

Agricultural Research with an Agronomic Focus

Whitefly IPM Management Trial

CRDC, Elders Rural Services and Summit Ag



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Silverleaf Whitefly is an emerging pest in the Southern Valleys with the last 3 out of 4 seasons having what was considered higher than normal populations. The aim of this is to demonstrate soft management options that can be employed on a commercial scale.

Key Points

Second year trial looking at the best soft management options for whitefly in the southern growing regions. After consultation with the wider growing community in the Whitton region the project direction was changed to broadscale management of whitefly through a combination of soft pesticide applications and the release of *Eretmocerus hayati* across a wide area to try and influence populations.

Higher levels of parasitism were achieved where releases were made as expected.

The whitefly population in all monitoring sites did not reach control level, with only a very small areas in the valley sprayed for whitefly at all.

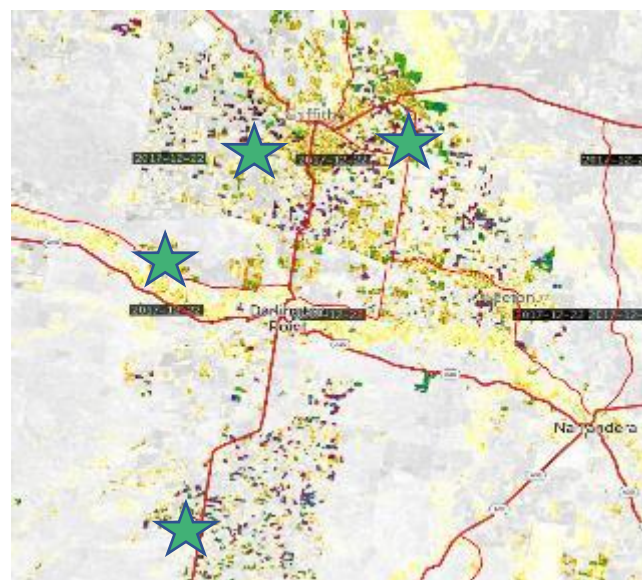
From the data collected it was possible to see that the release of the whitefly parasitoids resulted in higher levels of parasite nymphs and a lower whitefly population.



Trial Details

Population Monitoring

Monitoring the population of silverleaf whitefly was done by monitoring sticky traps across a range of sites around the area.



Above shows the locations of the main monitoring sites used across the valley that were used.

Background

The Southern Valleys are facing the ongoing threat of whitefly being a tough pest to manage due to the complexity of crop species in the valley. Over the last few years the incidence of whitefly in crops has increased, bringing with it concerns around the potential for sticky cotton. The Southern Valleys are relatively young, with the longer-term growers producing for about 9 years now. Over the last few years the myth that we never reach the 6th-7th generation due to cool conditions has been well and truly dispelled with whitefly becoming a common site in crops throughout the districts, including as far south as Deniliquin. The aim of this project is to continue to demonstrate softer approaches to pest management in the south including use of oils, while introducing the concept of area wide management including the release of parasites, while helping to build a better understanding of how different management strategies influence the population dynamics.

Soft Whitefly Management

Sites were selected across the southern valleys across a geographic spread. Across these sites there were a range of management techniques, comparing a softer management approach, including the use of oils, through to a more "standard" management practice in terms of no oils.

The sites were then monitored weekly from mid-December for whitefly with measurements taken from the 4th and 8th node for adults and 8th node for nymphs. This data was then compared across the season to look at trends. Some of the techniques employed included soft chemistry selection, the use of crop oils and the release of *Eretmocerus hayati*.

For all the farms involved growers used their "standard" insecticide program until 2 weeks prior to the first scheduled release. Growers used Transform as the insecticide prerelease. Post release one field was sprayed with Fipronil + salt in February which would have had a negative effect on the parasite releases.

Post release there were a few fields that had an Admiral or Pegasus spray. A lot of fields never had a late season spray due to the whitefly population crashing. It needs to be noted that the rain event in March meant there were no honey dew issues.



Above: Whitefly Adult

Parasite Releases

Due to feedback from growers in the region last year there was a request to look more into the releases of parasites into the area. Across our site selection we were able to get some growers to participate in an area wide release program. Growers helped to cover the costs of the releases and the grower participant covered the cost of the parasites themselves. As incentive for their involvement, CRDC covered the remaining cost for the parasitoid release.

The parasites were planned to be released the week of the 21st January and the week of the 4th of February. Due to the extreme heat the production of the wasps was hindered and therefore we were unable to get the first release out until the first week of February and the 2nd release was the 19th and 20th February. This is a lot later than ideal as it means that the whitefly population will likely be out of hand before the wasps have the ability to build up. Once here and operating the use of a drone was an extremely efficient way of releasing.



Above: Release drone at the IREC demo day

Fields from within the release zones were monitored prior to and after the release of the wasps, with large leaf samples taken prior to defoliation to assess parasitism. Numerous pictures were taken under the microscope and sent to Paul Jones to assist with Parasitism identification.

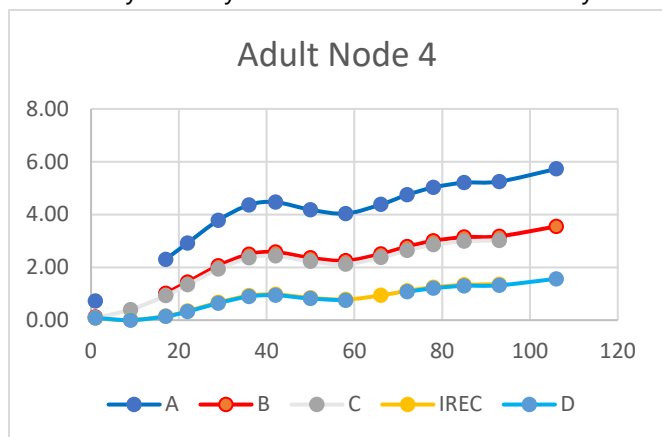
Trial Results

Population Monitoring

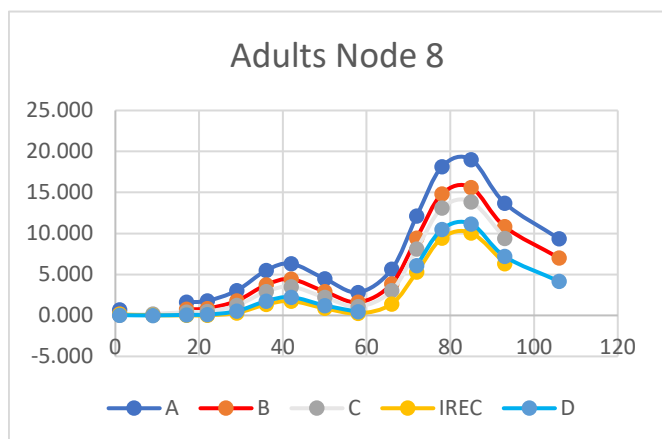
Sticky traps were used at 4 locations for the season to see if early season detection could be made. From the data we collected, the whitefly captured on the sticky traps was no different timing to the when whitefly spotted in the field visually.

The site at A and B were geographically isolated away from where the releases were made, and offered our comparison sites to the fields where releases occurred. The other 3 sites were where whitefly parasitoids were released.

The weekly whitefly counts were taken and analysed.

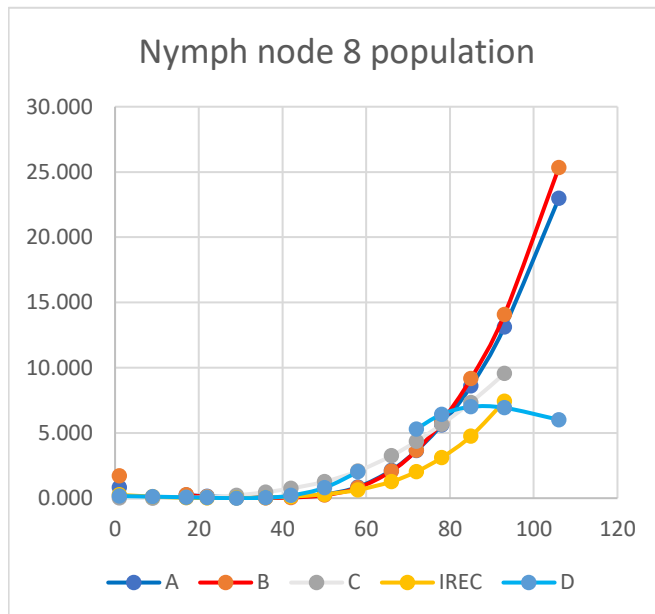


Above: Adult whitefly counts node 4 over time. This data was analysed using a common spline, the data showed that the linear and non-linear trends are common.



Above: Adult whitefly counts node 8 over time. This data was analysed using a common spline, the data showed that the linear and non-linear trends are common.

From the adult populations, it was possible to determine that the trend for the whitefly adults in either the released or non-released sites were consistent and there were no real differences.



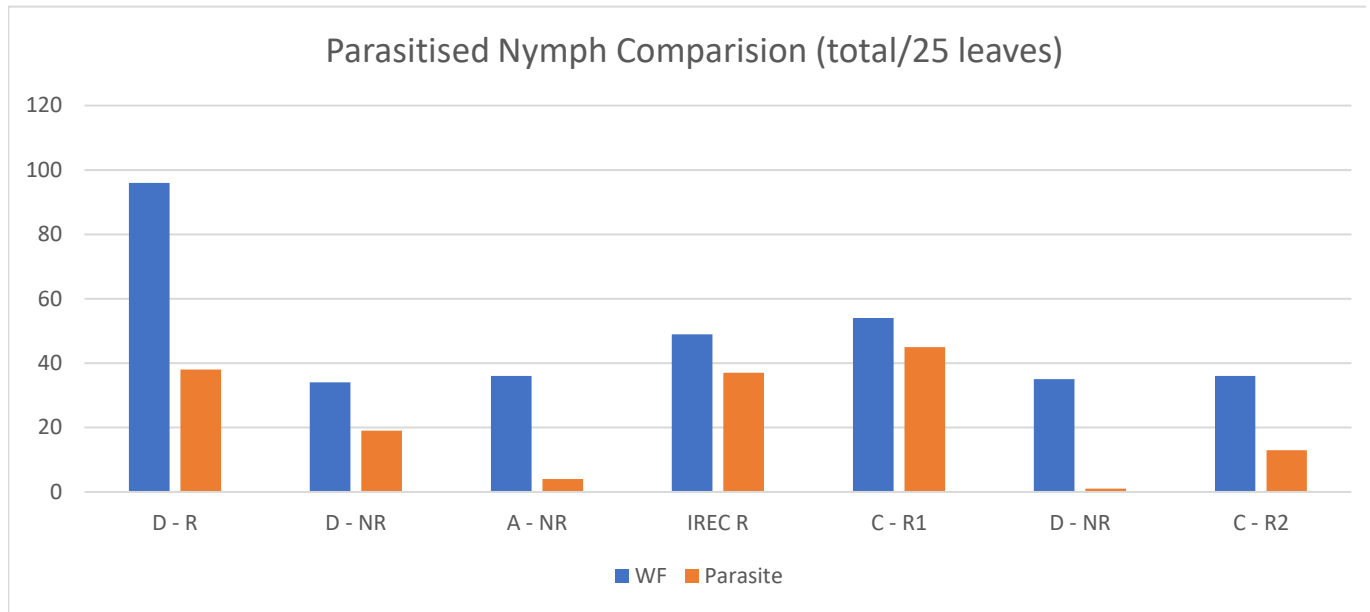
Above: Nymph population node 8 over time. This data was analysed using a common spline. The data showed the linear effects were common, but the non-linear were not. This indicated that the population where parasites were released, the nymph population stabilized or decreases, while the untreated fields, the nymph populations continued to climb.

Leaf samples were taken 8 weeks post release to assess parasitism of nymphs. Leaf samples were taken from untreated farms, fields where releases were made and fields on farms where releases were made on adjacent fields. These leaves were then analysed under a microscope to assess the nymphs. Photos were taken and assessed with the assistance of Paul Jones from bugs for bugs.



Above: Parasitised nymph.

Once counts were completed each of the sites were compared against one another to determine the significance in the number of parasitised nymphs vs unparasitised.



Above: Total nymph counts taken from leaves where WF are alive unparasitized nymphs.

site differences

D - R						
D - NR	P=0.378					
A - NR	P=0.020	P=0.007				
IREC R	P=0.029	P=0.477	P<0.001			
C - R	P=0.009	P=0.302	P<0.001	P=0.768		
D - NR	P<0.001	P<0.001	P=0.362	P<0.001	P<0.001	
C - R	P=0.383	P=0.394	P=0.060	P=0.065	P=0.032	P=0.003
	D - R	D - NR	A - NR	IREC R	C - R	D - NR

Above: significance table for Chi Squared Tests

Field Comparisons

The table above shows the field comparisons between the different fields. From the information above some of the interesting things to observe are, that there is no significant difference in the number of parasitised leaves found on either field on Site D, even though only one had nymphs released indicating the mobility of the parasitoids on the farm.

The site A block wasn't significantly different to the release blocks, but this farm also would have had a Pegasus spray just prior to sampling that may have influenced this result, as under the microscope more nymphs may have been categorized as dead compared to the visual inspections.

D R is the same field that was monitored every week which reflects the drop, in nymph numbers at the end of the season. There was no significant difference between the rest of the release fields. There was also no significant difference between the no release fields excluding D NR which is on the same farm.

From this it is possible to say that where the releases occurred and the soft chemistries maintained, there were more parasitised nymphs than the fields that weren't.

Conclusions

Sticky Traps

The use of sticky traps is unable to detect the presence of whitefly compared to in field monitoring as seen over 2 seasons.

Parasitoid Releases

The data collected, shows that there was some success in the use of parasitoids for helping reduce the numbers of viable nymphs. Some of the challenges that we will continue to face going forward, are the need to commit to using the wasps at the start of the season when there is no way of knowing what the end of season pressure will be like, and the issues around getting the wasps due to northern demand. Overall the practice change of heading towards the use of beneficials from this work appears viable.

Thanks To



For working with us on bug releases.

Our grower and agronomic partners

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- Commins Enterprises
- Webster Kooba
- ABS

Thanks To

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Research &
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As partners in this project.



For guidance and advice as well as helping with
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