Arizona Department of Agriculture

AILRC Grants Program – Final Report for 2022

Project 22-02

Project Title: **Area-wide Trapping and Monitoring of Lettuce Insects in Yuma**

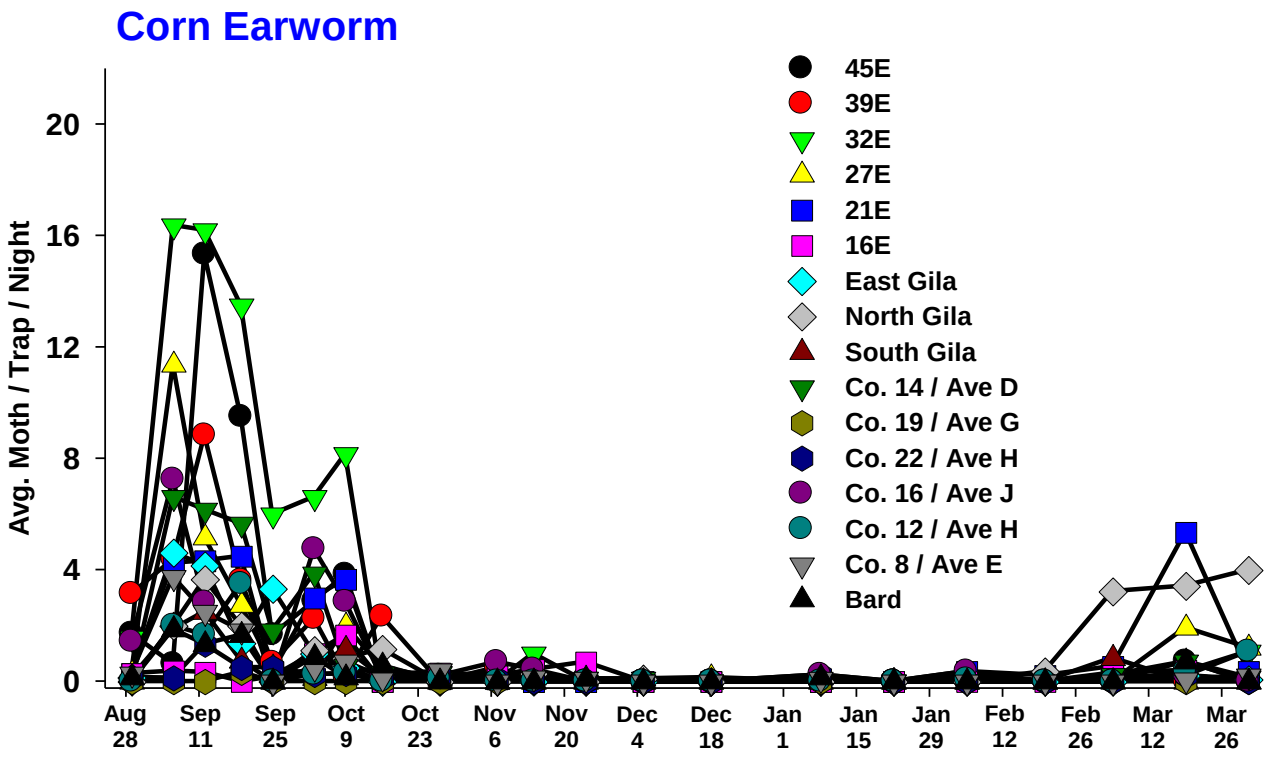
Project Investigator: John C. Palumbo, University of Arizona, Yuma Ag Center
Location of Research: Yuma Valley, Gila Valley, Dome Valley, Wellton Tacna/Roll

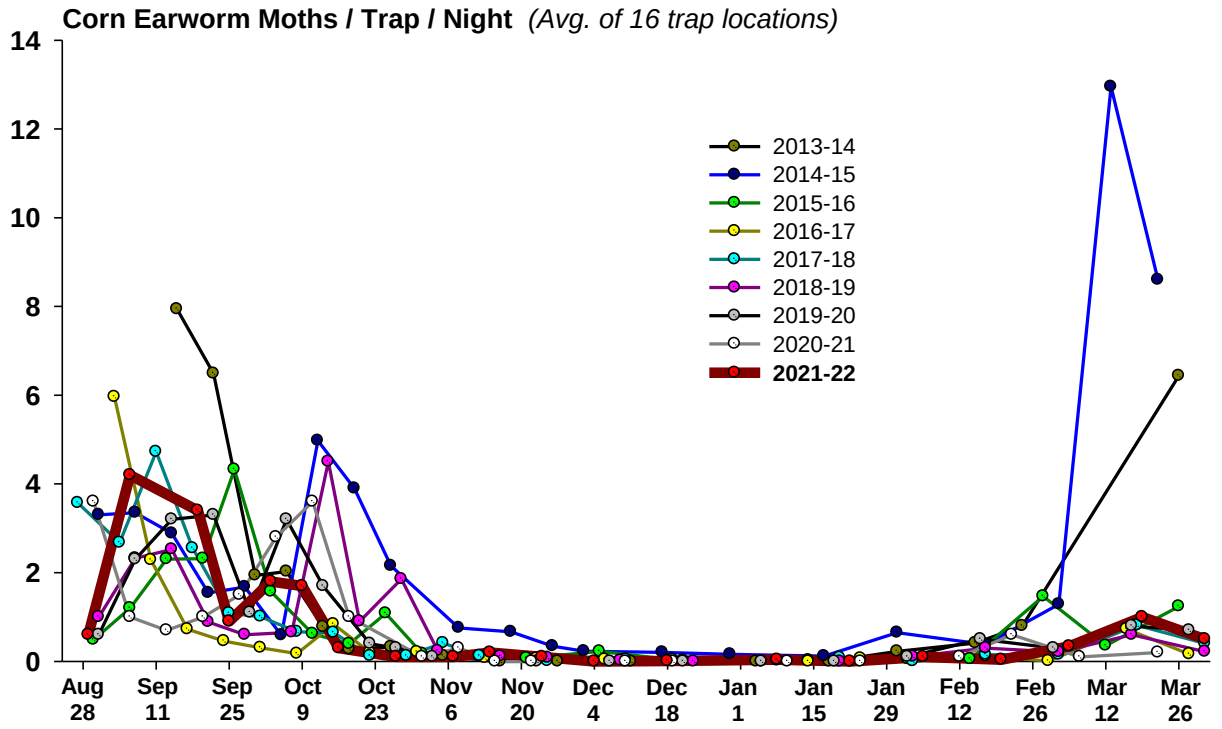
Project Goals and Objectives: The goal of this project was to continue for an 9th growing season the Area-wide Insect Trapping Network that provides real time information for PCAs and growers on adult insect activity of important insect pests that attack lettuce in the Yuma Valley, Gila Valley, Dome Valley and Wellton/Roll areas.

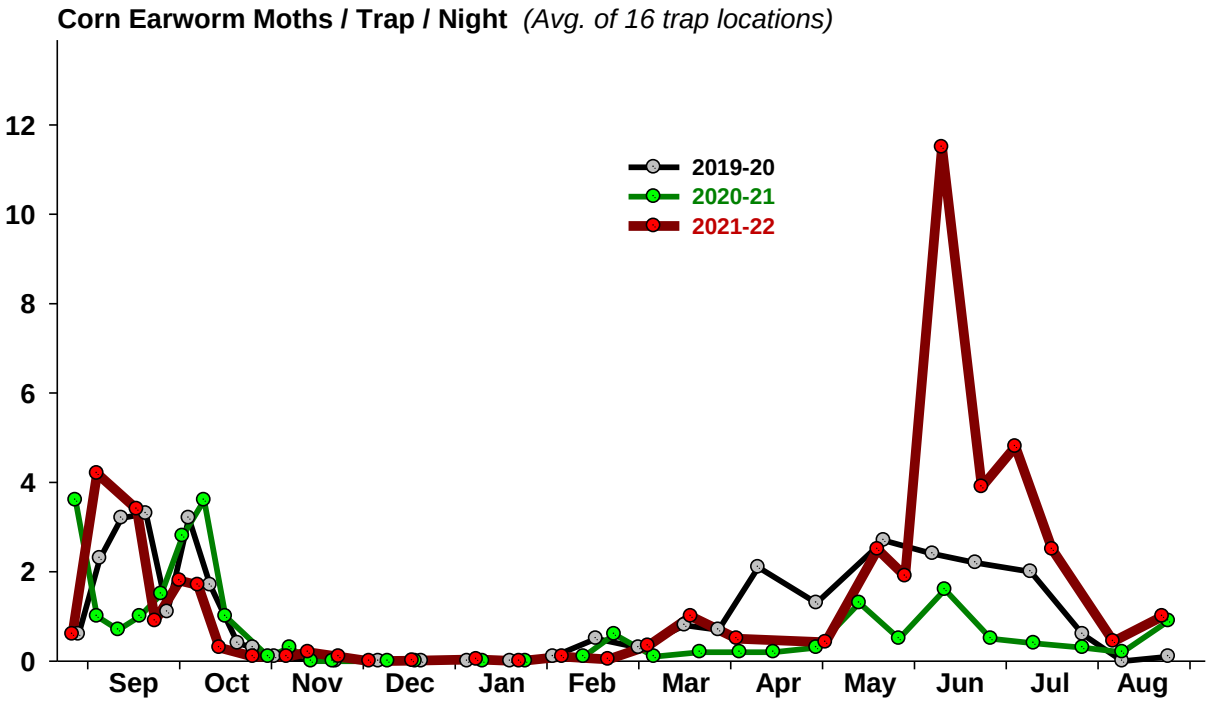
***Area-wide Insect Trapping and Monitoring*:** The continual occurrence of several key insect pests (western flower thrips, aphids, whiteflies, beet armyworm and cabbage looper) further justifies the need to explore new insecticides and their cost-effective use patterns for local growers and PCAs. However, the timely application of effective products is also important in insect management, particularly for occasional pest species. A good example of this is corn earworm (CEW), which caused problems for some lettuce growers in previous growing seasons in Yuma Valley, Dome Valley and Wellton. Because this worm pest can quickly invade developing lettuce heads, adequate monitoring for the larvae and correctly timed spray applications are critical for its control.

What has been helpful for growers and PCAs in managing these types of pests in the past 8 years is an early warning system to alert them of the pest's activity. A pheromone-trap/sticky-trap monitoring network spanning the major growing areas in Yuma has been designed and implemented to measure the activity and movement of adult populations that provides important information to growers and PCAs. This real-time information provides an indication of when pest activity is increasing based on pheromone traps captures and could serve as an indicator for intensified scouting and sampling in susceptible lettuce fields. We have also experienced that many shipper and food buyers request our information at the end of the season to be used in planning for the next season. This is an on-going project that has been funded by AILRC since 2013-14.

Methods: Traps established the past 8 growing seasons will serve as baseline insect activity in the Yuma area. Information will be gathered from a network of traps that will be placed and monitored weekly from mid-August through April. A total of 16 trap locations will be situated in the Yuma Valley (6), Gila Valley (3) and Dome Valley (2), Wellton (2) Tacna/Roll (2), and Bard (1) areas. Traps were located near or adjacent to the AZMET weather station when possible. The approximate location of traps in each valley was determined by a survey of Yuma growers and PCAs. At each site, pheromone traps were used to monitor for adult activity of corn earworm, beet armyworm and cabbage looper. In addition, yellow sticky traps were used to monitor whiteflies, aphids, thrips and leafminer adults. Traps were checked weekly, and data was processed at the Yuma Ag Center. The data was organized and presented by species and trap location. Relative weekly trends were also presented across the season. We also present trap captures during the summer months which we started in 2020.

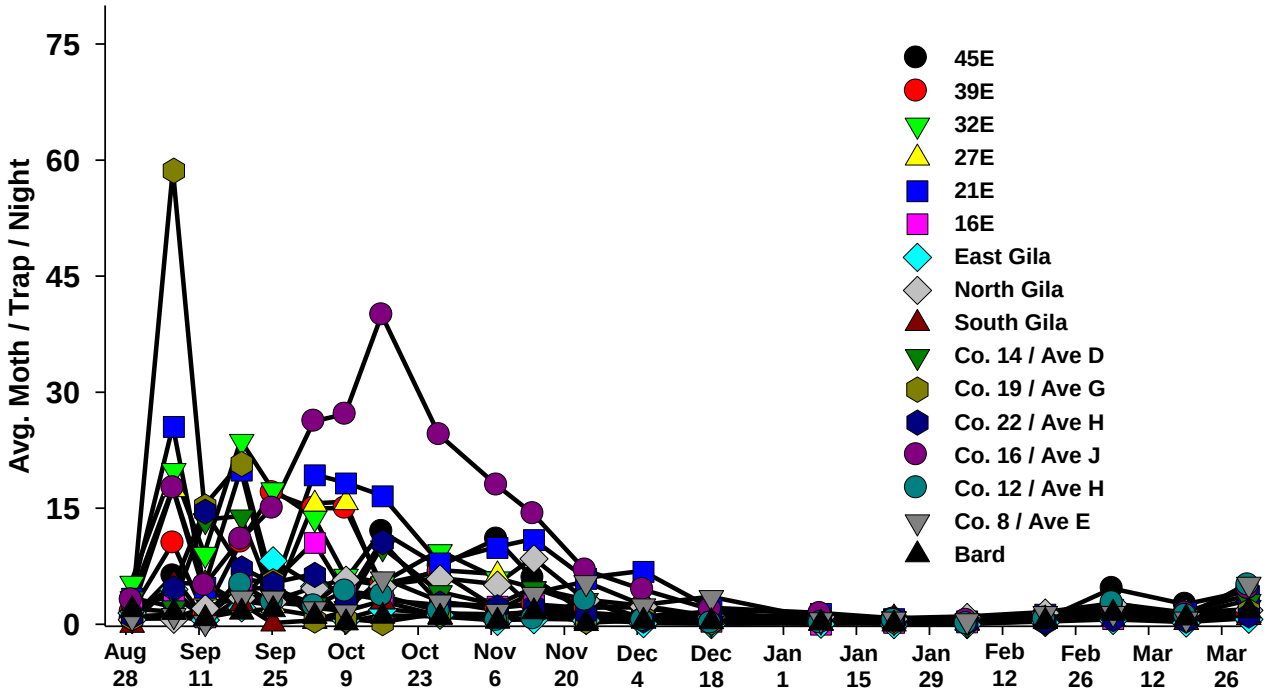

Corn Earworm
Avg. Moth / Trap / Night
0
4
8
12
16
20
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26
45E
39E
32E
27E
21E
16E
East Gila
North Gila
South Gila
Co. 14 / Ave D
Co. 19 / Ave G
Co. 22 / Ave H
Co. 16 / Ave J
Co. 12 / Ave H
Co. 8 / Ave E
Bard

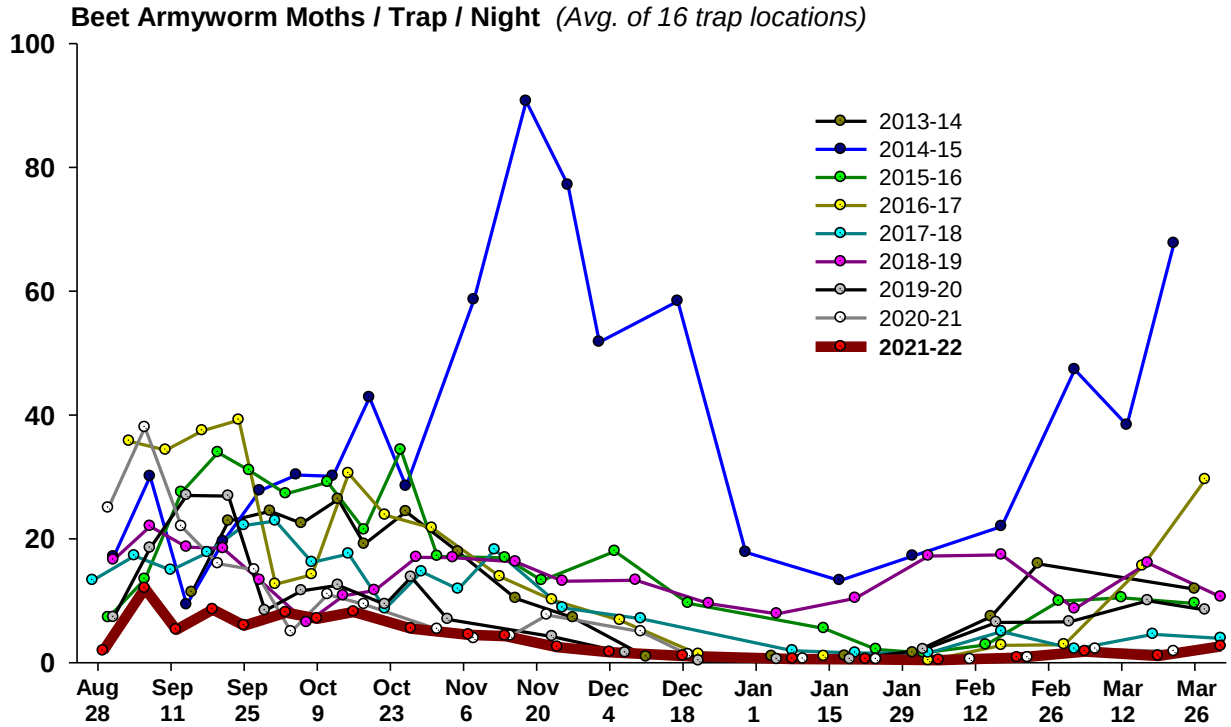

Corn Earworm Moths / Trap / Night (Avg. of 16 trap locations)
0
2
4
6
8
10
12
14
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26
2013-14
2014-15
2015-16
2016-17
2017-18
2018-19
2019-20
2020-21
2021-22

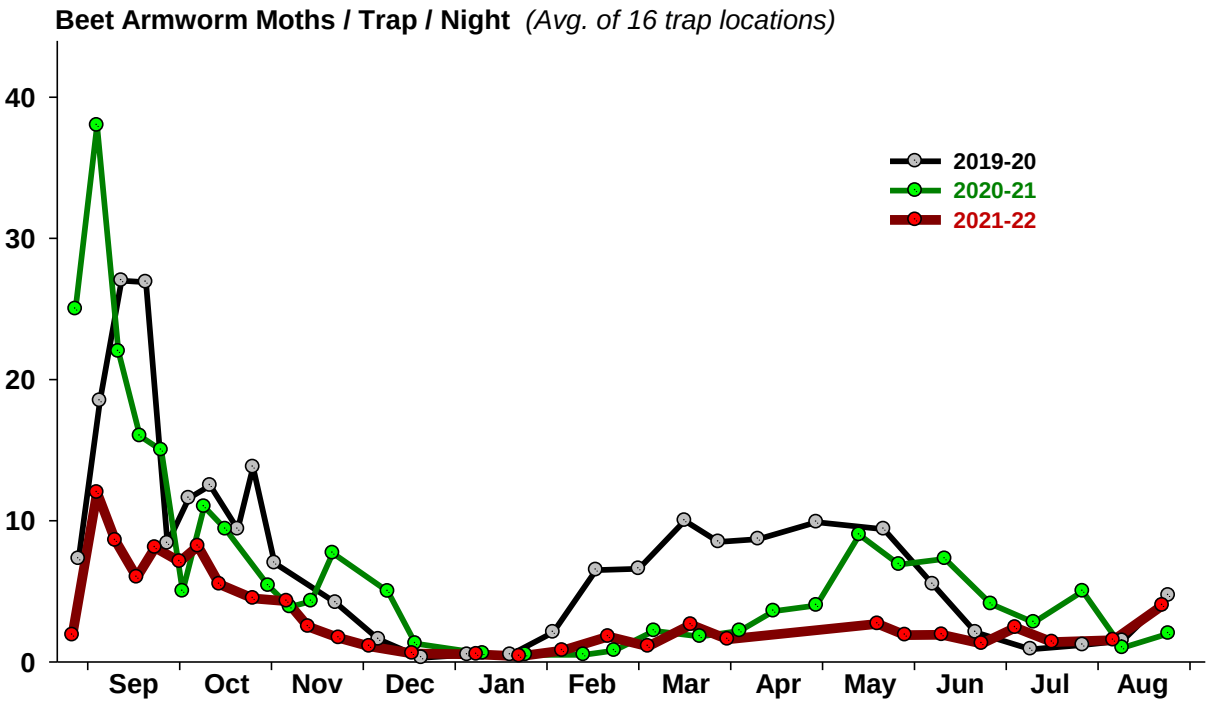


Corn Earworm (CEW): Overall, CEW moth activity was very high during late August 2021, but dropped off until early October when numbers in Roll spiked prior to first lettuce harvests. A few PCAs reported presence of CEW larvae in pre-harvest lettuce shortly thereafter. CEW trap catches in the spring were lower than average compared to Feb and Mar of 2014 and 2015 which is a key period during the produce season when lettuce is at a very high risk from corn earworm. There were no reports of CEW larvae causing problem in commercial fields in the spring of 2022. These data were made available to PCAs ad growers' season long. Year-long trapping over the past 3 years shows that CEW moths peaked twice yearly, in Sep-Oct, and then again in May-June after the season is finished.

Beet Armyworm

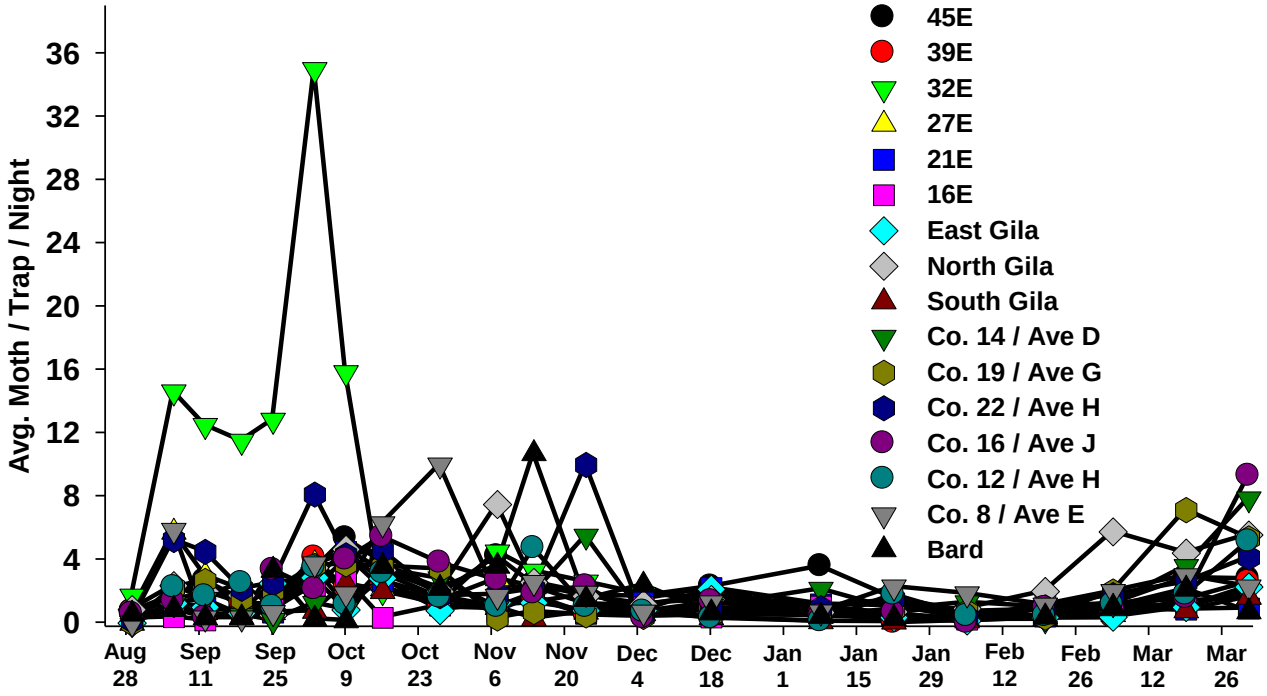


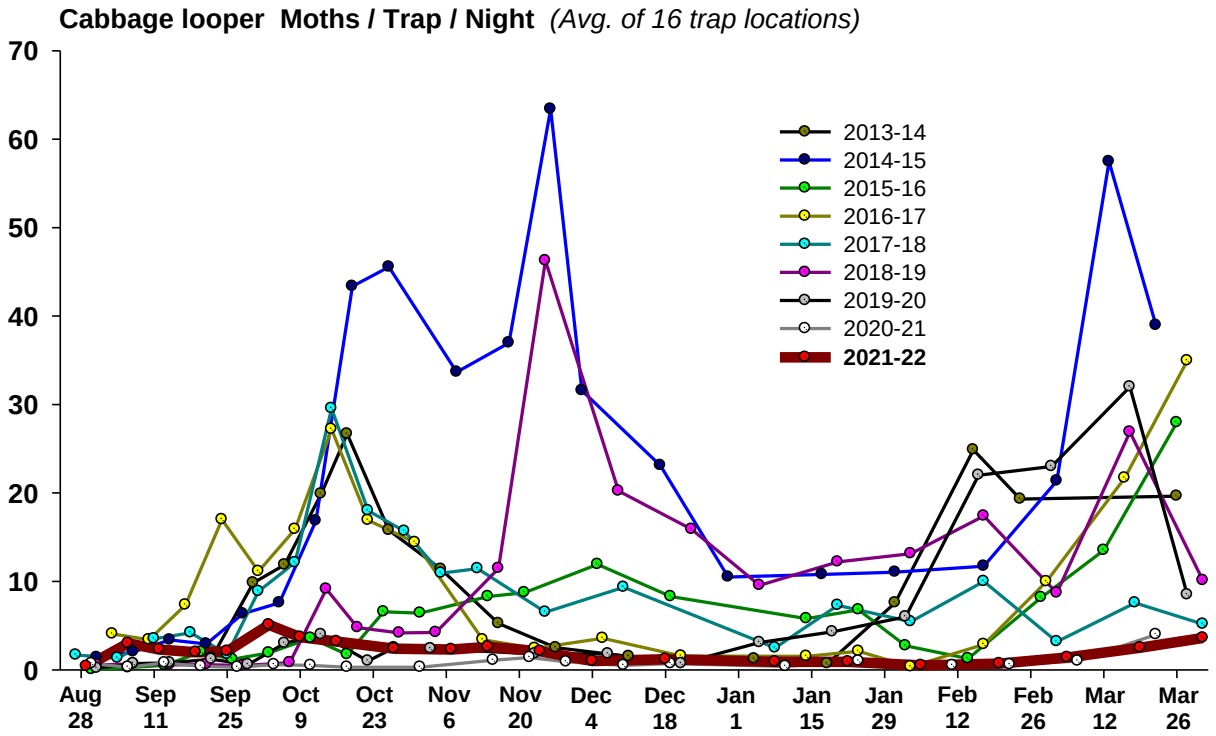


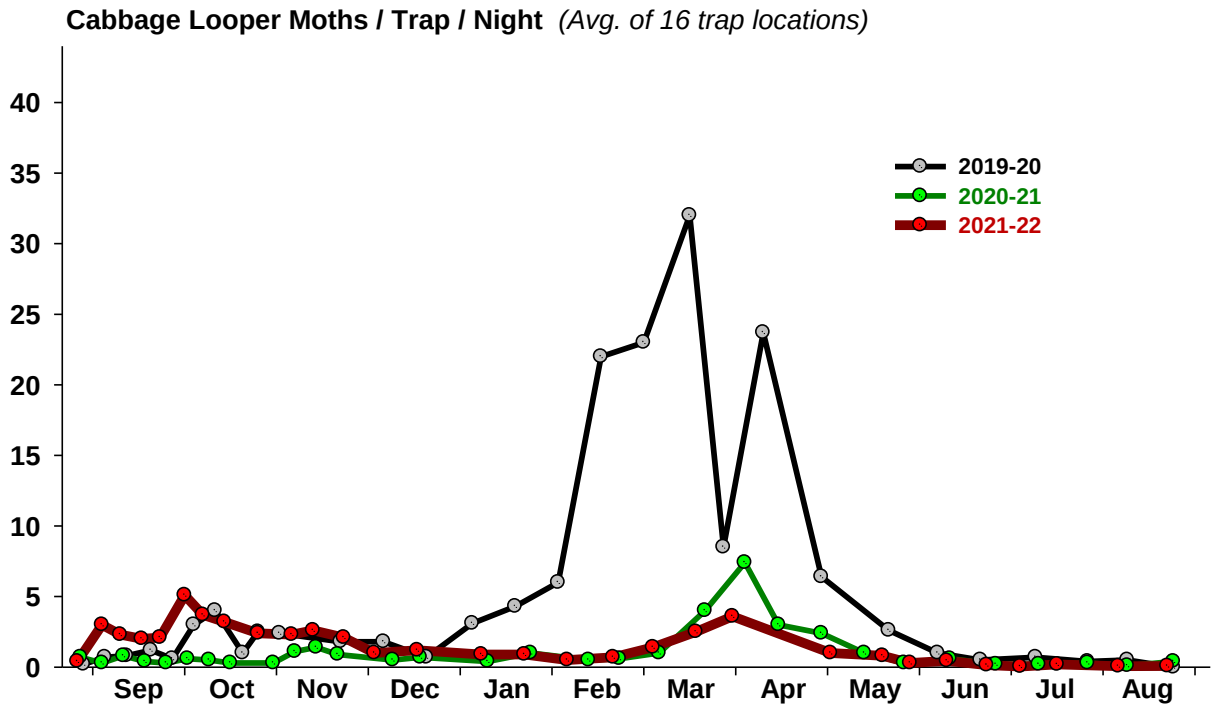


Beet armyworm (BAW): Cooler fall temperatures likely account for the below- average trap catches during the fall and winter of 2021-22. Similarly, BAW larval infestions in lettuce during September were the moderate compared to previous years. Overall, BAW trap catches this season were the lowest we've experienced in the past 8 years and activity was unusually light for most of the growing season. The desert drought conditions over the past 12 months associated with the lack of monsoon activity last year may account for low BAW incidence. Moth activity remained light throughout the summer.

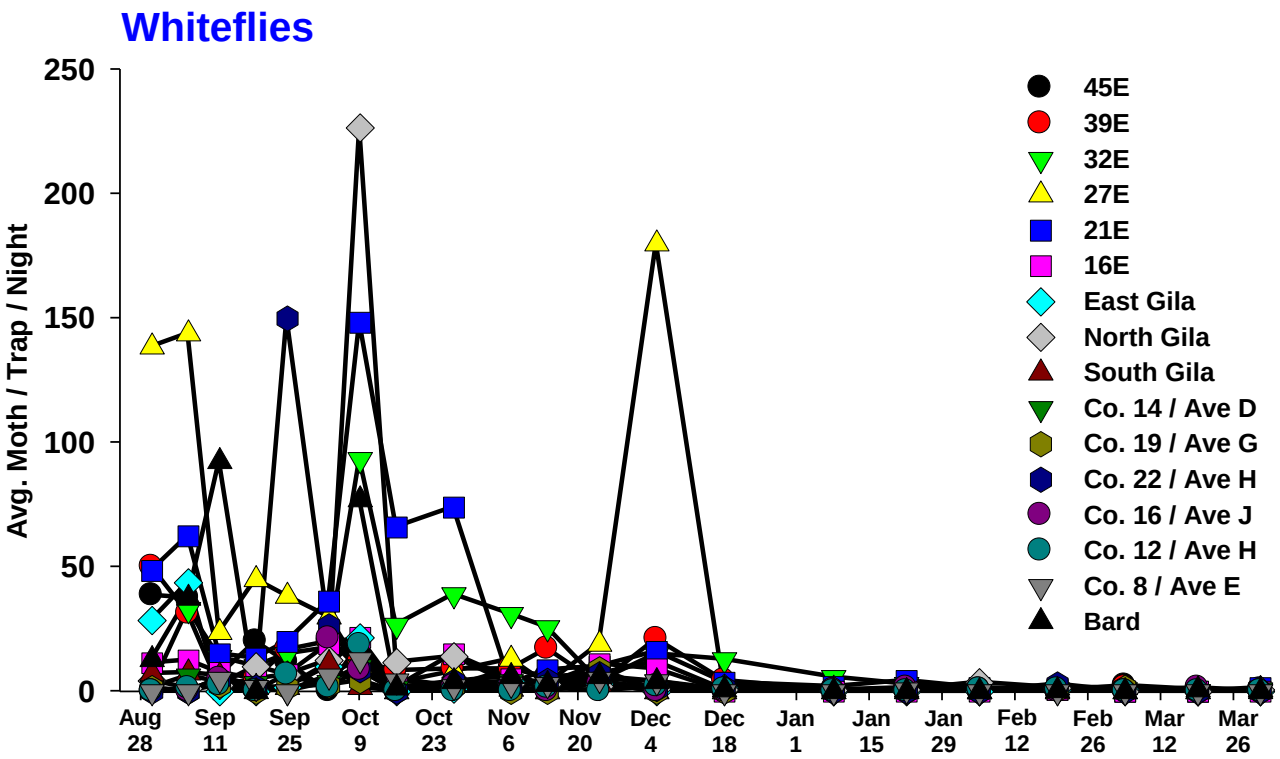
Cabbage looper

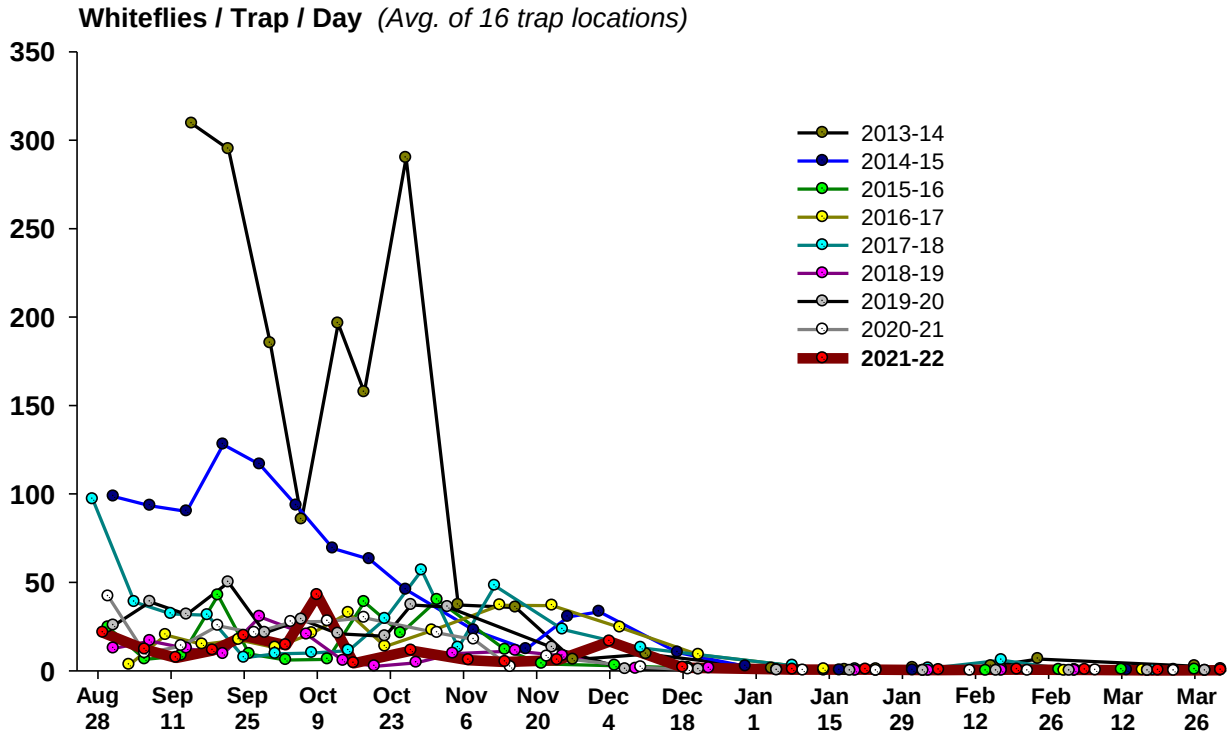


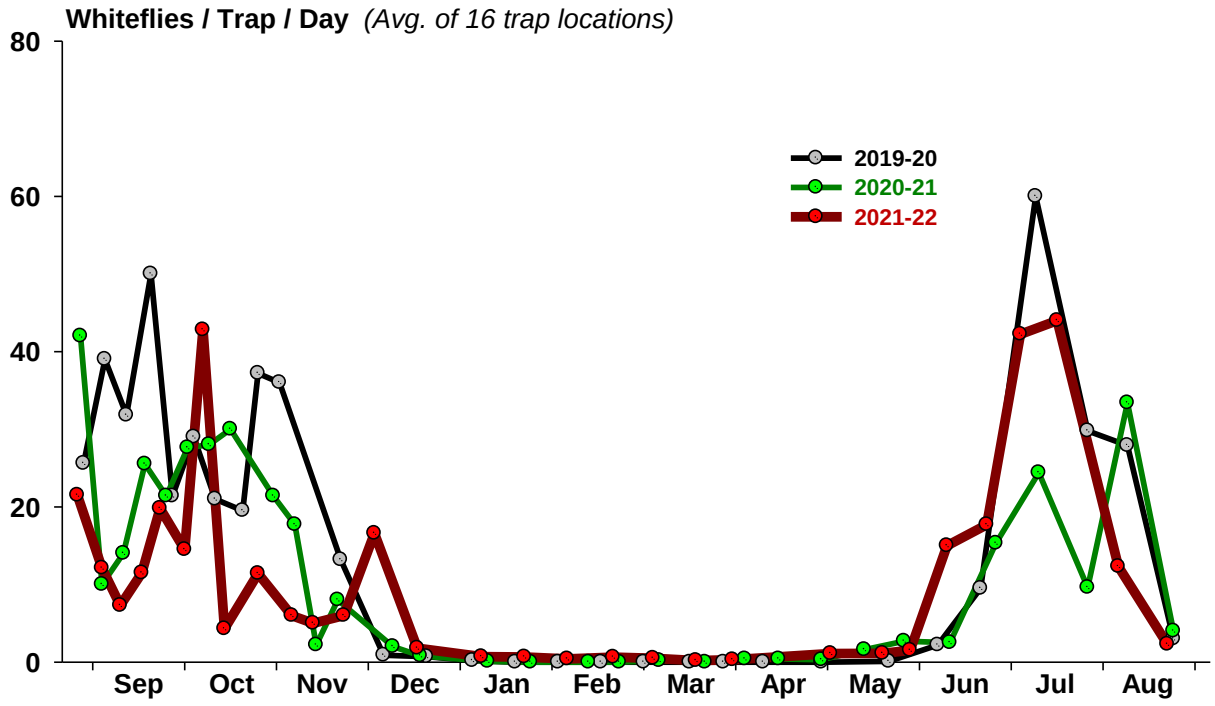




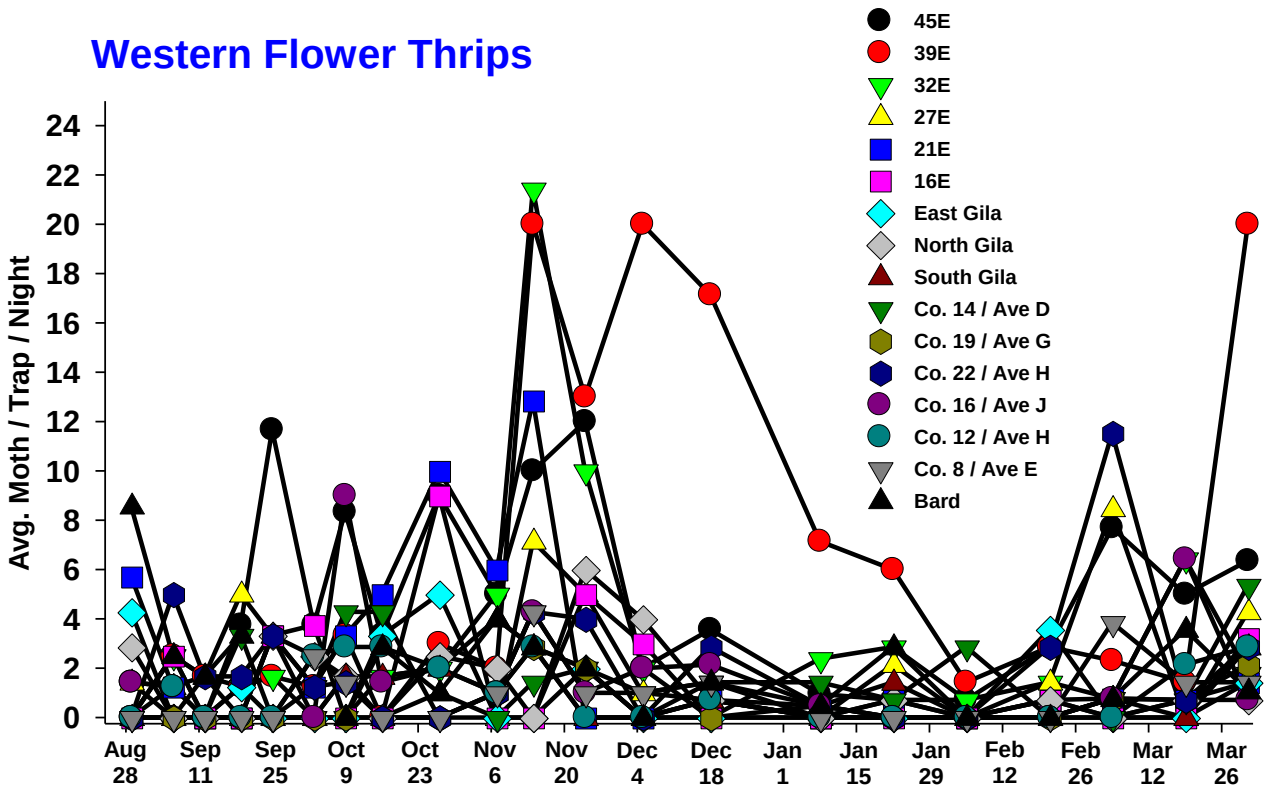
Cabbage looper (CL): for a second successive season, CL moths were essentially absent during the 2021-22 season where trap captures were the lowest recorded in 8 years. This is likely due to cooler fall temperatures in the fall and winter of 2021-22 and the associated lack of rainfall and humidity during the monsoon. PCA's also reported an absence of CL during the fall, except for an early infestation occurring in early October. CL larval populations were very light during the spring. These observations were consistent with lower trap captures during this time.

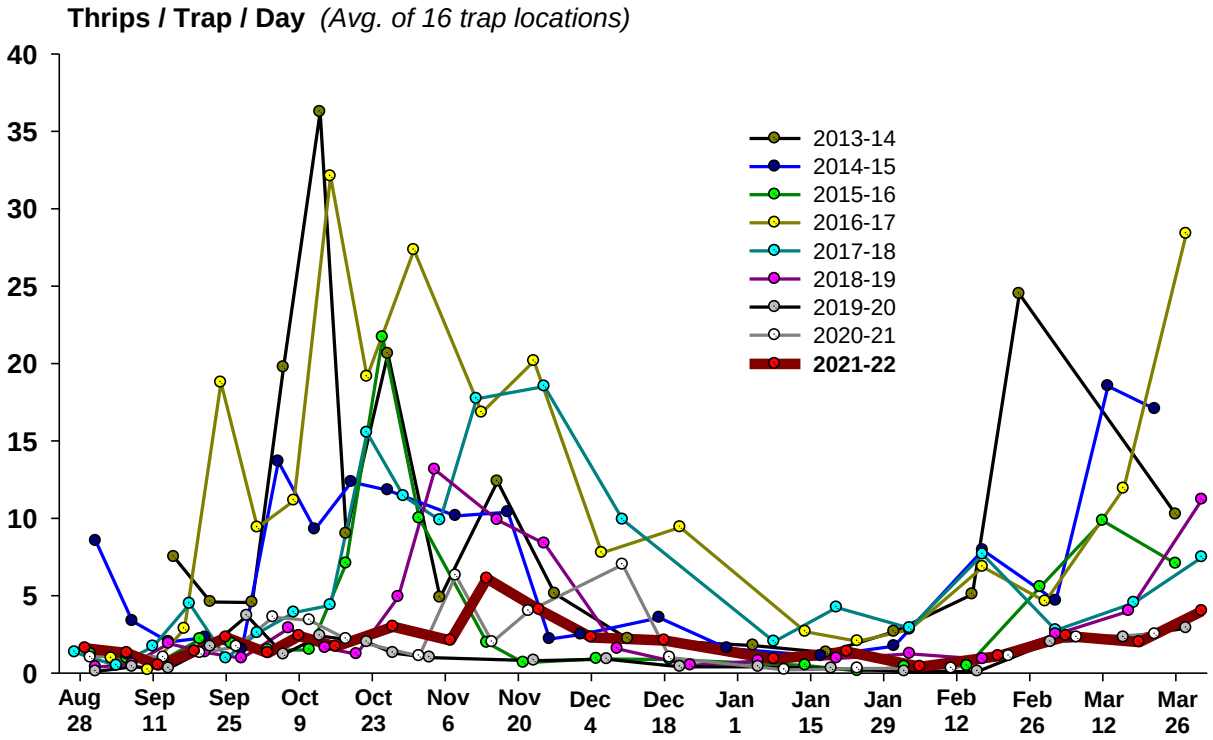

Whiteflies
Avg. Moth / Trap / Night
250
200
150
100
50
0
45E
39E
32E
27E
21E
16E
East Gila
North Gila
South Gila
Co. 14 / Ave D
Co. 19 / Ave G
Co. 22 / Ave H
Co. 16 / Ave J
Co. 12 / Ave H
Co. 8 / Ave E
Bard
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26

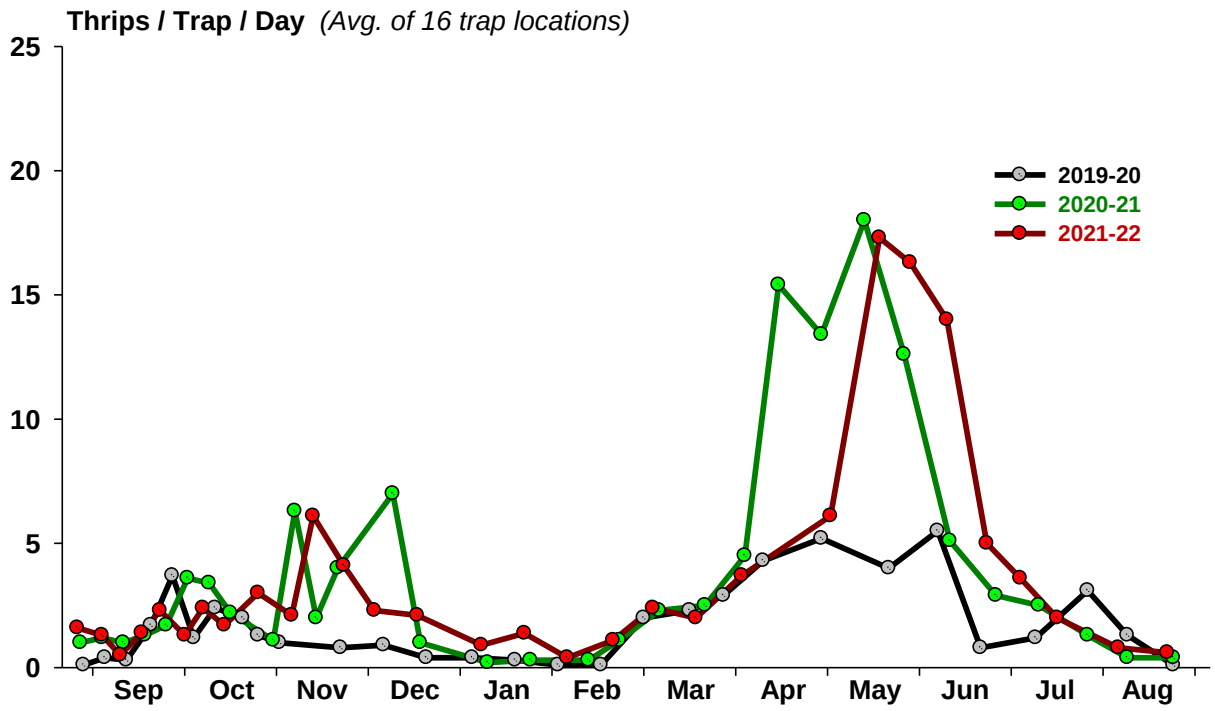

Whiteflies / Trap / Day (Avg. of 16 trap locations)
350
300
250
200
150
100
50
0
2013-14
2014-15
2015-16
2016-17
2017-18
2018-19
2019-20
2020-21
2021-22
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26



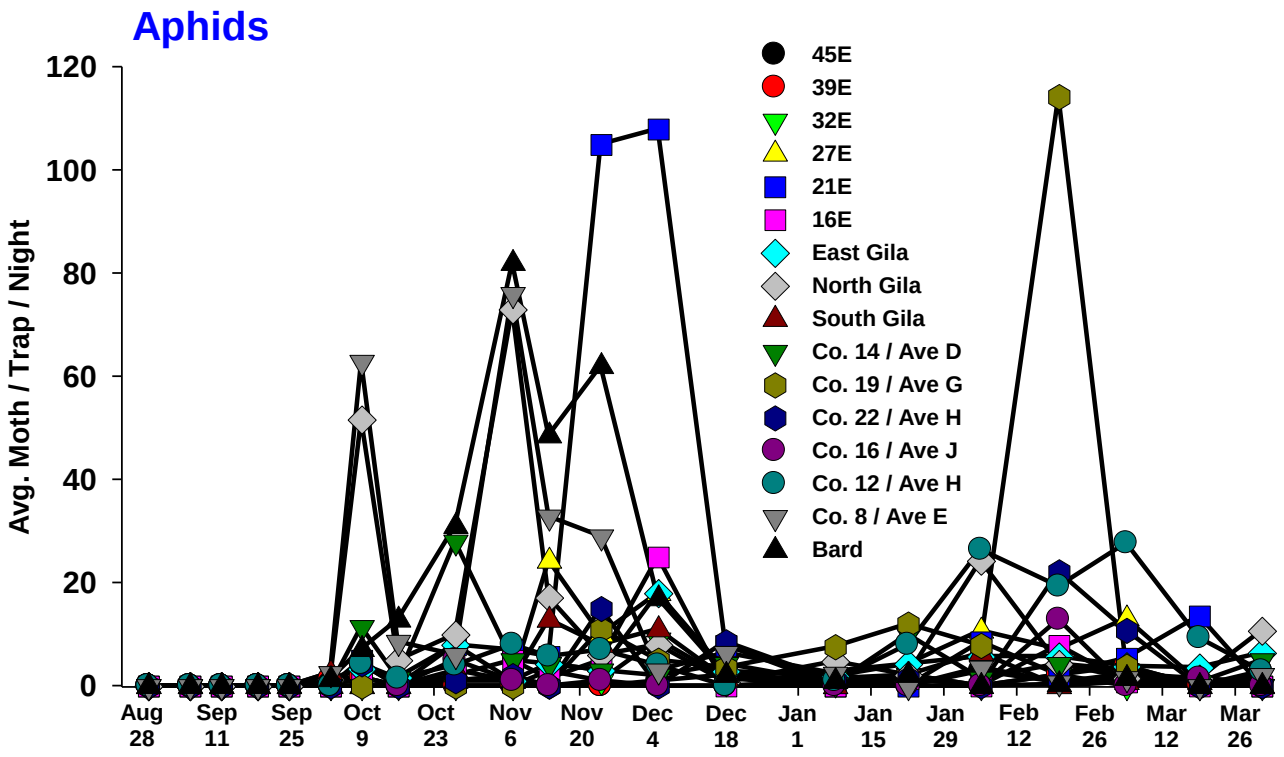
Sweetpotato Whitefly: Whitefly movement is greatest during the fall when adults are migrating out of cotton, alfalfa and melons onto lettuce. In contrast, whitefly move very little during the spring. In 2021-22, whitefly movement was below average early in the produce season and about average thereafter, comparable to the previous years. Traps peaked in October this year, near recently harvested cotton, melon and alfalfa fields, particularly in Dome and Gila Valleys. Traps counts reflect PCA reports of light infestations in lettuce fields. Summer trapping shows that a second peak in movement occurred in June-July consistent with spring melon harvest and early cotton termination.

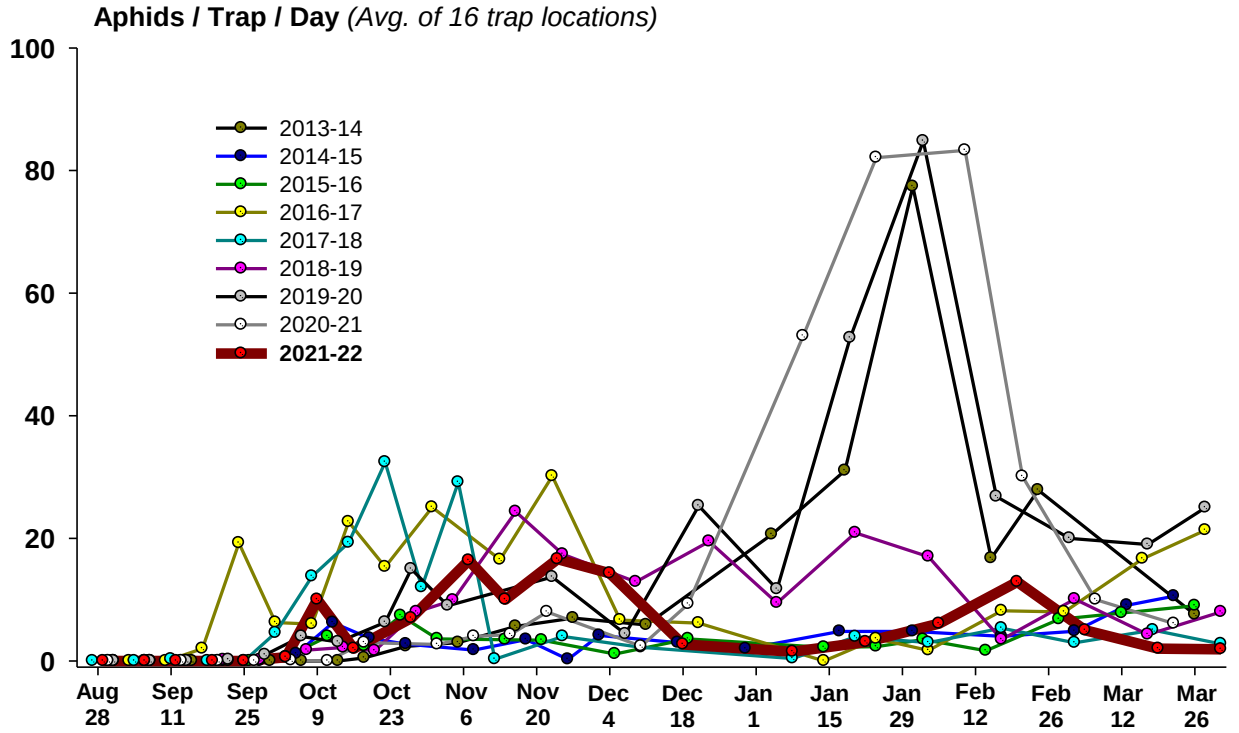

Western Flower Thrips
Avg. Moth / Trap / Night
0
2
4
6
8
10
12
14
16
18
20
22
24
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26
45E
39E
32E
27E
21E
16E
East Gila
North Gila
South Gila
Co. 14 / Ave D
Co. 19 / Ave G
Co. 22 / Ave H
Co. 16 / Ave J
Co. 12 / Ave H
Co. 8 / Ave E
Bard

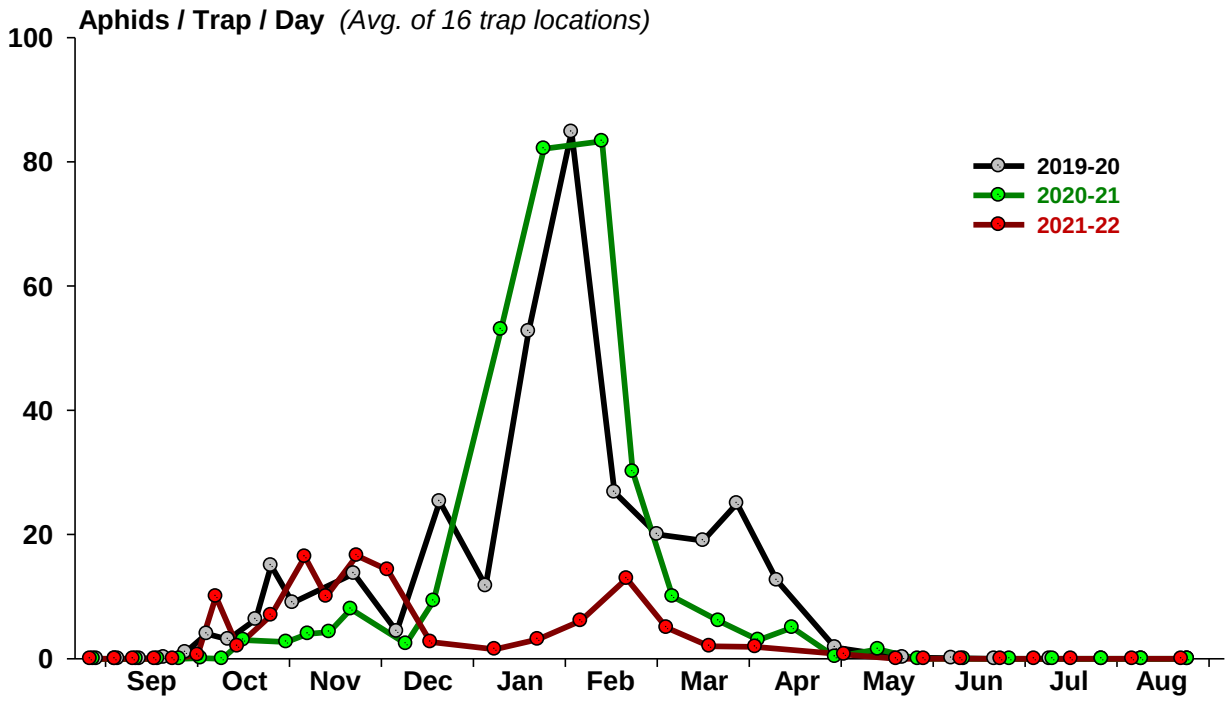

Thrips / Trap / Day (Avg. of 16 trap locations)
0
5
10
15
20
25
30
35
40
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26
2013-14
2014-15
2015-16
2016-17
2017-18
2018-19
2019-20
2020-21
2021-22



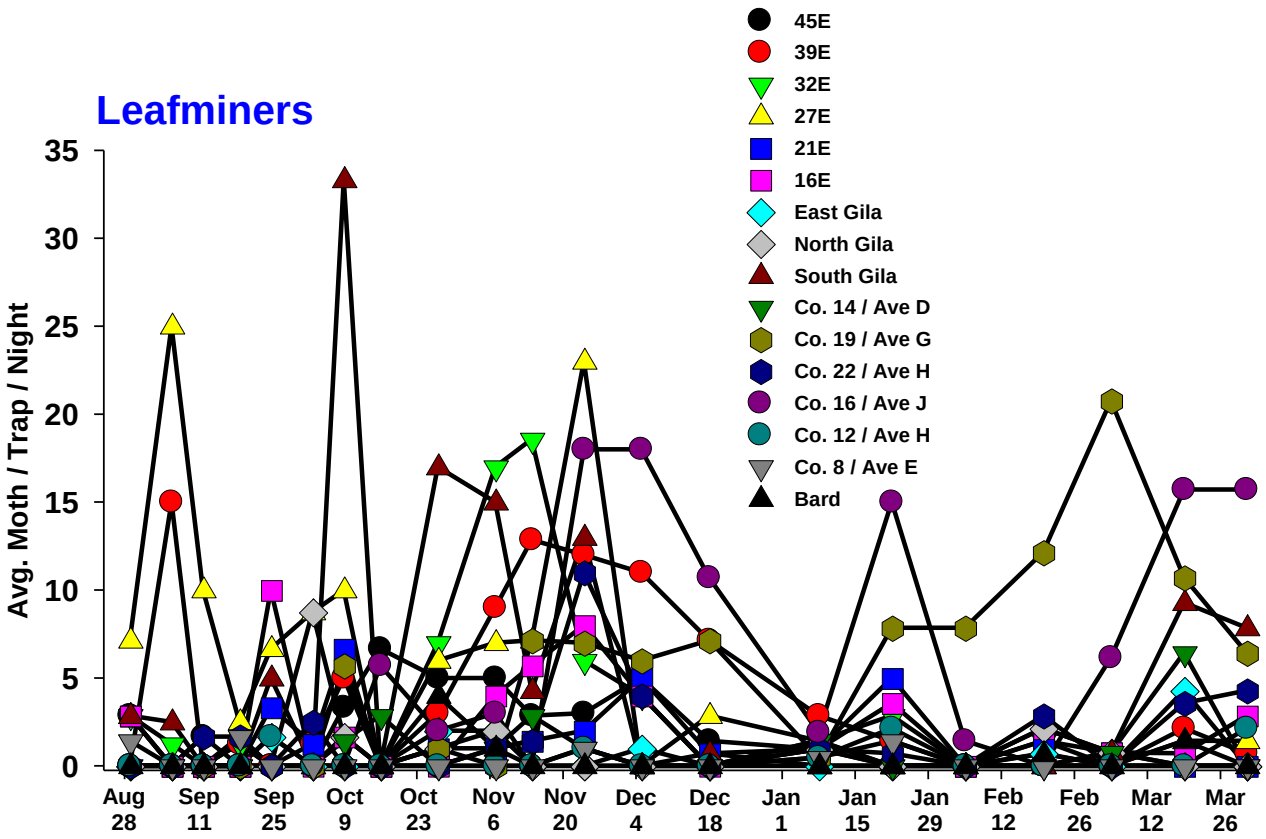
Western Flower Thrips: Based on previous observations, adult thrips tend to move primarily in October/November (from alfalfa, melons and cotton) and then again in Feb-Mar (with the reduction in produce acers). Thrips trap captures in 2021-2022 were well below average throughout the growing season. Activity was unusually light in the fall consistent with cooler temperatures. Activity in the spring was extremely light, consistent with the unusually rainfall occurring in February that tends to suppress thrips numbers. Summer trapping showed that annual thrips activity peaked in May-June, declining sharply for the duration of the summer.

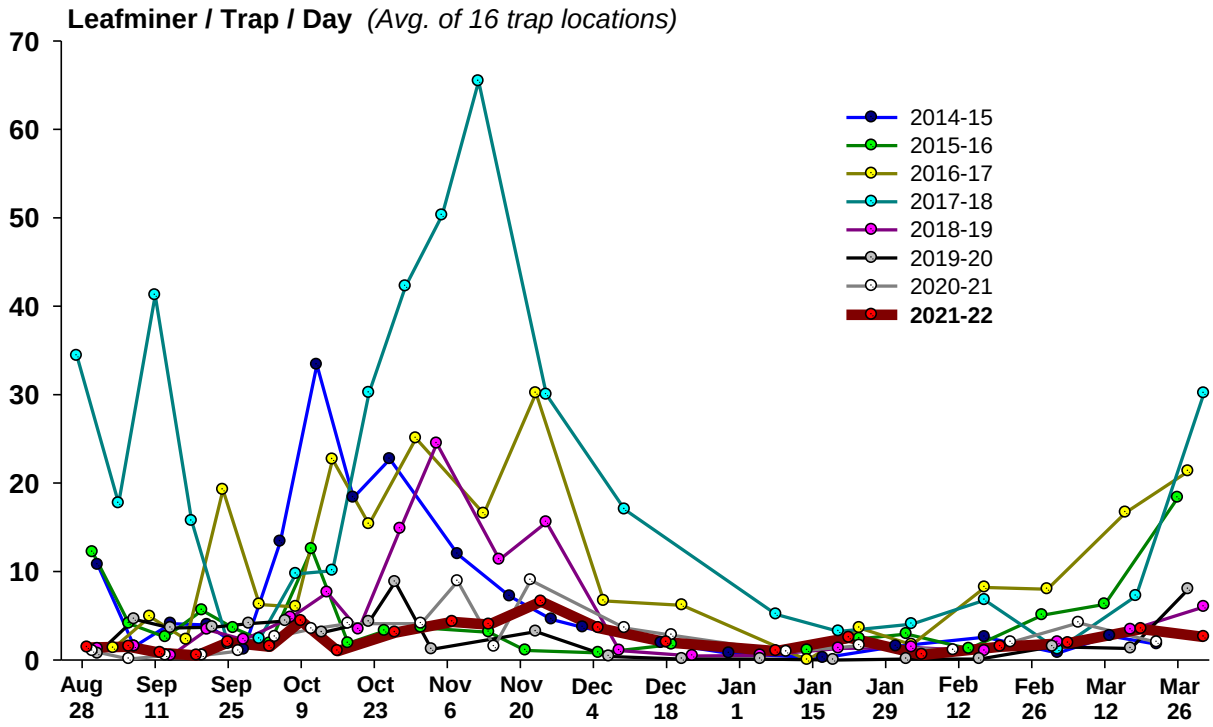

Aphids
Avg. Moth / Trap / Night
120
100
80
60
40
20
0
45E
39E
32E
27E
21E
16E
East Gila
North Gila
South Gila
Co. 14 / Ave D
Co. 19 / Ave G
Co. 22 / Ave H
Co. 16 / Ave J
Co. 12 / Ave H
Co. 8 / Ave E
Bard
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26

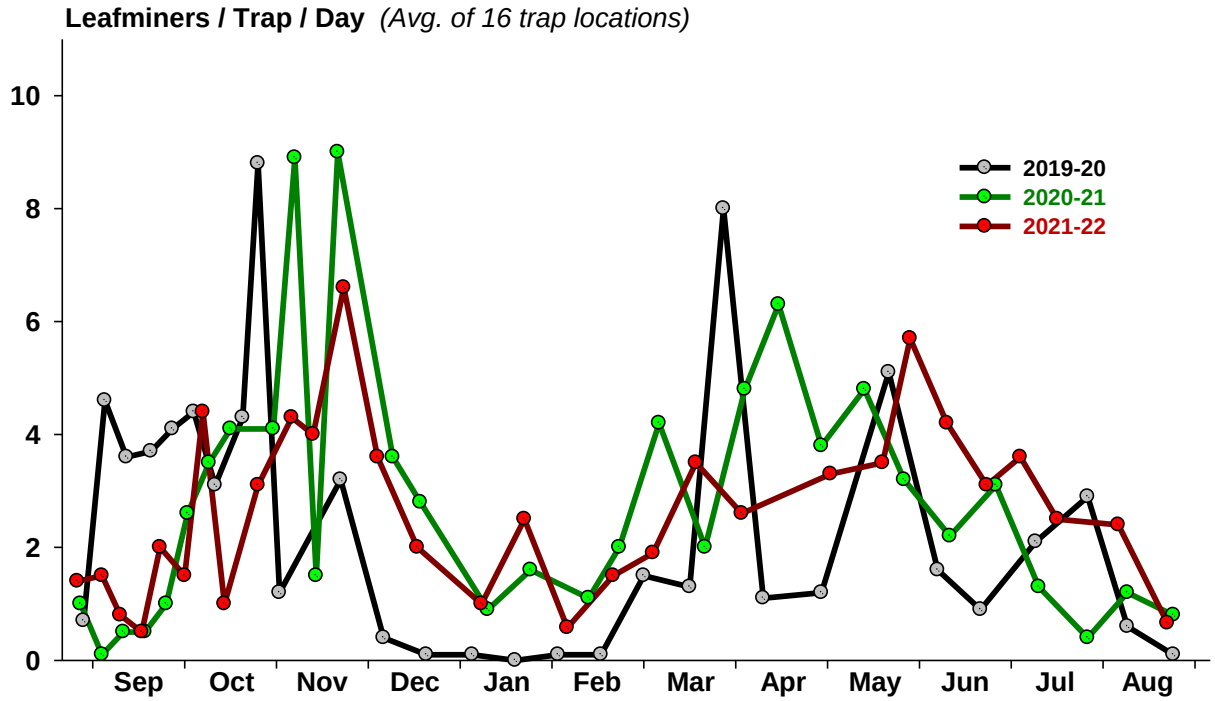

Aphids / Trap / Day (Avg. of 16 trap locations)
100
80
60
40
20
0
2013-14
2014-15
2015-16
2016-17
2017-18
2018-19
2019-20
2020-21
2021-22
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26



Aphids: Areawide, fall movement of aphids was slightly latein fall 2021, not increasing significantly until Nov-Dec. Aphid flights were about average during the winter, peaking in late-Feb, and consistent with warmer and drier weather conditions. This is likely why aphid colonization in produce fields was high this past spring, and PCAs indicated that aphid infestations were troublesome and required significantly more control than in previous seasons. It might also explain the high incidence of Lettuce aphid in some areas. Trap counts were generally higher in the N. Yuma and N. Gila Valleys. Green peach aphid was the predominant species found in traps and fields. Aphids are not trapped during the summer due to high temperatures and lack of adequate plant/weed hosts.


Leafminers
Avg. Moth / Trap / Night
45E
39E
32E
27E
21E
16E
East Gila
North Gila
South Gila
Co. 14 / Ave D
Co. 19 / Ave G
Co. 22 / Ave H
Co. 16 / Ave J
Co. 12 / Ave H
Co. 8 / Ave E
Bard
0
5
10
15
20
25
30
35
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26


Leafminer / Trap / Day (Avg. of 16 trap locations)
2014-15
2015-16
2016-17
2017-18
2018-19
2019-20
2020-21
2021-22
0
10
20
30
40
50
60
70
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26



***Liriomyza* Leafminers:** Similar to many of the other pests, Leafminer adult activity was below average last season, likely a reflection of the cooler fall temperatures. Leafminer activity was as low as we've observed in the past 8 years. There were no reports of leafminer issues in commercial fields. Most leafminer adults trapped were *Liriomyza sativae,* although *Liriomyza trifollii,* was observed on traps in some locations, particularly in the fall. The heavy use of product such as Radiant, Coragen, and Minect Pro, which are used for worm and whitefly control, have excellent control of leafminers and likely contributed to the low abundance the past few years.