cultivars with jassid tolerance do not get affected even by the moderate to high levels of jassid population on them but grow with no symptoms of pest attack. Insecticidal sprays taken up based on the population counts of jassids are often unnecessary. When the population of the generalist predator *Chrysoperla carnea* is more (at predatory to prey ratio of greater than or equal to 0.2) the decision to take up insecticidal spray should be abandoned. Spraying the crop should be done only at the time of appearance of 3rd grade injury symptoms of yellowing and curling along the margin of the leaves in the middle to upper portion of the crop canopy of at least 25 % plants in the field. Spray of 5 % neem seed kernel extract prepared on farm or crude neem oil spray @ 1% suppresses jassid population during pre squaring crop stage. In both cases detergent / soap powder @ 1 gm/litre of spray fluid is to be added for getting uniform spray suspension. Chemical insecticides such as lmidacloprid 200 SL @ 0.5 ml/lit and Thiamethoxam 25 WG @ 1-1.5 gm/lit of water can be used only when there are symptoms, indicative of susceptibility to high jassid injury. The conventional systemic insecticides should be alternated if more than one spray of systemic insecticides is to be sprayed. Sprays should be undertaken when the population of nymphs is more along with the second grade injury to the crop. Jassid attack during reproductive crop growth can be managed using the conventional insecticides like Endosulfan @ two ml/ lit of water. As a thumb rule the amount of spray fluid and the type of sprayer to be used at various crop growth stages are given in the table below.

Stage of the crop growth (Number of nodes above cotyledonary nodes)*	Required volume of spray fluid (l/ha)	Type of sprayer
< Four nodes	100-125	Hand operated knapsack sprayer
≥ four nodes to ≤ eight nodes	150-200	Hand operated knapsack sprayer
> 8 nodes to ≤ sixteen nodes	200-250	Power sprayer
> 16 nodes	250-300	Power sprayer

*** : Cotyledonary nodes are the first pair of nodes exactly opposite to each other on the main stem**

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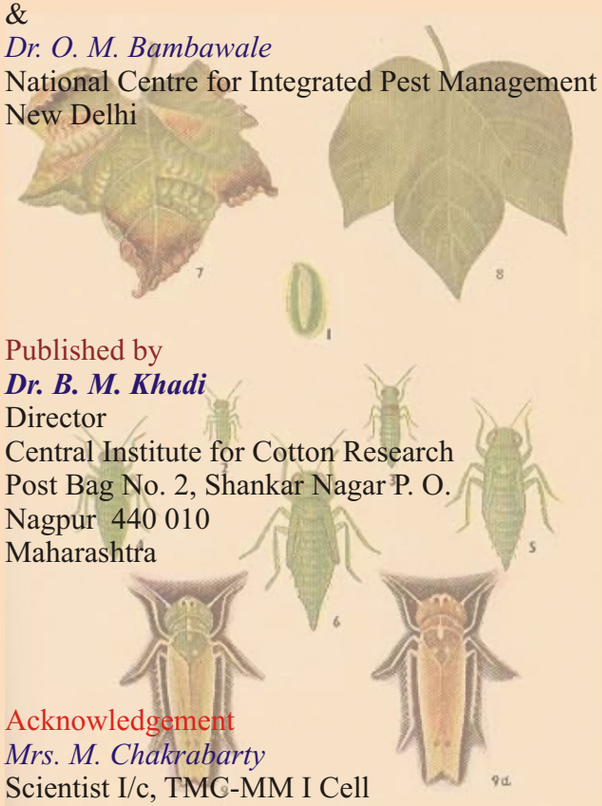

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English Version

Know Your Cotton Insect Pest
JASSIDS

Common Name	:	Jassids
Local Name	:	Tudtude
Scientific Name	:	*Amrasca devastans* (Dist.)
Family	:	Cicadellidae
Order	:	Hemiptera
Pest Category	:	Sap feeder

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Description of Insect Stages:

Egg: Eggs are curved, elongated and yellowish white in colour, and deeply embedded in the midribs of large veins on the undersurface of the leaves.

Nymph: Nymphs are flattened, pale yellowish green with characteristic way of moving diagonally in relation to their body, and remain confined to the lower surface of leaves during daytime.

Jassid nymphs

Adult: Adults are about 3.5 mm in length. They are elongate and wedge shaped with pale green body. Forewings and vertex have black spots. Adults are very active with sideway movements but quick to hop (hence referred as leaf hoppers) and fly when disturbed.

Jassid adult

Nature of Damage:

Both nymphs and adults suck the plant sap and introduce salivary toxins that impair photosynthesis in proportion to the amount of feeding. 1st and 2nd instar nymphs feed near bases of the leaf veins, later instars get distributed all over the leaves but feed chiefly on the under surface of leaves.

Symptoms:

The affected leaves curl downwards, turn yellowish, then brownish before drying and shedding. Severe incidence lead to stunting of young plants and results in "hopper burn" injury. The fruiting capacity of the infested plants is significantly affected and in many cases heavy infestation on young plants cause death of plants. Severe incidence during the late season leads to reduced yields.

Downward curling & marginal yellowing

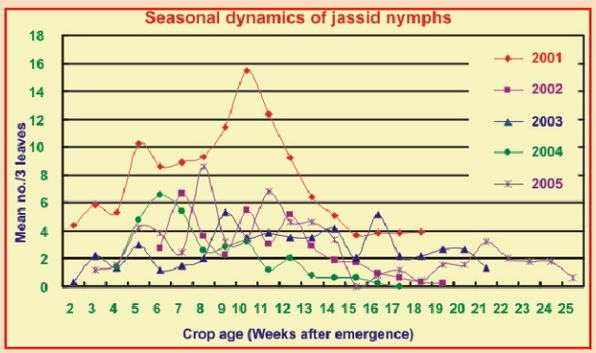
Marginal drying

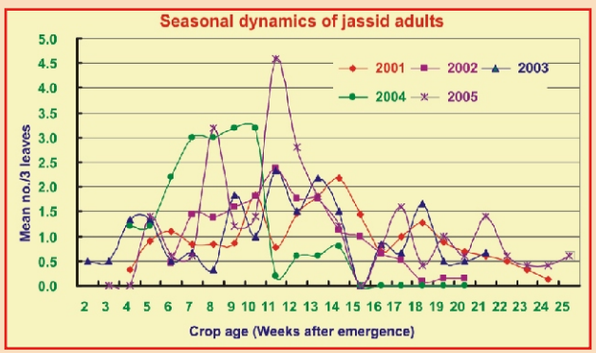
Life History:

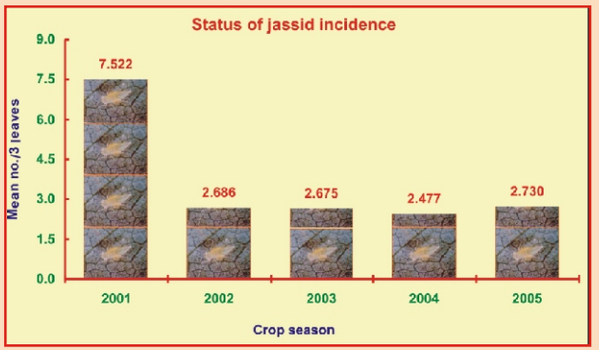
The female inserts about 15 eggs inside leaf veins. The incubation period ranges from 4-11 days. The nymphal period occupies 7-21 days depending upon weather conditions. Eleven generations have been estimated to occur in a year. Nymphs moult five times. Average number of eggs laid by female is about 15 with a maximum of 29.

Seasonal Dynamics:

Nymphs and adults have different seasonal fluctuation patterns. Jassids survive on a variety of wild hosts during dry season. Populations of the jassids occur throughout the year. The fluctuations of nymphal and adult populations vary within season. The nymphal population build up occur from the second week of seedling emergence. There has been overall reduction in status of jassids on cotton after 2001 mainly due to the wider use neonicotinoid seed treatment chemicals. Jassids attain pest status between July-August months, at times threatening the crop stand. Depending upon the atmospheric weather variables the number of generations on cotton can be as large as eleven.







Pest Management Options:

Selecting jassid tolerant cultivars can reduce yield loss from jassids. Management of jassids during very early crop growth stage should be attempted with a view to maintain optimum plant stand. Insecticides of neonicotinoid group such as imidacloprid and thiamethoxam applied as seed treatment are efficient in suppressing the population of jassids on the crop for a maximum period of 45-50 days. However, the 'prevention is better than cure' approach of pre-sowing seed treatment with systemic insecticides aids in attaining proper plant stand however they also cause luxuriant plant growth leading to higher attack by thrips during pre flowering stage, especially when there are dry periods. Therefore, keeping a close watch of crop growth and weather conditions, post emergence sucking pest management should be done on need basis. Crops should not be sprayed with insecticides considering the populations of jassid nymphs or adults on plants. This is because, the

Jassid symptoms of 3rd grade