International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.04, March 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

THE COMMON PESTS ATTACKING MULBERRY PLANTS: A REVIEW PAPER

ArbiaFatima[1], AinaBhat[2], K.A Dar[3]

[1,2,3]*Temperate Sericulture Research Institute,*

Sher - e- Kashmir University of Agricultural Sciences and Technology of Kashmir (India)

ABSTRACT

Silkworm being the monophagous insect, eats only mulberry leaves to produce cocoons. Silkworm is a commercially important insect. Mulberry is cosmopolitan in nature hich thrives in all kinds of soil, both under irrigated and rain fed conditions. The mulberry crop is often being infested by different pests with varying intensities. So far over 300 insects and non – insect species are known to infest mulberry.Thelepidoptera, hemiptera, coleoptera, thysanoptera, orthoptera and isoptera are the orders of insects which mainly cause huge damage to the mulberry crop. There are various pests infecting the Morusspp. among which the sap suckers, root feeders and defoliators are common.The sap suckers are classified as mealy bugs, thrips, spiraling white fly, hoppers, jassids, and aphids which suck the sap of mulberry trees. Among these sap suckling insects, the leaf hoppers, thrips or aphids cause direct damage to tissue of the crop.Nature has bestowed these sap sucking insects with the stylet,specialized mouth parts which help these insects penetrate into phloem and drain out the sap from the plants.

Keywords:Mulberry, pests, sap suckers, crop loss, symptoms.

I.INTRODUCTION

Mulberry, which belongs to the genus *Morus* of family Moraceae, is a fast growing deciduous, and perennial plant. It is deep rooted plant and produces abundant leaves which are essential for survival of silkworm crop. The silkworm ,*Bombyx mori*L., is a monophagous insect and hence mulberry forms the basic food for the lepidopteran insect. The abiotic components, variety of mulberry plant, agronomic practices influence profoundly the quality of mulberry leaf (Krishna swami et al., 1970).[1] The silkworm requires several nutrients, essential for the growth of silkworm which are directly or indirectly provided by the mulberry plant. The pests and diseases greatly reduce the nutrient value of the mulberry plant. Diseases have always been a major constraint in mulberry cultivation (Sastry, 1984). Mulberry being a perennial crop, the pathogen seems to readily perpetuate in mulberry gardens throughout the year and quickly spread to cover extensive areas (Rangaswami et al., 1976).there are about 300 insects and non insect species of pests which affect the crop . The pests that affect it are either sap suckers or defoliators mostly.

It has been seen that totally, 30 species of sap suckers inflict damage on the mulberry. Amongst the sap suckers, 18heteropteran, 10 homopteran and 2 thysanopteran species are recorded .The sucking pests of mulberry are

classified as major and minor based on the incidence of pest. The major sucking pests are mealy bug, spiraling white fly and thrips, while as minor pests include the scale insects, non insect pests in mites and the jassids. The less incidence of direct tissue infestation is done by the most of the sap sucking insects, such as adult leaf hoppers ,thripsand aphids. The sap suckers penetrate the plant tissues with the bristle lilke mandibular and maxillary stylets. These use the stylet to drain the sap from phloem sieve elements of vascular tissue of plants. The sap suckers reduce the photosynthetic potential of the growing plants and their by decrease the growth rate of plant.

Table 1- The percentage of incidence of important sap suckers of mulberry: (Govind et al 2005)

S.no.	Name of the pest	% incidence
1	Mealy bug *(M. hirustus*)	19.21
2	Spiraling white fly(*A. disperses*)	12.62
3	Jassid (*E.flavescens*)	9.08
4	Thrips (*P.mori*)	17.18
5	Scale insect (*S.nigra*)	8.24

II. SOME OF MAJOR AND MINOR PESTS OF MULBERRY ARE

2.1. THRIPS *(Pseudodendothripsmor*i)

(Thysanoptera :Thripidae)

It is the most dominant specie resulting in huge loss in different parts of the world. They are called thunder flies and storm flies. They occur throughout the year and are severe during summer season. It is anoligophagouspest . The thrips have become regular pests of mulberry plant both adult and immature thrips primarily cause damage to young leaves of the mulberry. It effects the epidermal tissues of mulberry plant .

The major thrips which cause damage to mulberry are – *Haplothripscoloratus,Taeniothripsglycines, Teaniothripsmelaniocornis*, and*Taeniothripscalaratris*.

2.1.1. SEASONAL INCIDENCE AND CROP LOSS

Low rainfall and humidity promotes thrips population whereas high rainfall and humidity results in lowering of thrips population on mulberry (Venugopalapillai and Krishnaswami, 1980).

About 40-50 % of leaf losses reported due to this pest of the total leaf produced (Mahadeva, 2011).[3]

2.1.2. SYMPTOMS AND DAMAGE

The nymphs and adults of thrips lacerate the epidermal leaf tissues and suck the oozing cell sap leading to damage of guard cells and finally results in drying of the leaf. The leaves which are infested by thrips become brittle, malformed and leaf are thus rendered unsuitable for silkworm rearing.

The affected leaves show streaks in the early stages and blotches in the advance stages of attack. Not the quantity and quality of mulberry leaves in the following year of damage gets reduced but the growth of mulberry trees will be also retarded in the following year (Zhang 1934; Wang , 1992). It has been reported that there is reduction in moisture, protein and total sugars occurs due tothrips attack (Naik,1997). Mulberry thrips even reduce the moisture content and cause a negative impact on the quality of leaves consumed by silkworm (Etebarietal.,1998).

2.2.MEALY BUG (*Maconellicoccushirustus*) (green)

(Homoptera :Pseudococcidae)

It is a major pest of which is popularly termed as "hard to kill pest". It is also known as pink hibiscus and grapevine mealybug. It is most prevalent in tropical regions and has a wide range of hosts which includes ornamental, timber and wild plants. There are 346 host plants recorded so far.Such as sugarcane, mango, teak, cotton etc. It appears throughout the year but the incidence is high in summer months. It is considered as polyphagous insect and is an important cosmopolitan sucking pest.

2.2.1.SEASONAL INCIDENCE AND CROP LOSS

Mealy bugs are frequently found during spanning at the end of the rainy season to the middle of dry season.It causes damage to the mulberry round the year the period r which is in the range from 0.79-11.69% and infestation is found to be severe during July to August (Benchaminetal., 1997)[4]. The estimated loss in leaf yield loss is about 4500 kg\ha\yr (34.24%) as reported by (Satyaprasad etal., 2000)[5]. The month of march is favorable for the pink mealy bug, whereas, the least infestation is noticed in the month of December (Hemalatha and Shree, 2008)[6].

2.2.2.SYMPTOMS AND DAMAGE

The mealy bugs feed on plant sap and remain usually under the leaves and at stem joints. They have piercing mouth parts through which they drain the sap. It is however seen that damage is not often significant at low pest levels; however, heavy infestations can kill a plant. The leaves produced have low nutritive value.

The leaves are wrinkled, thickened and become dark green in colorand then turnyellowish. The plants with heavy infestation have short internodes which form rosette or give bunchy top appearance. It is generally termed as "tukra". It has been seen that a heavy, black sooty mould may develop on leaves and stems into heavy honeydew secretions by the mealy bug(Govindaih etal.,2005).[2]

2.3. SPIRALING WHITEFLY (*Aleurodicusdisperses*)

(Homoptera :Aleyrodidae)

The spiraling whitefly derives its name because of the feature spiraling of waxy material., Earlier it was considered as a minor pest but due to extensive damage done by the pest in tropical regions its status has now been changed to major pest. It is native to Caribbean and CentralAmerica. They rapidly multiply and all the life stages of it are hard to control with conventional insecticides (Soodetal., 2003). It is a highly polyphagous pest and has wide range of hosts.

2.3.1. SEASONAL INCIDENCE AND CROP LOSS

The white flies are present throughout the year in south India, with high populations in(March to June) and low in winter (October – January). The prolonged dry spell followed by the hot humid weather favours the whitefly flare up(Bandopadhyay and Santhakumar, 2000). The crop loss in mulberry is up to 5kg cocoons per 100 dfls(YumnanDebaraj , etal., 2003)[7].

2.3.2 SYMPTOMS AND DAMAGE

The damage caused by the whiteflies Dialeuroporadecempuncta(Quaintance and Baker, .1913), *Aleurodicusdispersus*,and *Aleuroclave* spp. to mulberry plants is extensive . The whiteflies feed on nutrients of plant and affect the physiological process ultimately causing leaf shedding and reduced growth rate. Vast amount of honeydew produced by nymphs leads to sooty mould development on leaves and adversely affects photosynthesis (Sundararajetal.,2000). Plants are disfigured and with high populations plant may die. The chlorosis of leaves takes place along with curling and yellowing. The copious white, waxy, flocculants, materials secreted by all the stages of the pests is readily spread by wind causing nuisance (Kumashiroetal .1983)[8]

2.4. MULBERRY DEFOLIATORS

In all agricultural ecosystems, defoliating insects are common. The signs of insect defoliators include

- Defoliation
- Presence of insect life stages
- Silk webbing or streamers on ground or in foliage

There are two major groups of defoliators that cause damage to the plants through their chewing mouth parts which include the caterpillars and beetles. The mulberry defoliators include Bihar hairy caterpillar,*Glyphodespyloalis*Walker, leaf roller etc.

2.4.1.MULBERRY LEAF ROLLER (*Diaphaniapulverulentalis*)

(Lepidoptera: Pyralidae)

It is a major pest of mulberry plant. The leaf roller, infestation causes considerable reduction in leaf yield, resulting in economic loss to sericulturists .The infestation is observed in mulberry plantations from 15 to 70 days after pruning or leaf harvest. It is severe pest of mulberry in Karnataka, A.P, Tamil Nadu (Rajadurai et al., 1999).

2.4.1.1. SEASONAL INCIDENCE AND CROP LOSS

It occurs from June to February but reaches peak during September to November months (Rajadurai etal.,1999) reported peak season of it during June and persists up to February. It is estimated that 29.8% is the leaf yield loss.

2.4.1.2. SYMPTOMS AND DAMAGE

The leaf roller feeds on tender mulberry leaves used for Chawki silkworms and also damages the terminal buds. Hence growth of the plants is reduced. The leaf roller is highly susceptible to the dreaded pebrine disease of silkworm, caused by *Nosemabombyscis* (Geethabai and Ramegowda, 1999). These leaves when fed to silkworms

can lead to pebrineinfection. The caterpillar is found within the rolled up leaf formed by the filaments and hence the name leaf roller has been given.

2.4.2. *Glyphodespyloalis* Walker

(Lepidoptera: Crambidae)

It is also known as lesser mulberry pyralid or beautiful *Glyphodes* moth. It was described by Francis walker in 1859(DeprinsJ and Deprins W 2017)[9]. It is a monophagous pest of mulberry and transmits viruses to *Bombyx mori*. It is a serious pest of mulberryin India, China , Japan, Uzbekistan and Burma (Madyarovetal., 2006).

2.4.2.1. SEASONAL INCIDENCE

The *Glyphodespyloalis* Walker causes considerable damage to mulberry leaves especially in autumn season (July to October).

2.4.2.2. SYMPTOMS AND DAMAGE

Larvae form fine threads on the abaxial side of the mulberry leaves and eat the mesophyll from under those threads, leaving a network of epidermis (Aruga, 1994). If leaves infected with excreta of *Glyphodes* larvae are fed to silkworms, they develop constipation and are unable to defecate. After the 3rd instar of *Glphodespyloalis*, the larvae become scattered and roll the leaf with thread. From inside they feed on the leaf tissue. In severe cases of damage, the plants almost do not have any green leaves.

III. CONCLUSION

The review revealed that, these pests of mulberry result in huge loss to sericulturists.They reduce the growth of plants and cause serious injuries to the plant. These pests alter the biochemical constituents of leaves and hence, affect the overall quality of silk. It is therefore, necessary to adopt proper management practices to reduce the loss.

REFERENCES

[1]. KRISHNASWAMI, S., NOAMANI, M.K.R AND AHSAN , M. , 1970. Studies on the quality of mulberry leaves and silkworm crop production , part 1, quality differences due to varieties , Indian J. serc. , 9(1):1-10

[2]. GOVINDAIAH , GUPTA, V.P SHARMA , D.D , RAJADURAI , S AND NISHITHA NAIK.2005.Mulberry crop protection .Central silk board , pp 311-326

[3]. MAHADEVA , A. , 2011, Influence of thrips (pseudodendothripsmori) infestation on the biochemical constituents and photosynthetic pigments of mulberry (morus spp.) leaves . International journal of plant animal and environmental sciences (3):57-636

[4]. BENCHAMIN , KA, VENKATARAMANA, P., THIMMA NAIK , S AND SANATH KUMAR , Y.N. , 1997.pest and disease occurrence in mulberry and silkworm :A survey .Indian silk 36(2):27-32

[5]. sathyaprasad , k. manjunath , D., rajan, M.V. AND sarkar , a, 2000 . screening of mulberry germplasm for tolerance to sucking pest. Abs. ntnl.con.str for seri . res. Dev. CSRTI , MYSORE, 1:7

[6]. HEMALATHA AND SHREE , M.P. , 2008. Analysis of the trend of infestation by sap suckers in mulberry (Morus spp.) crop system . Indain J. seric ;47 (1) :130-132

[7]. YUMNAM DEBARAJ , GOGO , S.N.BISWAS, T. K AND BINDROO. B.B2013. new record of a natural enemy on mulberry white fly, Dialeuroporadecempuncta(Quaintance and Baker) in assam . Mun .ent.zool, 8 (2) :902-904

[8]. KUMASHIRO , B. R. LAL , P.Y. ,FUNASAKI ,G.Y.AND TERAMOTU, K.K.,1983. Efficacy of Nephapsisamnicola and EncariaLaitiensis in controlling Aleurodicus disperses in Hawaii. Proceedings of hawaiin entomology society, 24: 261-270.

[9]. DEPRINS , J. AND DEDPRINS , W. (2017). Glyphodespyloaliswalker ,1859, afromoths .retreived January 27 2018.