under this approach are:

- a. **Tillage of soil:** summer season ploughing is an powerful workout to interrupt the soil inhibiting inactive levels of insect. Deep ploughing of the world after the harvest reduces the hobby of fruit fly, purple pumpkin beetle and reduce pc virus as those bugs continue to be in the soil in earthen cocoon to complete the dormant stage in their life cycle.
- b. **Use of resistant/tolerant types:** tolerant/a good deal much less willing kinds are vital detail of IPM

programme. They reduce the pest prevalence thru non-desire (antixenosis), antibiosis and tolerance.

- c. **Manipulation in time of sowing:** thru manipulating the sowing and planting dates of the crop to preserve it a long way from maximum unfavourable stager of pest, losses can be controlled under economic threshold level.
 - Plant the cucurbit crop in November to avoid the damage of red Pumpkin Beetle.
- d. **Inter cropping:** As severa nature of plant obstructs the lifestyles cycle of insect and obstructed conditions are detrimental for similarly infestation. a few inter crop aggregate powerful in vegetable pest manage are:
 1. Rows of maize and outer rows of maize and internal row of wheat efficaciously blocked the individual thrips motion in onion.
 2. Intercropping with tomato or carrot reduces the occurrence of Diamond again moth in Cabbage
 3. Tomato intercropped with cabbage has been referred to to inhibit or lessen egg laying by way of diamond once more moth and leaf webber occurrence.
 4. single and double rows or border crop of coriander/fennel decreased the occurrence (49.eighty five-ninety eight.6%) of shoot and fruit borer of brinjal
- e. **Lure Crop:** The principle of lure cropping rests at the fact that genuinely all pests display a fantastic preference to best crop level. some early plants are sown in narrow strips spherical a chief crop to function a lure for the pest that might be common to each. trap crop should be incredibly attractive to the pest than the principle crop. lure cropping has indicated a incredible advantage in phrases of economic returns on a mean of 10-30 regular with cent boom in net earnings mainly resulting from decreased insecticide use and pest assault. The number one advantage of lure cropping is that pesticides are seldom required for use on the precept crop and this complements the herbal manipulate of pest. furthermore, entice plant life may also moreover more over attract natural enemies for that reason improving herbal manage. The beauty of entice flora can be extra applicable by manner of way of use of insect pheromones, plant kairomones or insect food nutritional nutritional dietary supplements. Use of tall African marigold as entice crop for the manipulate of tomato fruit borer, *H. armigera*, changed into confirmed in 1992 (Srinivasan *et al.*, 1994) ^[31]. Planting Indian mustard as a lure crop for the control of insect pest of cruciferous vegetable (Moorthy and Kumar, 2004) ^[14]. It gives big economic and environmental benefits and it may efficaciously included with cultural, natural and chemical manipulate strategies (Kambrekar, 2015).

Mechanical manage of Insect Pest

Bargain and suppression of pest population through the usage of manual gadgets is called as mechanical manage. This includes: Hand deciding on of larvae (larvae of cutworm, leaf ingesting caterpillar and so on), suction traps (aphids and white flies), mild traps (moths, furry caterpillars), pheromone trap (moths and fruit flies), Trenching the field (navy pc virus, grasshoppers).

- Normal pruning and activate disposal of pest broken eggplant shoots, in particular as tons as the first harvest,

is an critical aspect within the BSFB IPM approach (Satpathy *et al.*, 2005, Tiwari *et al.*, 2009) [22, 33].

- Affected twigs and give up result must be clipped off or removed from the arena (Shankar *et al.*, 2010) [23].
- Installation of pheromone traps @ five-7 in line with ha for early detection and 12-15 consistent with ha for trapping and mass destruction for mating disruption
- apply poison baits (40 ml malathion + 200g gur / molasses in step with 20L of water) within the form of spray or bait stations for control of fruit flies
- Mass trapping of fruit flies adults the use of cue lure
- Set up yellow sticky traps coated with adhesive or sticky glue at crop canopy degree for monitoring grownup whiteflies.

Physical manipulate of Insect Pest

Discount or suppression of pest populations by means of manner of the usage of the gadgets which impacts them bodily or modify their bodily environment. Manipulation of temperature, humidity, moderate is used for the control of insect pest populace.

- Soil solarization in nursery beds in addition to in the critical field.
- Botanicals
- Soil software program of neem cake decreased the prevalence of fruit fly to 6 percent in cucurbits, even as insecticide implemented plots recorded its occurrence at greater than 15 percentage. Many neem formulations had been positioned effective inside the path of serpentine leaf miner additionally. NSKE and karanj oil have positioned effective in competition to cucurbit leaf miner (Rosaiah, 2001).
- In cabbage and cauliflower, Neem cake and NSKE sprays software program program DBM substantially in cauliflower and cabbage (Srinivasan and Moorthy, 1992; Moorthy and Kumar, 2004) [13, 14]. Demonstration of NSKE sprays under mechanised cabbage farming became also finished in a big location of Tamil Nadu with the aid of Moorthy *et al.* (1998) [12].
- The insecticide resistant brinjal shoot and fruit borer come to be effectively decreased to six-10% by using the use of the use of 2-three soil applications of neem and pongamia cakes @ 250 kg/ha. Use of NSKE @ five% and Neem gold @ 2 ml/l were located effective in opposition to *L. orbonalis* (Tiwari *et al.*, 2009) [33] NSKE and nimbecidine turn out to be decided powerful against tomato fruit borer, *H. armigera* (Singh *et al.*, 2009) [26].
- The soil software of neem cake @ 250 kg/ha at sowing and repeated applications at 30-45 days interval have grow to be located to lessen the superiority of okra insects. Leaf extract of *Parthenium hysterophorus* three% modified into positioned effective in competition to leafhopper (Pawar *et al.*, 2001) of okra. Leaf extract of *Lantana camara* become placed powerful in the path of *Earias* sp. (Lok Nath, 2008) [9]. *Pongamia extract*, *Lantana leaf extract*, *Tobacco extract* and *Garlic extract* were located powerful in the direction of *L. orbonali* (Pandey & Thakur, 2017) [17].

Organic/ Microbial manipulate

Exploitation of herbal enemies could be very vital to IPM programme and it's far getting used very extensively now-a-days by means of the farmers below IPM bundle deal. those

consists of

1. **Predators:** A predator is unfastened living organisms which feed on its prey, is commonly larger than its prey and requires multiple prey to complete its development is referred to as predators. Examples: Ladybird beetle feeds on aphids.
 - Ladybird beetles, *Rodolia cardinalis* and *Coccinella* sp: The ladybird beetles feeds especially on aphids and one in all a kind gentle-bodied insects, consisting of mealy bugs and spider mites.
 - Syrphid fly larvae: Larvae of this species feed on aphids and mealybugs.
 - Green lacewing larvae: *Chrysoperla carnea* - Lacewing larvae, known as aphid lions, feed on insect eggs, aphids, spider mites, thrips, leafhopper nymphs, and small caterpillar larvae. man or woman lacewings aren't predacious.
 - Damsel trojan horse: The laptop virus predate on aphids, leafhoppers, mites, and caterpillars.
2. **Parasitoid:** A parasitoid is a unique form of predator, it actually is often in equal period its host, kills its host and calls for best one host for development proper proper into a loose residing man or woman. *T. chilonis* parasitized the eggs of many lepidopterous insects i.e. *H. armigera*, *L. orbonalis*, *Earias* sp. and so on.

Trichogramma wasp: *Trichogrammatidae* - This tiny wasp assaults eggs of more than two hundred pest species, together with cutworms, corn borers, corn earworms, armyworms, codling moths, and cabbage moths. launch time is important for their effectiveness thinking about they only attack pest eggs.

- Inundative releases of the egg parasitoid, *T. brasiliensis* @ 2,forty,000/ha also are advocated for the manage of fruit borer. Six releases at weekly periods @ 40,000/ha with the number one release coinciding with 50% flowering in tomato is typically recommended (Moorthy *et al.*, 1992) [13].
- *Cotesia plutellae* & *C. glomeratus* natural bio-agent of DBM larvae is powerful to suppress its populace in subject situation (one thousand adults in step with launch each 2 week c programming language up to attain).
- Launch of *C. plutellae*, Conservation of *Camponotus chloridae*, a potential parasitoid of *H. armigera*.
- *Telenomus remus* parasitized the eggs of tobacco caterpillar Spodoptera litura.
- *Phryxe vulgaris* (dipteran fly) also are discovered abundantly in cole plant life fields to parasitize the caterpillars.

Three. Pathogen: Microorganisms like micro organism, viruses, fungi, protozoa and nematodes boom illnesses to the pest and hence help in killing pest. This includes:

- (i) **Fungus:** *Beauveria bassiana*, *Metarrhizium anisopliae*, *Nomuraea rileyi* - Used for smooth bodied insects, soil dwellers and lepidopterous larvae.
 - Spraying of *B. bassiana* 1X10⁴ cfu/g times with per week c programming language satisfactorily controlled whitefly nymphs and adults. Spraying of *B. bassiana* @ 2. five kg/ha modified into observed effective toward shoot and fruit borer, *L. orbonalis* in brinjal (Tiwari *et al.*, 2009) [33]

- In okra moreover located effective towards *Earias* sp. (Lok Nath, 2008) ^[9]

(ii) Bacteria: *B. thuringiensis* - Used towards fruit and shoot borer of brinjal, Okra & tomato

- Bt @ 0.5 kg/ha + elimination and destruction of infested twigs cease end result and fallen leaves had been decided simplest towards shoot and fruit borer, *L. orbonalis* in brinjal (Tiwari *et al.*, 2009) ^[33]
- Software program of Bt in okra have become located effective in competition to *Earias* sp. (Lok Nath, 2008) ^[9].
- Spraying of bacterial components Bt @ 500 g/ha also can additionally proved useful in regulating the *Helicoverpa* larvae in the project condition.

(iii) Virus: Ha-NPV: Used towards tomato fruit borer: S-NPV- used in opposition to tobacco caterpillar. Ha NPV @ 3 hundred LE modified into located powerful in opposition to tomato fruit borer, *H. armigera* (Singh *et al.*, 2009) ^[26]. The sprays of Ha NPV at 250 larval equivalents/ha has been located to be powerful in controlling fruit borer. research at IHR have indicated that three-4 packages at weekly durations, the number one spray coinciding with flowering, reduced pest incidence to minimum (> 5%) (Mohan *et al.*, 1996) ^[15].

- Sprays of Ha NPV @ 250 LE /ha at 28,35 and 40 two days after transplanting located effective in opposition to tomato fruit borer, *H. armigera*
- Spray Spodoptera NPV 250 LE/ha + 1% jiggery along side decal (0.5 ml/litre) at some point of evenings (Monobrullah and Shankar, 2008) ^[23].

Practical desire of chemical substances may additionally keep the IPM tool these pesticides need to be judiciously used thinking about sure thing like prepared length of chemical, financial threshold degree and initiation of manage measures through pheromone /light entice catches.

Relaxed Use of Chemical

Comfy use of chemical materials may be observed in IPM. For this everyday monitoring of crop for prevalence of pest, monetary Threshold level and surely appropriate selection and use of chemical materials is critical.

Following elements need to get hold of emphasis at the time of selection of chemicals for use:

- Vegetable with a lot less deciding on c program language period have to be sprayed with insecticide having less geared up duration.
- Chemical substances like plant-starting insecticides and growth regulators can also be part of IPM. For eg. Neem products have validated efficacy in opposition to bugs like jassids & borers of okra.
- ETL primarily based absolutely software program program time desk permits in keeping minimal pest populace & use of insecticides on this kind of manner that it does no longer have an impact on survival of natural enemies.
- Ultimate, however no longer the least, particularly comfortable chemical materials, ought to be considered to be used if required anyways practices are followed.
- IPM interventions
- Seed treatment with systemic chemical pesticides to avoid assault of sucking insect pests.

- Inter cropping with legumes to boost natural enemy population and trap cropping to lessen harm because of crucial insect pests to most crucial crop.
- Plant forty five-day antique marigold seedlings and 25-day antique tomato seedlings concurrently in a sample of 1 row of marigold for every 16 rows of tomato (optionally available for tomato fruit borer control)
- Sow one row of mustard for each 25 rows of cabbage (optionally to be had).
- bird perches for alighting insectivorous birds to predate on dangerous bugs.
- Pheromone traps for tracking or mass trapping of moths.
- Yellow sticky traps and moderate traps to manipulate sucking pests like white flies, jassids and aphids
- Scouting to show reputation of pests and useful insects at regular intervals.
- Periodical removal and destruction of dropped squares, dried plants, infested shoots and end result of brinjal, tomato and okra.
- biological manipulate is self propagating and self perpetuating. Augmenting bio-control sellers like Trichogramma, Chrysoperla, Syrphid, Ichneumonid, Coccinellids and Braconids.
- Spraying of bio-insecticides like *B. bassiana*, *B. thuringiensis*, *Metarhizium anisopliae*, *Verticillium lecanii*, Ha NPV, SI NPV, botanicals, neem seed kernel extract (NSKE).

Conclusions

No longer with status use of pesticides, insect pests and illnesses purpose massive losses in vegetables. extra over, many insect pests have advanced resistance to insecticides used to manipulate them, implying repeated packages of insecticides and boom in the rate of safety, secondary out break and pest resurgence. there may be an urgent need to popularize the today's technology after taking inventory of the existing techniques and if critical, regulate them to fit one-of-a-kind ecological goals. As maximum of the veggies are being eaten row, so, right care and precautions are to be taken care of while recommending using pesticide. Sole reliance on chemical manage need to be avoided. The preference must take transport of to the alternative effective techniques of manipulate like cultural practices, host plant resistance, biocontrol, use of biopathogen/botanicals to lessen the use of pesticides. The greater present day technologies and practices provide better safety in competition to insect pests with the useful resource of adoption of included pest control closer to food awesome and immoderate yield manufacturing for home and export market of vegetable vegetation.

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