

observed during sixth and seventh weekly interval while for Adhanur it was during third week.

- iii) Among all the soil series, Kalathur has supported higher biomass production over a range of time owing to its higher available P status compared to other soil series.
- iv) Soil available nutrient status shows that Kalathur is having a Water Holding Capacity of 55 per cent, Cation Exchange Capacity of 35 me/100g, N status - low, P and K status - medium whereas other soil series are exhibiting relatively a lesser water holding capacity and are low in N, P and K status. This fact suggests the role of P (and K to a little extent) in buttressing the biomass production of *Azolla*.

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EFFECT OF CROP MIXTURES ON THE INCIDENCE OF THRIPS

Thrips tabaci LINDEMAN IN ONION*

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ABSTRACT

Thrips infestation was significantly less on onion plants in crop mixtures than on pure crop. Tomato, mint and coriander were significant in lowering thrips population densities on onion in crop mixtures. Tomato had greater influence than coriander and mint. However, in contrast to the pest load, the bulb yield of onion was significantly less in plots where onion was intercropped with tomato.

KEY WORDS : *Thrips tabaci*, Onion, Crop mixtures.

Thrips, *Thrips tabaci* Lind, is the most serious pest of onion which can cause yield loss upto 50 per cent (Rahman and Batra, 1945). Insecticides are often chosen to control the thrips as they are rather susceptible to chemicals (Mohan and Kumar, 1980 ; Reddy and Jagadish, 1980 ; Gawande *et al.*,

1984 ; Warriah *et al.*, 1994). However, pesticides leave behind residues and environmental problems. On the other hand, management of thrips by manipulating the cultural practices is a risk-free alternative. Mixing or intercropping of onion with other crops is worth evaluating in view

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of the previous information available. Earlier onion in mixture with *Dacus carota* L. had lowered *T. tabaci* population on onion (Uvah and Coaker, 1984). Intercropping of onion and garlic with tomato had also decreased the level of thrips infestation (Afifi and Haydar, 1990). Incidence of *T. tabaci* was less on white cabbages intercropped with white clover, *Trifolium repens* (Theunissen *et al.*, 1992). This trial was conducted with a view to understanding the effect of crop mixtures on *T. tabaci* populations.

MATERIALS AND METHODS

The experiment was conducted during November, 1996 - February, 1997 at AC& RI, Killikulam. The trial was laid in a randomized block design comprising six treatments in four replications. Pure crop onion served as the control. In other treatments, onion (*Allium cepa* var. *aggregatum*) was mixed with mint [*Mentha arvensis* Linn. (Labiatae)], coriander [*Coriandrum sativum* Linn. (Umbelliferae)] and tomato [*Lycopersicon esculentum* (Solanaceae)]. Plots were three metres long and two metres wide in which ridges were formed 45 cm apart. Onion bulbs were planted on both sides of ridges at 10 cm spacing. Tomato seedlings were transplanted at 60 cm interval along ridges. Mint cuttings were closely

planted both on ridges and in furrows without any spacing. Coriander seeds were broadcast densely. Irrespective of the crop mixture, onion plant population was maintained the same. An NPK fertilizer schedule of 30:60:30 Kg/ha was adapted. Flood irrigation was given on need. The crops received no plant protection. Onion plants were screened for thrips population, both nymphs and adults, every week. Ten plants were chosen at random in each plot and were carefully examined from base to leaf tip. The population density was assessed in number per ten plants. The extent of damage was assessed in two ways from ten random leaf samples drawn from each plot 75 days after planting at the time of peak infestation. The lacerated silvery patches were measured from a 2.5 cm long leaf bit cut from the middle sector of sample leaves. These tubular sample bits were cut open longitudinally before examination under a transparent graph sheet. The extent of laceration was measured in square centimetres. Since high variability was observed in the width of cut ends of the leaf bit samples, this value was converted into laceration per square centimetre. Secondly, the tip drying was measured with scale in cm from the apex of each of the ten leaves per plot. Yield data were recorded at harvest. The pooled data from two seasons were subjected to analysis of variance.

Table 1. Influence of crop mixtures on thrips infestation and on yield in onion

Crop Mixture	Mean number of thrips / 10 plants		Mean area of laceration (cm ²)	Mean length of dry tips (cm)	Mean onion bulb yield (kg/plot)
	Nymphs	Adults			
Onion alone	7.55 (2.60) ^c	7.14 (2.71) ^c	0.77 ^d	6.71 ^c	2.590 ^a
Onion + mint	2.74 (1.63) ^b	2.60 (1.67) ^b	0.40 ^e	3.51 ^b	2.980 ^a
Onion + coriander	2.19 (1.48) ^b	2.22 (1.55) ^b	0.29 ^{bc}	3.86 ^b	2.854 ^a
Onion + tomato	0.43 (0.94) ^a	0.74 (1.09) ^a	0.06 ^a	1.22 ^a	1.613 ^a
Onion + tomato + mint	0.75 (1.04) ^a	0.61 (1.03) ^a	0.17 ^{ab}	1.14 ^a	1.148 ^b
Onion + tomato + coriander	0.43 (0.94) ^a	0.46 (0.97) ^a	0.17 ^{ab}	1.22 ^a	1.525 ^b

Figures in parenthesis are square root transformed values. Means followed by the same letter are not significantly different by DMRT at P = 0.05

RESULTS AND DISCUSSION

Crop mixtures significantly influenced not only the occurrence of and the damage due to *T. tabaci* but also the bulb yield (Table 1). Thrips infestation was significantly more on onion leaves in pure crop (7.55 nymphs and 7.14 adults/plant) than on onion foliage in crop mixtures (0.43 - 2.74 nymphs and 0.46 - 2.60 adult / plant). Population of nymphs and adults were lowest on onions in mixture with tomato + coriander (0.43 nymphs and 0.46 adults / plant). Same level was observed in plots where onion was in mixture with tomato alone (0.43 nymphs and 0.74 adults / plants), or with tomato + mint (0.75 nymphs and 0.61 adults/plant). Crop mixtures involving onion+coriander, or onion+mint proved significantly inferior to onion+tomato as well as to onion+tomato+mint/coriander (2.19-2.74 nymphs and 2.22-2.60 adults / plants) in lowering the number of thrips.

The area lacerated by thrips on leaves and the extent of tip drying were significantly less on onion leaves in crop mixtures than on leaves of pure crop onion. Onion in mixture involving tomato had significantly lesser damage from thrips infestation. On the other hand, onion yield was significantly much higher in plots where onion was planted either alone or in mixture with mint or coriander (2.590-2.980 kg / plot) than in plots wherever tomato was raised (1.18-1.613 kg / plot). Though tomato had greater influence than coriander and mint in suppressing thrips population, the yield was comparatively very low in tomato plots. Afifi and Haydar (1990) also reported that intercropping onion with tomato decreased both the level of thrips population and yield of onion. The low level of infestation on onion in crop mixtures may be attributed to the volatiles from the dense foliage as suggested by Suresh and Dasan (1996). The

root and shade effects of tomato may have reduced the bulb yield despite low density of thrips population.

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