

3. MATERIAL AND METHODS.

The present research work was undertaken with a view to explore the possibility of using extracts of some plants with different concentration against tomato pests. The research work was carried out in rabi season of 2007-2008 at experimental field of S.G.M. college, Karad.

The material used and methods followed for the investigations are presented in this chapter.

3.1 Material

3.1.1 Plants selected for treatment.

Sr.No	Common Name	Botanical Name	Plants part used
1	Neem	<i>Azadirachta indica</i> A. Juss	Leaves
2	Custard apple (Sitaphal)	<i>Annona squamosa</i> L.	Leaves
3	Ghaneri	<i>Lantana camara</i> L.	Leaves
4	Nerium (Kanher)	<i>Nerium oleander</i> L.	Leaves
5	Yellow Datura	<i>Argemone mexicana</i> L.	Leaves
6	White Datura	<i>Datura stramonium</i> L.	Leaves
7	Nirgudi	<i>Vitex negundo</i> L.	Leaves
8	-	<i>Blumea malcolmii</i> Hook.	Leaves
9	Kurdu	<i>Celosia argenta</i> , Linn	Leaves
10	Kudkudi / Ekdandi	<i>Tridax procumbens</i> Linn	Leaves

1) *Azadirachta indica*.A.Juss.

common name – Neem, Nimb, Nim

Trees, c 6 m high. Leaves crowded near branch ending. Leaflets 3.5– 6.5 x 1.2 cm, ovate – lanceolate, flowers white, in axillary panicles. Drupes c.5 cm long, ovoid seed solitary, ellipsoid.

Flowers and fruits – March – June.

Distribution – Planted. Common throughout the state along the roadsides and in gardens. Some times naturalized through self propagation.

The extracts of neem seeds and leaves are used as ⁱⁿ ~~an~~ insecticide. Extracts of neem seed have reported to inhibit feeding in some field pests like *Pieris brassicae* and *Chrotogonus trchyperous* (Sandhu and Darshan singh, 1975 Sandhu & Verma, 1975)

In laboratory and field trials at the International Rice Research Institute Philliping I had been demonstrated that 12 % neem oil emulsion when sprayed on paddy suppresses feeding by brown plant hopper, *Nilaparvata lungens stal.* (Saxena *et al.* 1979)

2) *Argemone mexicana*.L. –

Common name – Yellow dhotra.

Annual, Prickly herbs, 30 – 100 cm tall. Leaves radical and cauline 5 – 10 x 2.5 – 4.0 cm blush green, variegated white, Spiny along margins and on veins sessile. Flowers bright yellow, 3 – 4 cm across, solitary, terrminal. Capsules 2 – 3 cm long spinous, seed numerous, black globose.

Flowers and fruits- Throughout the year.

Distribution – A weed in waste pleaces and common throughout.

3) *Datura stramonium* L. –

Herbs, 70 cm high, annuals or perennials, erect, profusely branched, leaves ovate, margins shallowly. Capsules 3 – 5 – 4.5 cm long, ovoid, ellipsoid.

Flowers and fruits – September – October.

Distribution.- Infrequent in waste lands Aurangabad, Pune, Satara.

4) *Vitex negunda* L.

Common name – Negundo, Nigd, Nirgundi, Nirguri.

Shrubs, 5 m tall, branches grayish white with fine tomentum. Leaflets 3 – 10 x 1 – 2.5 cm ovate lanceolate, base acute, margins entire – sinuate with few scattered teeth in middle above. Inflorescences of terminal, compound, tomentose. Flowers 6.4 cm long, bluish – purple; calyx white tomentose. Drupes 0.4 x 0.3 cm, ovoid, enclosed by campanulate fruiting calyx.

Flowers and fruits :- January to June.

Distribution :- Common throughout the state as hedges along fields.

5) *Tridax procumbens* L.

Annuals or perennials, erect or procumbent herbs, branched at base. Leaves opposite, ovate, or lanceolate, margins serrate to coarsely incised dentate or erect, retrorsely hirsute 10 – 25 cm long; ray florets white, ligules mostly bilabiate, disc florets tubular- campanulate, yellow, 5 – lobed, pappus of many aristate bristles, unequal in length. Achenes c 0.3 cm terete or ribbed, sparsely scarious, truncate at apex.

Flowers and fruits – Throughout the year.

Distribution :- Common throughout as a weed in waste places.

6) *Annona squamosa*. L.

Common name – Sitaphal

Trees c 4 m tall. Leaves 6 – 8 x 2.5 – 4.5 cm. Oblong. Lanceolate, glaucous beneath solitary, leaf oppsed or 2 – 4 together on a short 1.5 – 2.0 cm long; sepals connate base; petals pubescent, 3 outer 2.5 cm long fruit yellowish – green seed brownish – black polished, obling. C. 2.0 x 0.5 cm.

Flowers – March - August

Fruits – April – December.

Distribution – Indigenous in west Indies naturalized throughout. Asia, cultivated throughout for its edible fruits, also occurs us on escape.

Seed extracts of custard apple (*Annona squamosa* yiedded acetogenins which appear promising for the development of effective pest control agents phytophagous insects. (Rupprecht et al. 1990).

Chitra and Vamsidhar (2000) studied the effect of *Annona squamosa* L. seed extract on protein concentration of *spodoptera litura* Fab. larvae was studied. Spodoptera larvae was studied. Spodoptera larvae were reared in laboratory on castor leaves treated with Lc 30 of seed extract. Total protein were reduced in treated when compared to untreated larvae. Steep raise in total protein content of puper might be dre to increased concentration of storage protein in haemolymphs, which were needed during quiescent phase.

7) *Blumea malcolmii*. H.

Herbs, c 1 m high decumbent or asending strongly aromatic. Leaves 2.5 – 10 x 1.5 – 5 cm. Obovate, sessile. Heads 1.5 – 2.0 cm across, terminal fasculate, subsessile Achenes dark brown, obscurely angled, sparsely pubescent.

Flowers and fruits. -October – May

Distribution – Ahmednagar, Jalgon, Kolhapur, Nanded (Naik 1998)

Note – It is endemic to India.

8) *Celosia argentea*. L.

Herb erect or procumbent, 30 –90 cm high. Leaves 0.5 – 2.0 x 0.3 –1.5 cm broadly ovate, lanceolate elliptic or linear. Inflorescence of dense, terminal spikes. Flower white or pink. Utricles ellipsoid, tapering at apex into style.

Flowers and fruits- August –february.

Distribution- Common throughout as weed, and harvested field in wastelands etc.

9) *Lantana camara*. L.

Shrubs, 2-3 m tall, much branched .Leaves 2.5-7 x 1.5-5 cm, ovate –elliptic, apex acute, base rounded,. margins crenate, serrate. Inflorescence of terminal and axillary spikes. Flowers c 1.5 cm long, orange-red, turning into scarlet. Drupes c 0.4 cm across, globose, fleshy, black coloured when ripe.

Flowers and Fruits –Throughout in waste places and shrub forests.

Distribution- Common in waste places and shrub forests.

10) *Nerium oleander*. L.

Shrub can reach up to 20 ft (6.1 m) tall but is usually seen trimmed at 6-10 ft (1.8-3.1 m). It forms a rounded mound to about 10 ft (3.1 m) wide. It is a tough, versatile plant with showy summertime flowers in white, red, pink, salmon and light yellow. Leathery, lance shaped leaves range from about 4-10 in (10.2-25.4 cm) long, depending on variety and are a bright green. Oleanders have a tendency to become leggy - overgrown individuals should be pruned as needed to maintain a nice shape. A popular variety is 'Petit Salmon' which is a dwarf that grows to only 4 ft (1.2 m).

3.2. Details of the experiment

3.2.1 Laboratory study

The present research work was undertaken with a view to explore the possibility of using extracts of same plants with different concentration against red spider mites. Ten plants viz *Lantana camara* L. *Blumea malcomii* Hook, *Tridax procumbens* L. *celosia argentea* L. *Datura stramonium* L. *Annona squamosa* L. *Nerium oleander* L. *Azadirachta indica* A. Juss *vitex negundo* L. *Argemone maxicana* L. were selected for this purpose.

3.3 Extraction of spray solution

Collect the leaves of selected plants. Washed with distilled water and dry with blotting paper weighed 10 gms of leaves made a small pieces and crushed in mortar with pestle in 10 ml. distilled water. Filtered through 4 layered muslin cloth. It was treated as a stock solution. Then made different concentration as 1 ml stock solution added in 99 ml Distilled water – 1 %, 2ml. Stock solution 98 ml distilled water – 2 % and 3 ml stock solution in 97ml. stock solution in 97 ml distilled water – 3%. In this way prepared the extracts leaves of selected plants.

3.3. 1. Efficacy of plant extracts against Red spider mite.

Six weeks healthy seedlings of Namdhari variety of tomato were collected from nursery and transplanted in the plot (5 x 3 m.). The distance

between the plants were raised in the earthen pots for conducting the laboratory study. The red spider mite culture maintained in the field was used for laboratory study.

After one month of tomato planting ten adult red spider mites emerged on three leaves from bottom, middle and top of same plant (planted in earthen pots) were allowed to settle down. The prepared extracts were spread on them. Dimethoate in 0.03 % concentration was used as a standard check and distilled water as a control. Count down the dead mites immediately and recorded as 0 hours in observation table. The spread leaves covered with muslin cloth bags. Then further counts were taken after 4 , 8 and 12 hours. All observations were recorded in observation table. For the final observation the mean number of dead mites of three leaves per plant were considered. The mortality percentage was calculated by Annova.

3.3.2. Efficacy of plant extracts against whiteflies.

After one month of planting the tomatoes whiteflies were observed naturally on the plants and there after occupied the total cultivated plants. The small netted nylon bags of size 6 x 12 cms were prepared to cover the three leaves bottom, middle and lowerside. Then count down the adult flies and pupa on the trapped leaves. The number was recorded in observation table.

Then prepared leaf extracts sprayed on different leaves through nylon net with the help of small spray pump accordingly and labeled properly.

Then after 0 hrs, 4 hrs, 8 hrs and 12 hrs, counted the dead ^{flies} ~~flies~~ and blackish pupa. At final observation table the mean number of dead ^{flies} ~~flies~~ and blackish pupa of 3 leaves per plant were considered.

3.4.

Field experiment

The effective concentrations of the selected plants were supplied to some tomato cultivar farmers for the test. These tests were for the awareness of farmers to use plant originated pesticides. The observations and readings were not considered and recorded in the present work