Open Access Multidisciplinary Online Magazine

Agri-India TODAY

Monthly e-Newsletter

Volume 01 | Issue 10 | October 2021

www.agriindiatoday.in

Editorial Board

INDEX

[Article ID : 01/X/01/1021]

MURANI MITE (*Polyphagotarsonemus latus*) – A SERIOUS PEST OF CHILLIES

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Abstract
Chilli has become an important spicy component in everyone's food everywhere. Cultivation of chilli is being affected now a days by a broad range of pests particularly mites. One such mite called the yellow murani mite (*Polyphagotarsonemus latus*) causes serious damage and yield loss in the chilli crop. The farmers need more knowledge in managing the mites and in controlling them. This review articles gives almost all details regarding this non insect pest.

Keywords : chilli , curling , mite , stunting

Introduction
Chilli is one of the most important commercial spice crop of India. The botanical name of chilli is *Capsicum annum*. It is grown widely all over the world. There are almost 400 different varieties of chillies all around the world. It is called by various names like bell pepper, hot pepper, sweet pepper, etc.. . The world's hottest chilli is "Naga Jolokia" that is widely cultivated in the hilly terrain region of Tezpur, Assam. The biting pungency of chilli is due to the presence of a pigment called capsaicin. More than 20 species of pests have been reported attacking leaves and fruits of chillies. Thrips and mites causes a major damage to the pest. Mites are becoming a major serious pests now a days . The yellow murani mite *Polyphagotarsonemus latus* belonging to the family Tarsonemidae has become an emerging non insect pest in chilli crop. This article briefly explains about the host range, biology , symptoms of damage and management of this serious non insect pest.

Host Range
This pest is a polyphagous pest and affects crops like cowpea , green gram , horse gram , pillipesara , sesamum , lablab , jute , cotton , potato , tomato , brinjal , cucurbits , tea , beans and amaranthus.

Biology and Ecology
- Adults are large, oval and green yellowish bearing 4 legs. The larva or nymph are tiny, translucent white.
- Early winter is more favourable for adult forms and mid-winter for apterous forms are observed in large number.
- They are responsible for spreading the infestation from plant to plant and establish new colonies.

Figure.1 Adult

Figure.2 nymph

Life Cycle

The life cycle of this yellow mite has three distinct stages namely egg, nymph and adult. The figure.1 displays the complete life cycle of murani mite.

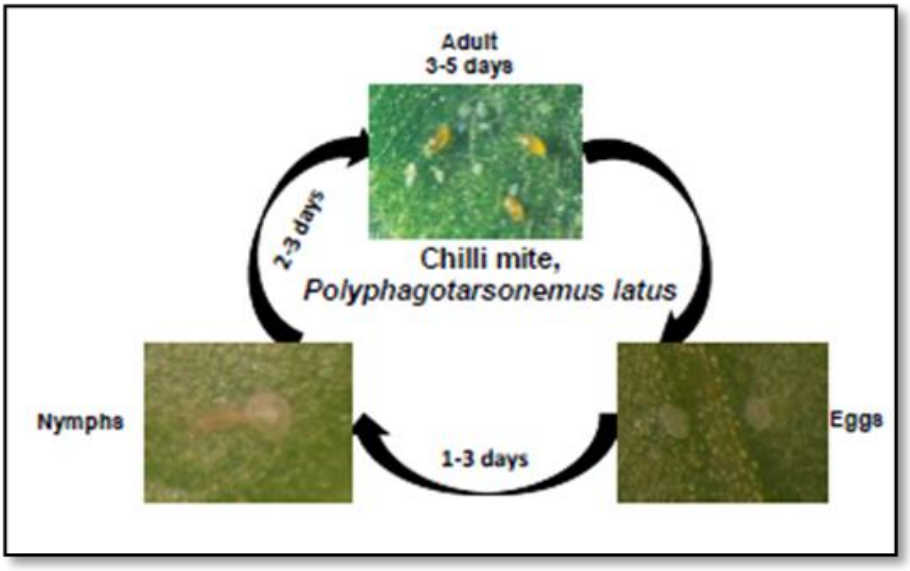

Figure.3 life cycle of yellow murani mite.

Egg : The eggs are minute and oval in shape laid on the ventral side of young leaves. The incubation period lasts for about 1-3 days.

Nymph: After hatching, the larval is sluggish with three legs and this stage lasts for a day. After a day it gets transformed into a quiescent nymph. First instar nymph or larval period varies from 12h – 1.5 days and the second nymph or larval period is of 12hr. Total nymph or larvae period lasts for 1-2 days.

Adult : The adults measure 0.1 mm in length and bear 4 pairs of the legs. They are yellowish green in colour and translucent in nature. Adult longevity varies from 3 - 5 days. The total life cycle is completed within 6.5 – 10 days.

Nature of Damage : Both the adults and nymphs sucks sap from the young leaves and fruit tips.

Symptoms of Damage : Sudden curling and crinkling of leaves followed by development of blister patches. Severe stunting of growth and death of plants. Petiole in a few cases becomes elongated and it is referred to “rat tail” symptom. Later they stop growing and die.

Petiole elongation

Figure.4

Stunted growth

Figure.5

Figure.6 downward curling

Management

Cultural practice :

- Growing tolerant varieties like Guntur types
- Management of nutrients and water will also helps in reducing the mite population.

Biological control: The potential predator *Amblyseius ovalis* controls the population of yellow murani mite in chilli ecosystem.

Chemical management:

- Karnataka: Spraying of Fenazaquin 10 EC @ 2 ml/lit or Vertimec 1.9 EC @ 0.2 ml/lit or dicofol 18.5 EC @ 2.5 ml/lit or Wettable sulphur @ 3 g/lit for management of mites.
- Tamil Nadu and Spice board: Spray dicofol 18.5 EC @ 2.5 ml/ lit or wettable sulphur 50WP @ 5 g m / lit of water and avoid application of monocrotophos.
- Andhra Pradesh: Spray Dicofol (kelthane) 5ml or Wettable sulphur 3g/ Micronised sulphur 2.5g/litre of water. In severe conditions repeat the spray with 4-6 days interval.
- National Horticulture Board: Spray phasalone 3ml/litre (Severe conditions) or Wettable sulphur 3g/litre of water or dicofal 5ml/lit of water.

Conclusion

Mites are generally non insect pests which attacks the crops and brings about serious yield losses. Different mites causes peculiar symptoms in crop plants. In chillies, the mite *Polyphagotarsonemus latus* causes crinkling and curling of leaves and finally brings about plant death. It is a polyphagous pest and attacks many other field crops too. The recommended

chemical acaricides controls these mites to an extent. For effective control, an extensive research is need which in turn will be of great benefit to the farmers.

References

A. Regupathy, R.Ayyasamy. 2019. A guide on crop pests. Namrutha publications. 102pp.

Cho, M.R., Jeon, H.Y., La, S.Y., Kim, D.S. and Yiem, M.S., 1996. Damage of broad mite, Polyphagotarsonemus latus (Banks), on pepper growth and yield and its chemical control. Korea J. appl. Ent.35: 326-331

Lagarmalai, J., Grinberg, M., Perl-treves, R. and Soroker, V., 2009. Host selection by the herbivorous mite Polyphagotarsonemus latus (Acari: Tarsonemidae). J. Insect Behav. 22: 375-387

[Article ID : 01/X/02/1021]

INTEGRATED PEST MANAGEMENT PRACTICES IN MANGO AGAINST LEAFHOPPERS - A REVIEW

Akkabathula Nithish

Introduction

Mango is the national fruit of our country and also known as “King of fruits” due to its wide range of adoptability, taste, colour, flavor, nutritive value, attractiveness, fragrance and health promoting qualities etc. Among the tropical fruits, it is to be considered as the most ancient and supposed to have its origin around Indo-Burma region. India stood in world’s first place in the production of mango and has been in farming in the sub-continent for well over 4000 years. Mango tree is attacked by about 400-500 kinds of insects, 10-20 kinds of mites and 20-30 kinds of nematodes at the world level. Of these, about 188 kinds of insects have been recorded in India (Tandon PL and Verghese A., 1985). Nearly 250 insects and mites attack the trees of mango in different stages (Pena JE, Mohyuddin AI., 1997). Among them leaf hoppers are the harmful and economically important insects which they can cause losses of 20-100% of inflorescence (Verghese A, 2000). This pest is found in all the mango cultivated countries of the world like India, Bangladesh, Taiwan, Vietnam, Burma, Sri Lanka, Philippines and Pakistan. This pest is reported in all the mango cultivating areas of India but is highly widespread in Northern India. Among different species of mango hoppers *Amritodus atkinsoni*, *Idioscopus clypealis*, and *I. niveosparsus* are the major important which are persistent on leaves and panicles, causing about 50% yield losses in severe attack. They are the major yield limiting factors which reduce the productivity and quality of mango fruits.

Key words: Mango, Leaf hoppers, IPM

Identification of pest

They are having a wedge-shaped body with broad head and narrow abdomen towards the back. The hind legs are well adopted for quick hops. *Amritodus atkinsoni* is a dark grey in colored insect having two distinct dots on the scutellum and is comparatively bigger in size of all three species measuring about 4–5 mm in length while *I. niveosparsus* is somewhat smaller in size having three dots on the scutellum with a distinct white band over its light brown coloured wings. *I. clypealis* is the smallest among all the three species which is light brown in colour with two spots on the scutellum and measures about 3.5 mm in length (Butani, 1979).

Nature and symptoms of damage

Adult hopper lays eggs on inflorescence stalks and flower buds. Both nymphs and adults cause the damage by sucking the phloem sap from shoots, young leaves and inflorescences. Affected inflorescences turn brown and become dehydrated. Severely puncturing and continuous draining the sap from plant tissues cause curling and drying of the infested parts and resulted in non-setting of flowers and fruits, also dropping of immature fruits, thereby reducing the yield (Gundappa TA and Shukla PK, 2016). Moreover, hoppers secret honey dews during feeding which encourages fungi development namely *Meliola mangiferae* and *Copnodium mangiferum.* The black sooty moulds developed on leaves interfere with photosynthetic activity which adversely affected plant growth and yield.

Activity of hoppers of mango tree

The period of activity of hoppers coincides with maximum appearance of inflorescence, shoots and tender leaves (Zagade MV, Chaudhari JN, 2010). Usually hoppers were found colonized in both reproductive (on inflorescence) and vegetative (on newly emerging leaves) phases of the mango trees. Maximum numbers of hoppers is found at the time of flowering period (full bloom stage) and are active round the year in crevices and cracks of the tree trunk (Babu *et al*, 2002).

Control measures for mango hoppers

1. **Cultural control** : There seems to be short of systematic work on the effect of pruning, high-density planting, proper spacing and other cultivation practices on mango hoppers populations. Regulate the number of flushes by pruning of dense, overcrowded and overlapping branches in the month of November to December and also in rainy seasons in such a way that ample light is penetrated in to the trees. As darkness and dampness are associated with increased populations and quick multiplication of pest, keep the orchards neat with removal of weeds, regular ploughing, removal of excess, dead and diseased branches to increase supply of light to various parts of the trees are considered advantageous in minimizing the pest damage (Singh, 1993). Resistance in certain mango varieties could be due to the presence of higher potassium in the inflorescence (Nachiappan and Baskaran, 1983). Avoid plantings of alternate host plants like guava, custard apple and hibiscus etc. Avoid use of nitrogenous fertilizers in excess and burn the crop residues or cow dung cakes during evening hours to generate smoke in the orchards. The spacing between the trees moreover plays a main role in reproduction of the hoppers. So proper spacing should be maintained in orchards, as orchards with nearer spacing and also varieties having dense inflorescence attract more populations of hoppers (Srivastava 1997; Reddy and Dinesh 2005),

2. **Biological Control :** Application of bio-agents, *Metarhizium anisopliae* or *Beauveria bassiana* @ 1x 108 cfu/ml on tree trunks once during off season and two times at 7 days interval during flowering season and also conservation predator like *Coccinella septempunctata*, *C. transversalis*, *Chrysopa lacciperda*, *Menochilus sexmaculatus, Mallada boninensis,* and parasitoids like *Gonatocerus* sp., *Polynema* spp., *Tetrastichus* sp. and fungus like *Verticillium lecanii.*

3. **Host plant resistant :** Less using components in IPM are Host plant resistance and semio-chemicals which deserves immediate attention. Significant differences in the pest incidence among different genotypes were recorded indicating the scope for host plant resistance (Nachiappan and Bhaskaran 1983; Devi Thangam *et al*. 2013).

4. **Botanicals :** Botanicals possess different biological effects like repellent, antifeedant and juvenile hormone activity (Pradhan and Jotwani, 1971; Girish and Jain, 1974). Certain neem formulations and products have been therefore exploited for the management of these insects. At initial stages when the hopper population is less than 4 per panicle spraying botanicals like lemon grass oil (0.125%) nimbicidin (0.2%) citronella oil (0.25%) and neem oil (1%) give best results in controlling the hoppers (Verghese 2000).

5. **Chemical Control :** Chemical sprays have to be minimized and should be used on need base only after insect population crosses its ETL. Initial spray should be given at the early stages of panicle formation with Buprofezin 25% SC @ 1.25ml/ lit of water, 5- 15 lit per tree or Imidacloprid 17.8% SL @ 3ml / lit of water, 10 lit/ tree or Lambda-cyhalothrin 5% EC @ 0.5 - 1.0 ml/ lit of water or Oxydemeton–methyl 25% EC @ 600 - 800 ml in 600 - 800 lit of water/acre. If hopper population is more than 5-10 per panicle, next spray should be given

when panicles attain full-length stage but before full bloom and the final spray should be done after the fruits are set at pea size stage. A rational rotation of insecticides is desirable to counteract the tendency of pest to develop field resistance. Chemical sprays should be avoided at the time when trees are on full bloom stage to avoid killing of pollinators (Verghese and Devi Thangam 2011).

Conclusion

The recorded works on leaf hoppers of mango indicated that, with practices of IPM in mango fields, the hopper population can be minimized and well managed totally. On arrival of location specific commercial cultivation and different varieties, there was a considerable shift in the hopper populations of mango over many years. Orchards of mango hold a more numbers of local natural enemies which suppress the hoppers. They should be identified and conserved for biological control. Semio-chemicals and Host plant resistance utilization are less used components in IPM against hoppers in mango, so they deserve instant consideration. Growing mango trees to meet international principles demand residue-free product, and therefore there is a need to build up good agricultural practices and research in this path is necessary. Indiscriminate utilization of broad-spectrum insecticides alone has chances of threat to natural enemies which leads resistance development in hoppers.

References

Babu LB, Maheshwari TM, Rao NV. Seasonal incidence and biology of the mango hoppers. Entomon. 2002; 27:35-42.

Butani DK (1979) Insects and fruits. Periodical Expert Book Agency, Delhi

Devi Thangam S, Verghese A, Dinesh MR, Vasugi C, Kamala Jayanthi PD (2013) Germplasm evaluation of mango for preference of the mango hopper, *Idioscopus nitidulus* (Walker) (Hemiptera: Cicadellidae) :The first step in understanding the host plant resistance. Pest Manag Hort Ecosyst 19:10–16.

Girish, G.K. and Jain, S.K. (1974). *Bull. Grain, Techno/.,* 12 : 226-228.

Gundappa TA, Shukla PK. Seasonal dynamics of mango hoppers and their management under subtropics. GERF Bull. Bioscience. 2016; 7(1):6-9.

Nachippan, RM. and Baskaran, P. (1983). *South Indian. Hort.,* 31(304) : 160-165.

Pena JE, Mohyuddin AI. Insect pests (Ed.) Richard, E. Litz. The mango Botany, production and Uses. CAB International Willing Ford Oxon UK., 1997, 327-340.

Pradhan, S. and Jotwani, M.G. (1971). *Entomologists Newsletter,* 1: 75-77.

Reddy PVR, Dinesh MR (2005) Evaluation of mango exotic collections for resistance to hopper, *Idioscopus niveosparsus* Lethierry India. J Plant Gen Res 18(1):69–70.

Singh, G. (1993). *In* : *Advances in HorticultureKL.* Chadha and 0.P. Pareek (eds). *Vol. 3-Fruit* Crops: Malhotra Publishing House, New Delhi. pp. 1481-1500.

Srivastava RP (1997) Mango insect pest management (No. Ed. 1). International Book Distributing Co, Lucknow.

Tandon PL, Verghese A. World list of insect, mite and other pests of mango. Technical Document, No. 5, IIHR, Bangalore, 1985, 6(3):122-131.

Verghese A (2000) Status and management of the mango stone weevil *Sternochetus mangiferae* (Fab.) (Coleoptera: Curculionidae) in India. Pest Manag Hort Ecosyst 6(1):15–21.

Verghese A, Devi Thangam S (2011) Mango hoppers and their management. Extension folder no: 71-11, ATIC series: 31-11. Indian Institute of Horticultural Research, Bangalore.

Verghese A. Effect of imidacloprid, lambda-cyhalothrin and azadirachtin on the mango hopper, *Idioscopus niveosparsus* Leth. (Homoptera: Cicadellidae). Acta Horticulture. 2000; 509(2):733-736.

Zagade MV, Chaudhari JN. Impact of meteorological parameters population dynamics of mango hopper in high rainfall zone of Konkan region. Journal of Agrometeorology. 2010; 12(1):111-113.

[Article ID : 01/X/03/1021]

HEAT: SOLUTION LIES IN THE CORE OF A PROBLEM FOR QUALITY MAINTENANCE OF FRUITS

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Abstract

The quality of fruit determined by different biotic and abiotic factors. Pre harvest and even post harvest management of fruit is the utmost need of the hour. Among the different abiotic factors, heat is an important driven factor which causes numerous problems on fruits quality. However, this same heat can be utilized in appropriate manner to save the fruits from different biotic threat and help in maintaining fruit quality. So, in a nutshell, the heat posing as a setback can also be a solution of different problems. In this article we will try to summarize this contradictory role of heat on fruits in both pre and post harvest stages.

Key word: Heat, Fruit, Biotic and abiotic factors, Quality.

Introduction

With the increasing temperature of the environment due to global warming, the fruits cultivation is facing different negative impact like reduced fruit yield and quality. Nevertheless, plants have various natural mechanisms to dissipate the increased temperature by 1) long-wave radiation, 2) heat convection into the air and 3) transpiration. Transpiration can be interrupted by the stomatal closure due to the unavailability of adequate water uptake which induces the Abscisic Acid (ABA) production in roots leads to the closure of stomatal guard cells. Under very high temperature generally the radiated heat builds the high temperature around the crop environment. This also leads to stomatal closure and reduce heat convection. Hot and dry wind helps in heat build up by increasing the dehydration of leaves and limiting the water movement.

Effect of heat

Generally it was a common observation that photosynthesis rate decreases dramatically at temperature above 94 ºC. Many disorders have been reported on various fruits which occur due to the imbalance of heat. Other than the reduction of photosynthesis rates generally the pollen production also impaired in high temperature which indicates the less fruit set. Heat injury in plants induces sunburn and sunscald on fruits, leaves and stem along with leaf and fruit drop and rapid leaf death.

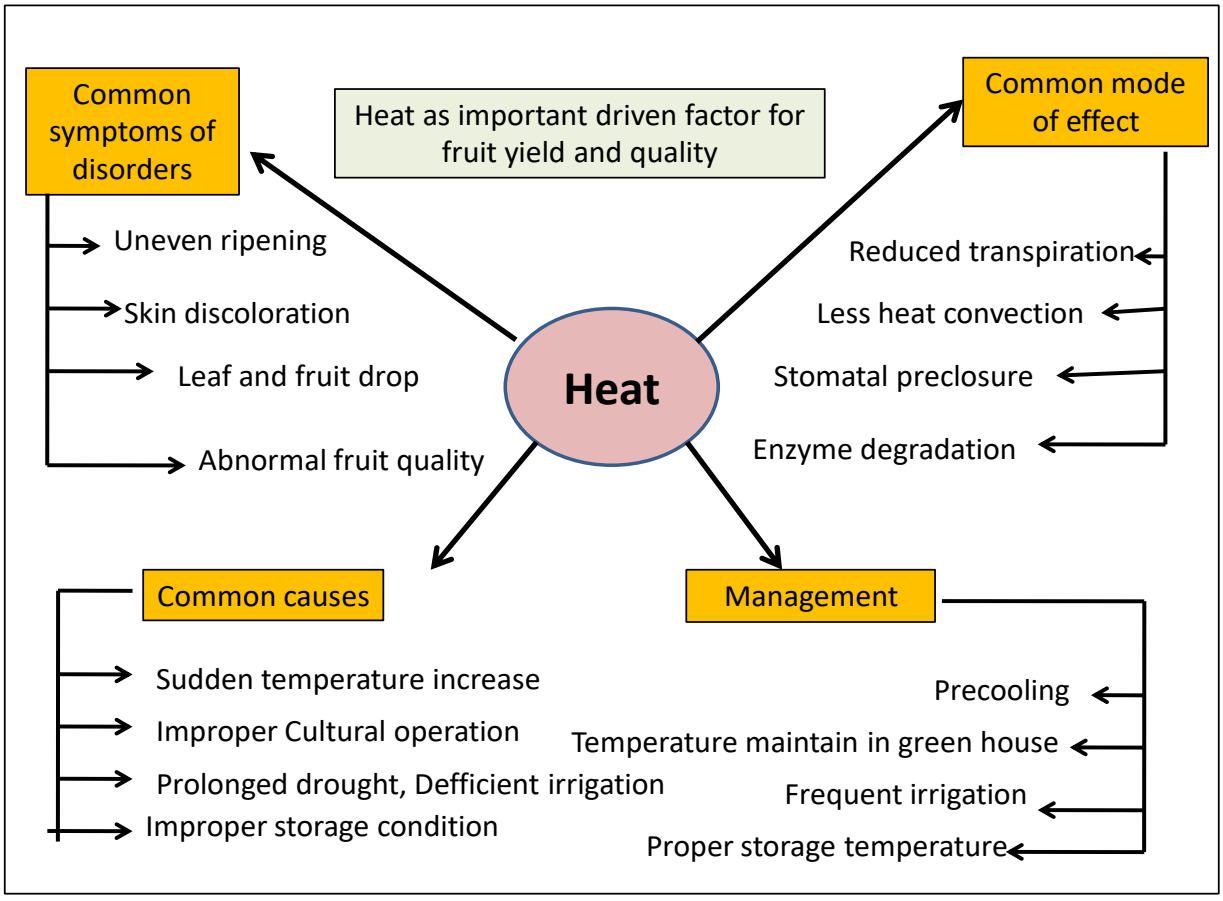
Table-1 : Disorders occurred due to the excessive heat

Sr. No.	Disorder	Symptom	Associated fruits
1	Sunburn	Fruit surface temperature (FST) of 126 ˚F for 10 minutes causes necrotic (dark brown or black) spot on pill.	Apple, Peach, Apricot
2	Sunburn browning	Skin colour changed to dull brown reduces the marketability.	Apple
3.	Lenticels marking	Lenticles on fruit skin become prominent produce numerous dot like symptom	Mango, Apple, Pear

4	Hard lumps in pulp	Formation of much firmer mesocarp due to the inactivation of enzyme in the cell wall in response to heat stress.	Papaya, Banana
5	Water core	Uneven softening of fruits fleshy core due to the increase in temperature during ripening.	Japanese pear
6.	Fruit drop	Excess temperature and lack of soil moisture induced the dropping of fruits in different stages of maturity.	Citrus, Mango
7	Russeting	High temperature at night causes irregular cell division, cracking and formation of cork tissue.	Apple and pear
8	Abnormality in pistil development	Underdeveloped pistil development in higher temperature	Almond and sweet cherry.
9	Spongy tissue	Convective heat leads to development of white corky patches with or without air pocket in fruit pulp.	Mango
10	Pink berry	High temperature variation in day and night (Diurnal temp variation) leads to pink colour berry formation	Grape

Management

Heat management in field and storage condition is the main challenge to control all the heat interfered disorder in fruits. Although in field, heat management is more tedious job. The management of these kind of disorders are graphically represented here :-



Heat as protector and solution of biotic threat and fruit quality maintenance

As described the heat as both be the problem and savior in both pre and post harvest stages of fruits, here we will depict how heat can be a solution for controlling the threat, thereby helps the farmer to protect valuable produce. On the whole, postharvest heat treatments are useful for the control of insect and disease disinfestations, modifying fruit responses to cold stress, delay ripening and maintaining fruit quality during storage.

Mode of action of heat treatment

1. Protection from chilling injury : Chilling injury at low temperatures induce uneven ripening, lack of flavor and aroma, skin discoloration, internal or surface browning, development of a grainy texture, and increased susceptibility to microbial infections. Heat treatments are reported to delay or prevent the development of chilling injury (Lurie; 1998). Yun *et al.* mentioned that mandarin during storage after a 2 min dip at 52 °C successfully suppressed *Penicillium italicum* development, and reduced chilling injury during storage. While, Hot Air Treatment of 39 °C for 3 days found to delay internal breakdown development in stored peaches, although it enhanced the red coloration in both peel and flesh (Zhang *et al*., 2011).

2. Reduction of decay : Heat treatment of fruit generally control decay by different mechanism like 1) direct germicidal effect of the pathogens, 2) inducing defense mechanisms in host and 3) limiting the sites of pathogen penetration by melting and spreading the cuticular waxes on the fruit surface. Karabulut *et al*. (2010) examined hot water immersion of stone fruits with temperatures ranges from 24 to 70°C for control of *Monilia fructicola* and concluded that treatments at 60°C for 60 s reduced the incidence of brown rot from 80% to less than 2% in plums.

3. Effect on physico-chemical and nutritional quality : Hot air and hot water treatment have the ability to increase the fruit quality also. Chen *et al*. reported that hot air at 40°C for 2 days prior to 40 days of storage at 10°C increased higher concentrations of fructose and glucose and lower citric acid in citrus and enhanced the better flavor quality. Whereas, Jacobi *et al*. (2001) explained, heat treatments improved the marketability of the fruit by acceleration of certain ripening processes, such as increased skin yellowness and uniformity of ripe skin colour in mango.

4. Protection from insects : Vapour heat treatment (VHT) and Hot water immersion (HWI) quarantine treatments have been developed to disinfest fruit flies (*B. dorsalis*, *B. papayae* , *B. carambolae* and *B. cucurbitae*) in mangoes, where 47 °C fruit core temperature will be held for 10-25 min depending upon the different varieties of mango (Jacobi *et al*., 2001).

5. Delay fruit ripening : Some heat treatments can also delay or inhibit ripening in certain mango varieties. This helps to fetch better market price when there is higher demand. 'Tommy Atkins' cv. of mango given a vapour heat treatment (VHT) at 50°C for up to 240 min had a reduction in ACC oxidase activity, colour development and softening in the inner mesocarp tissue (Mitcham and McDonald, 1997). However, after 3 days of treatment, the ACC oxidase activity recovered in most treated fruit and continue to ripen.

Conclusion: It is comprehensible from the above points that the same factor *i.e* heat; although being responsible factor of numerous disorder, can be a solution of some basic problems like fruit quality parameter, insect damage and decay. It is the beauty of creation that whenever one problem occurred naturally, the solution also centralized in the core of problem. Scientific aspect to this natural way of solution should come under more experimental outlook and it should also be popularized. This will reduce the harmful chemical dependency for the protection of fruit and can be economical also.

Reference :

Chen M, Jiang Q, Yin X.R, Lin Q, Chen J.Y, Allan A.C, Xu C.J and Chen K.S (2012). Effect of hot air treatment on organic acid-and sugar-metabolism in Ponkan (*Citrus reticulata*) fruit Scientia Horticulturae 147: 118-125

Jacobi KK, MacRae E.A and Hetherington S.E (2001). Postharvest heat disinfestation treatments of mango fruit Scientia Horticulturae 89: 171-193.

Karabulut O.A, Smilanick J.L, Crisosto C.H and Palou L (2010). Control of brown rot of stone fruits by brief heated water immersion treatments Crop Protection 29: 903-906.

Lurie S (1998). Postharvest heat treatments *Postharvest Biol Technol* 14: 257-269.

Mitcham E.J and McDonald R.E (1997). Effects of postharvest heat treatments on inner and outer tissue of mango fruit Trop Sci 37: 193-205.

Yun Z, Gao H, Liu P *et al* (2013). Comparative proteomic and metabolomic profiling of citrus fruit with enhancement of disease resistance by postharvest heat treatment BMC Plant Biol 13: 44.

Zhang L, Yu Z, Jiang L, Jiang J, Luo H and Fu L (2011). Effect of postharvest heat treatment on proteome change of peach fruit during ripening J Proteomics 74: 1135-1149.

[Article ID : 01/X/04/1021]

DIGITAL MEDIA AND ITS IMPORTANCE FOR FARMERS

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Digital media or online media means a machine that encodes the message into readable formats. Digital media refers to that type of media which broadcast the material on the screen. Material includes text, audio, video, graphics that are put out through internet.

Types of digital media

- Earned Media
- Owned Media
- Paid Media

In this pandemic period everyone is consuming digital media. Digital media has different forms as videos, articles, advertisements, music, podcasts, audio books, virtual reality, or digital art.

There are many problems in Digital platform. eg: Gmail has less storage. Old material deleted automatically.

Photos/Illustrations

Photos and illustrations are the important part of digital media. Photos are visible on internet everywhere. To write the articles, blogs etc, photo is necessary. This is also part of digital art. Illustrations are the part of website. Without this, people don't not take any interest to read the material.

Text

All the digital media includes some text material. Text help us to provide the valid information, explain and entertain you.

e-books

e-book or online books are in the digital format. E-books are good source to provide the information among the people. There are different types of books as commercial books, business book, educational text books etc.

Blog Posts/Articles

Blog writing and article writing is also possible in digital media platform. They are the short e-book. This is easily accessed online. We can read the blogs with in 10 to 20 minutes. People take interest to read and write on the blogs. The main purpose of blogs are to inform and create awareness among the readers. Many people write the blogs as journalist, personal bloggers, company, organization.

Social Media

Social media is also one of the good platform of the digital media. There are different channels on social media platform like Facebook, WhatsApp, Twitter, Instagram, Linkedin etc. Social media can be used to contact with your friends, family members, advertsising the products, communication with the employee and customers and advertise the products etc.

Online Advertising

Online advertising is also one form of digital media. Some types of digital media ads include: [1] Website banner ads [2] Search ads [3] Video ads [3] Social media ads.

Video Games

Video games are designed to entertain the people. They are typically played on a gaming console, though some types of games can also be played on a computer, tablet, or smartphone. A video game incorporates many types of digital media, including art, text, and video.

Digital Media for farmers

In this period where all the people have fear about covid and people avoid to visit any place for taking information. In this era, digital media or online platform is the best source to provide the information among the farmers. There are different portals, websites, apps which are meant for only farming community. Farmers can get the benefit from these sources. This is a good source which provides the information on any time and on any place.

Conclusion

We can conclude that social media is a good platform to provide the information to any community either farming or youth or any segment of the society. This is a good source as people don't have to go anywhere to take information.

[Article ID : 01/X/05/1021]

MUSHROOM PRODUCTION AND ITS IMPORTANCE

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Spawn production

A good quality grain of paddy is taken.
Grain is first half boiled and then the excess water is drained out keeping with appropriate moisture for growing of mycelium in the grain.

Two hundred gm (200gm) of such grain was packed in 15×18 cm polypropylene bag or in 500 ml conical flask. The grain was mixed with gypsum (calcium sulfate) and calcium carbonate 10g in the ratio of 3:7. The total mixture was sterilized at 121^0c for 15 minute at 15 p.s.i.

After cooling mycelial discs of pure cultures of the test hybrids and parent strains were inoculated aseptically into the grain and incubation was done at 25±1°C for 10-20 days. After completion of mycelial growth, the packets/ flasks looked full of whitish mass. After this stage the packaged product of full of mycelia was ready to be used as spawn.

Packing

Sundried paddy straw was chopped at a size of 3-5cm by chaff cutter or by sickle.
In one liter of water bleaching and lime were added @ 1 g and 2 g respectively, and then straw was dipped in that mixture for 24 hours.
That container was covered with lid to sterilize the substrate by the gas produce by lime and bleaching.
Afterwards the container holding straw was kept in slanting position for next 24 hours, so that the excess water can be drained out.
Straw was spread in floor by adding insecticides (Hexa 50) @0.2-0.3% and was mixed uniformly with straw.
A polypropylene bag was cut at 2ft-2.5ft length. On polypropylene bag one side was tied with sterilized rope. 3kg paddy straw was sterilized. The polypropylene bag was loaded with that sterilized paddy straw up to 3inch to 4inch. After every layer of paddy straw, spwan of different mushroom strains were spread by hand. This is how 4-5 layers of straw and spawn was made alternatively in that polypropylene bag. 200gm spawn was used for each cylinder. For proper aeration and spwan running, small holes on the polypropylene bag were made. To prevent the microbial contamination or insects infestation, that holes were plugged with tight non absorbent cotton plug. After two to three weeks, total paddy straw was covered with the mycelial growth of mushroom strain, which was applied as spawn the strain was *Pleurotus* spp.

Economic and other values of Mushroom Cultivation

I. **Nutritional value :** Mushroom is a rich source of vitamin C, B and D, including riboflavin, niacin, folate, and thiamine. It contains different minerals like calcium, iron, magnesium, potassium, copper and phosphorus. It also contain high amount of carbohydrate but fat and fibre in low amount. Starch is totally absent in mushroom.
II. **Protein content :** Fresh mushroom contain 3-7% of protein and from dry mushroom we can get up to 25-40% protein. Amides, all essential amino acids and lysine are also present in mushroom.

III. **Medicinal value :** Mushroom can be a way to manage the high blood pressure and heart diseases. Besides this, mushroom has other so many medicinal properties. Mushroom is also helpful in the treatment of several life threatening diseases like mushroom can prevent the spread of cancerous cell. It helps to boost up the immunity, so that human body can fight back against several viral contagious diseases like HIV/AIDS.

Besides all these, mushroom cultivation is a source of income and employment generation.

Advantages of Mushroom Growing

I. Idle structure can be used.
II. Comparatively small capital is required than other business in initiation.
III. Investors can get at least a minimal production all around the year inspite of mushroom seasons.
IV. On mushroom cultivation, agricultural waste can be used in a sustainable manner. Like various straw or other factories and plantations' wastes are used as substrate.
V. Mushroom can be used in bioremediation. It can degrade the pollutants and helps in environmental conservation.

Consumption benefits of mushrooms.

- All essential amino acids are present in myushroom.
- It is a rich source of Vit. B12 and Vit. C which are animal products.
- Mushroom contains low amount of sodium and this make mushroom perfect for heart and kidney ointments preparation.
- It contain calcium, iron, phosphorus, folic acid and potassium.

Challenges in Mushroom Growing

- Farmers are not experts in techniques of mushroom production.
- Using of readymade spawn is not economically viable and also quality of that spawn is not at all assured.
- Most of the people do not know the advantages of mushroom cultivation and economic and medicinal value of mushroom.
- There are some traditional and religious thoughts, involved with it, which is one of the important challenges in mushroom cultivation.

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