Arizona Department of Agriculture

AILRC Grants Program – Final Report for 2023

Project 23-01

Project Title: **Area-wide 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

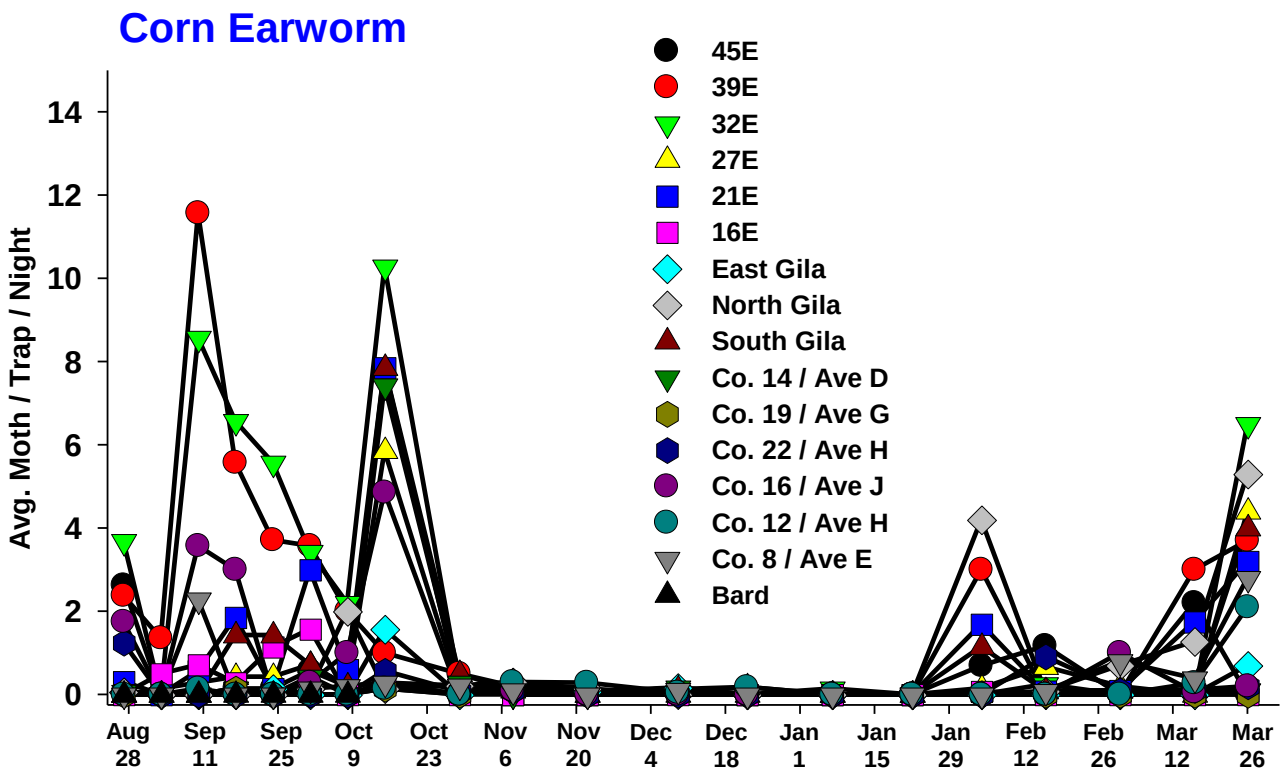
Project Goals and Objectives: The goal of this project was to continue for an 10th growing season the Area-wide Insect Trapping Network that provides real time information for PCAs and growers on adult insect activity of important insect pests that attack lettuce in the Yuma Valley, Gila Valley, Dome Valley and Wellton/Roll areas.

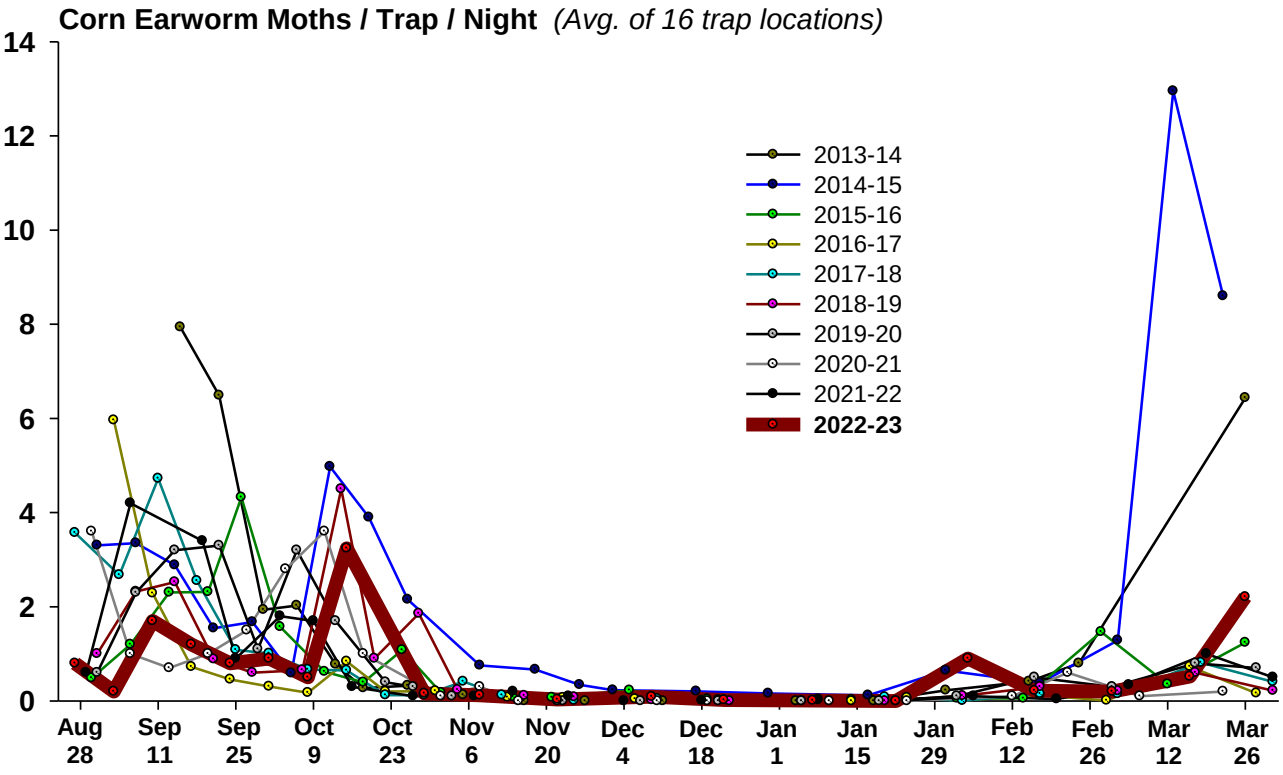
***Area-wide Insect Trapping and Monitoring*:** The continual occurrence of several key insect pests (western flower thrips, aphids, whiteflies, beet armyworm and cabbage looper) further justifies the need to explore new insecticides and their cost-effective use patterns for local growers and PCAs. However, 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.

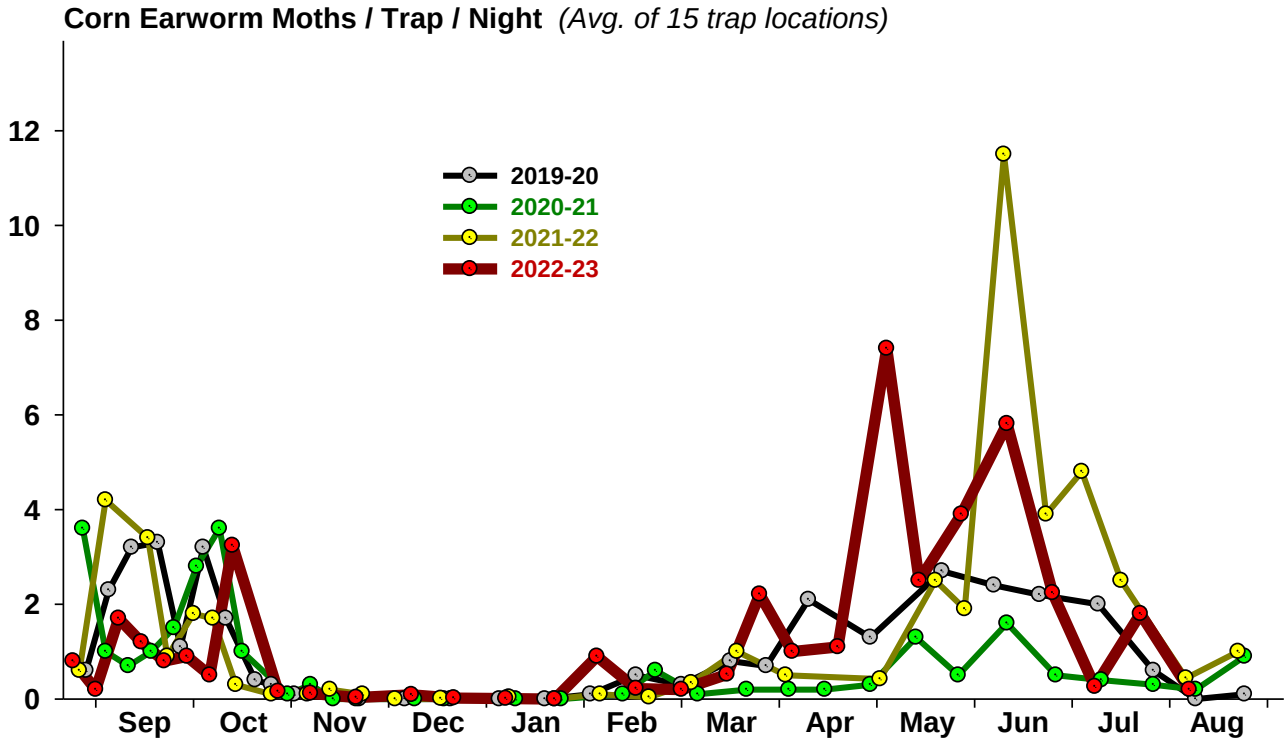
What has been helpful for growers and PCAs in managing these types of pests in the past 10 years is an early warning system to alert them of the pest's activity. A pheromone-trap/sticky-trap monitoring network spanning the major growing areas in Yuma has been designed and implemented to measure the activity 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.

Methods: Traps established the past 10 growing seasons serve as baseline insect activity in the Yuma area. Information was gathered from a network of traps placed and monitored weekly from mid-August through April. A total of 16 trap locations were 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, cabbage looper and diamondback moth. 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.

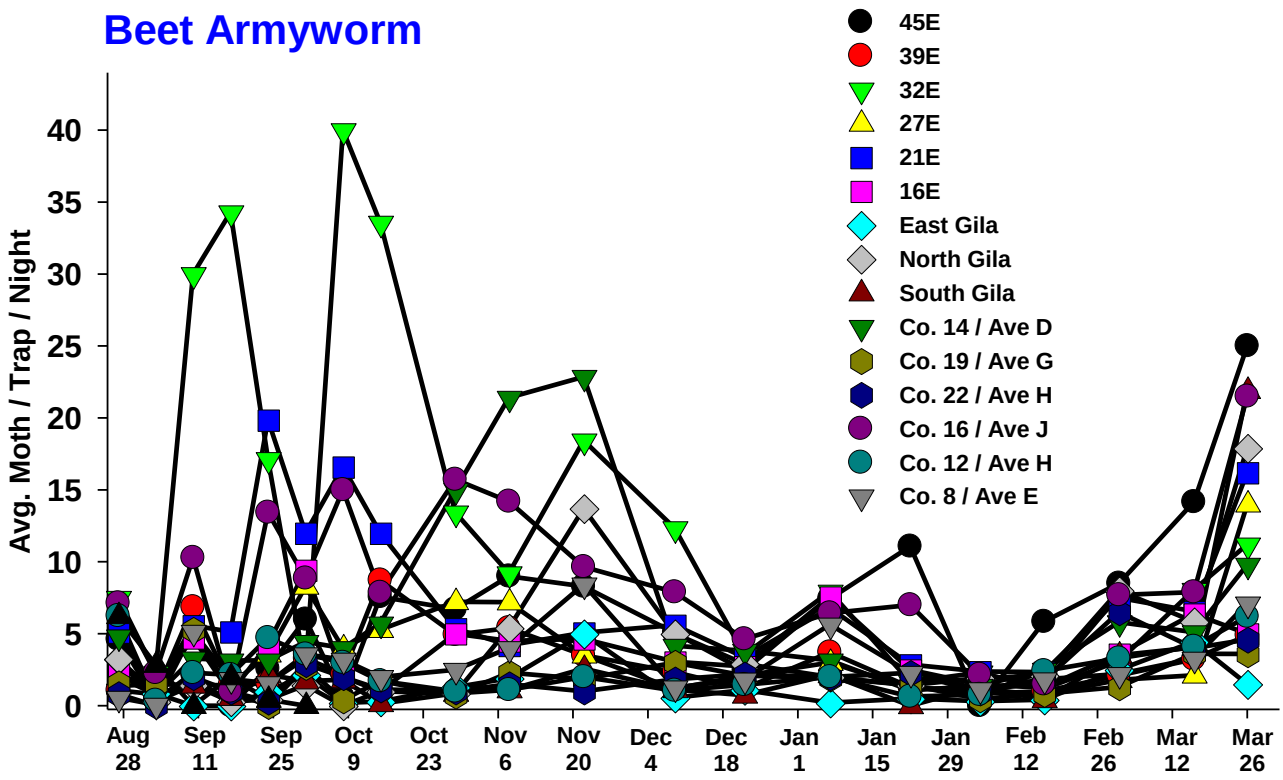
Results:

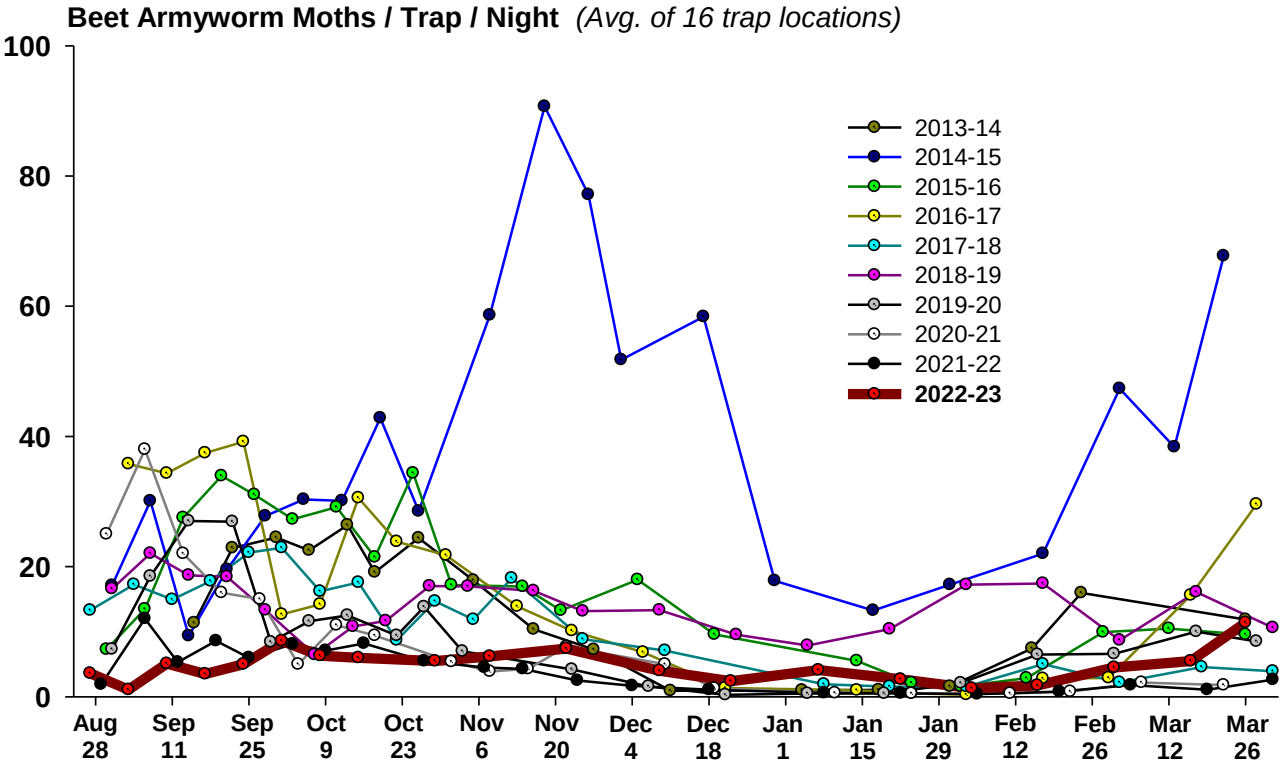

Corn Earworm
Avg. Moth / Trap / Night
0
2
4
6
8
10
12
14
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26
45E
39E
32E
27E
21E
16E
East Gila
North Gila
South Gila
Co. 14 / Ave D
Co. 19 / Ave G
Co. 22 / Ave H
Co. 16 / Ave J
Co. 12 / Ave H
Co. 8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

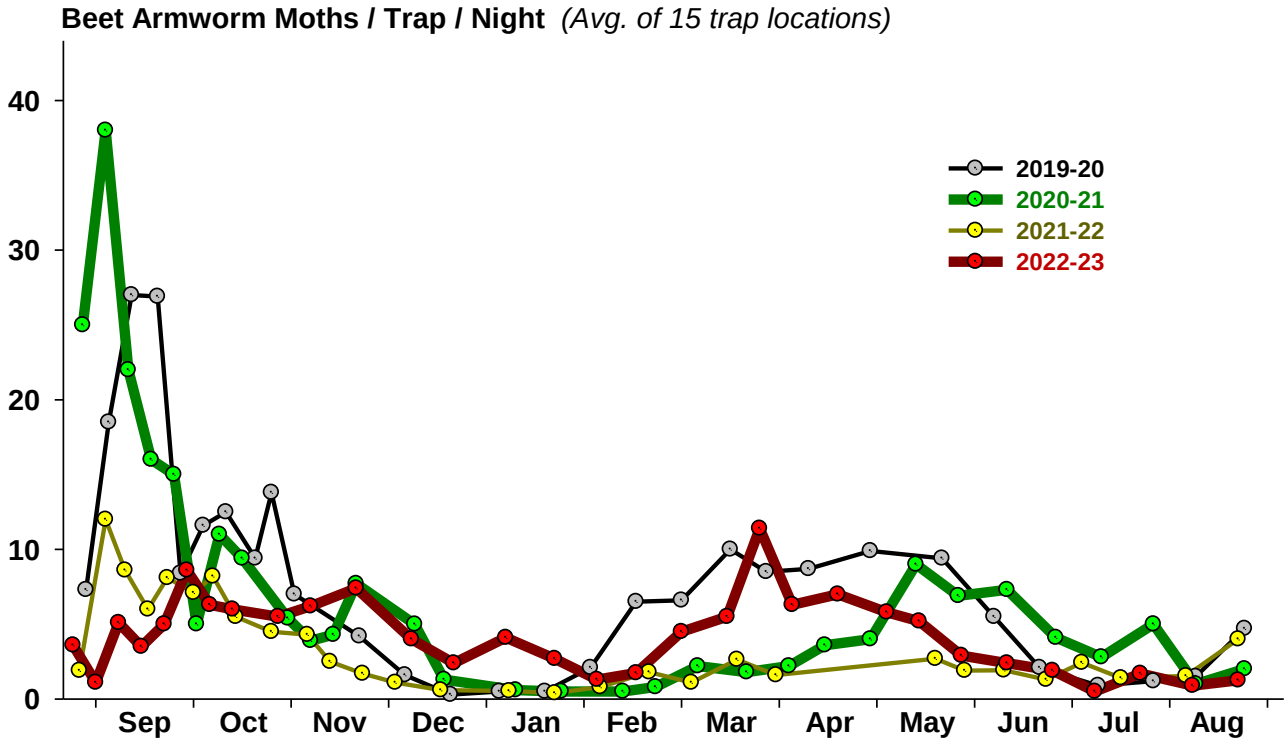

Corn Earworm Moths / Trap / Night (Avg. of 16 trap locations)
0
2
4
6
8
10
12
14
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26
2013-14
2014-15
2015-16
2016-17
2017-18
2018-19
2019-20
2020-21
2021-22
2022-23



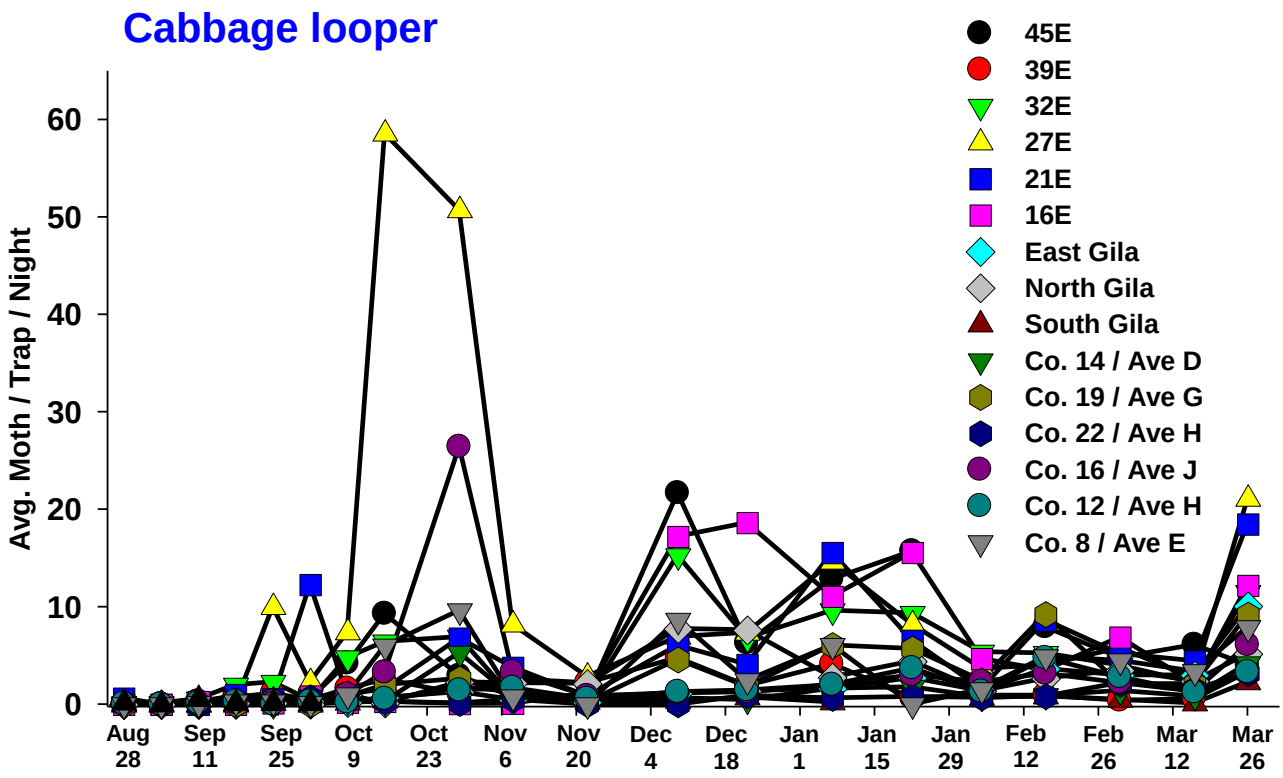
Corn Earworm (CEW): Overall, CEW moth activity initially picked up in early September, but peaked in mid-October during the season. A few PCAs reported presence of CEW larvae in pre-harvest lettuce shortly thereafter. CEW trap catches in the spring were lower than average compared to Feb and Mar of 2014 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 2023. 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 early summer after the season is finished.

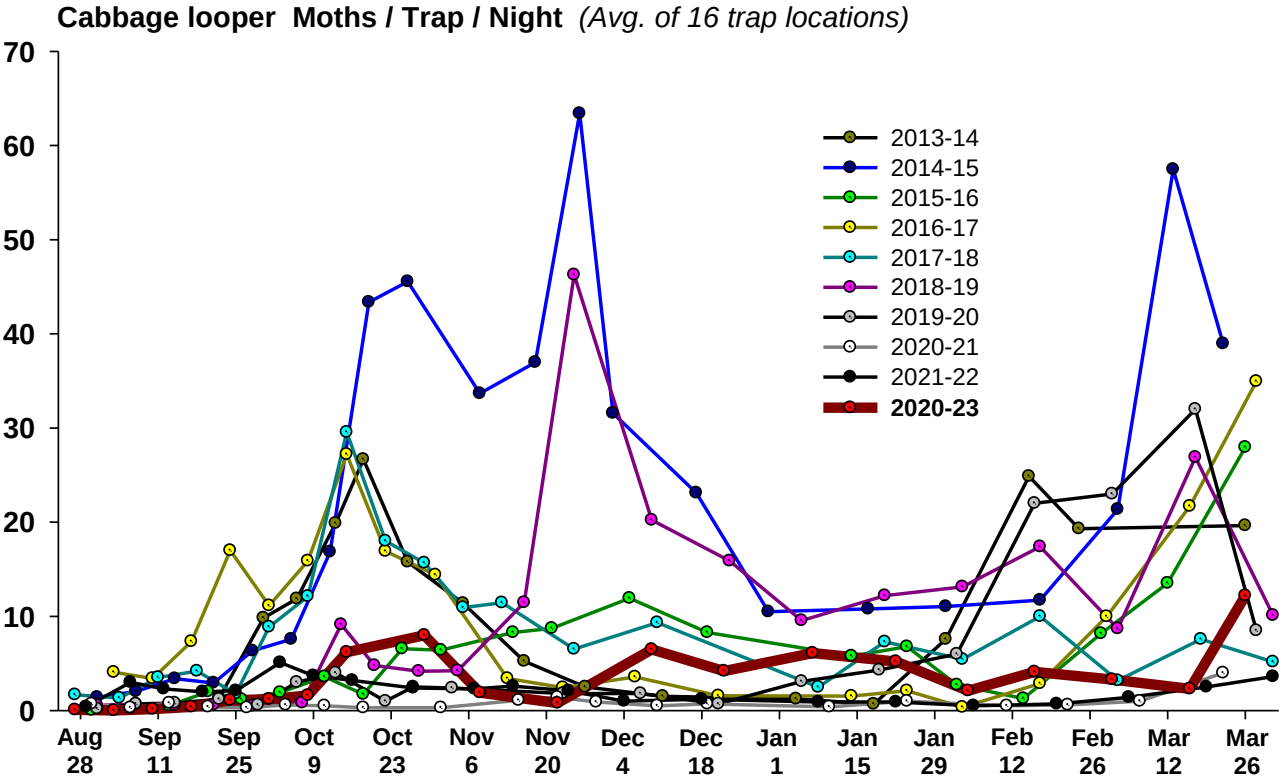

Beet Armyworm
Avg. Moth / Trap / Night
0
5
10
15
20
25
30
35
40
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26
45E
39E
32E
27E
21E
16E
East Gila
North Gila
South Gila
Co. 14 / Ave D
Co. 19 / Ave G
Co. 22 / Ave H
Co. 16 / Ave J
Co. 12 / Ave H
Co. 8 / Ave E

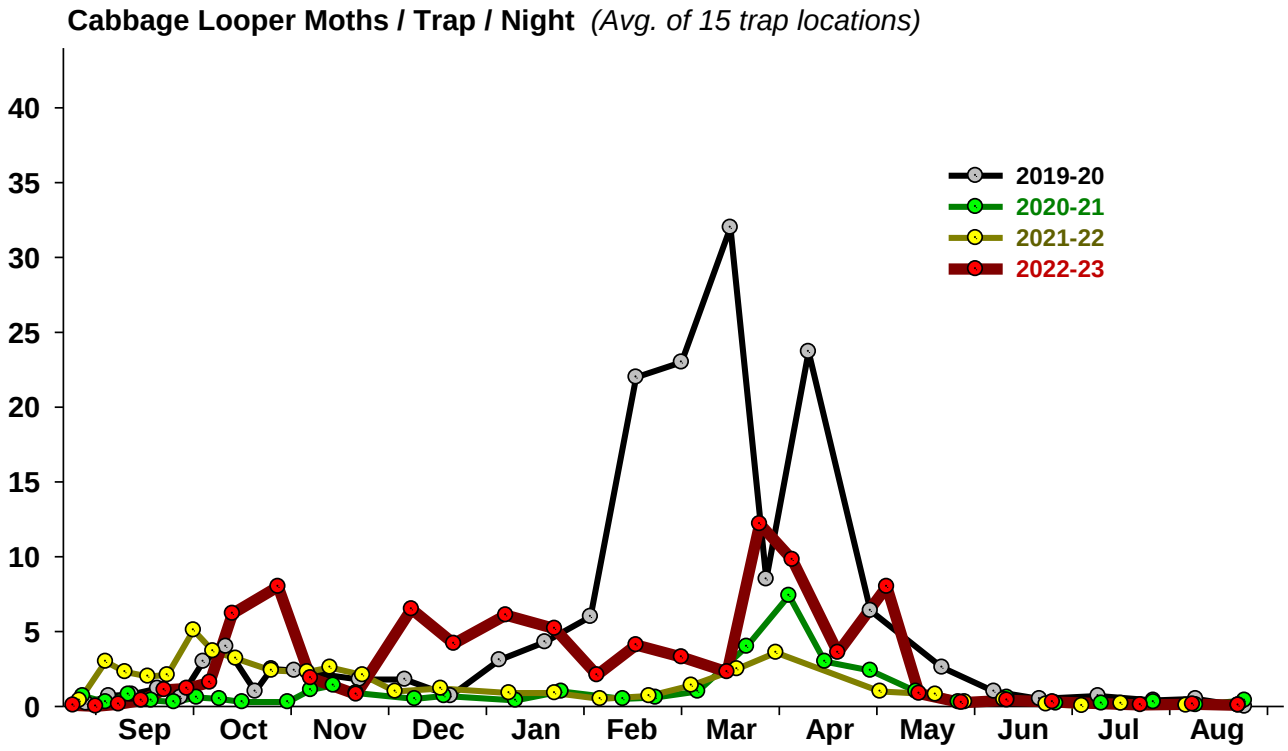

Beet Armyworm Moths / Trap / Night (Avg. of 16 trap locations)
0
20
40
60
80
100
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26
2013-14
2014-15
2015-16
2016-17
2017-18
2018-19
2019-20
2020-21
2021-22
2022-23



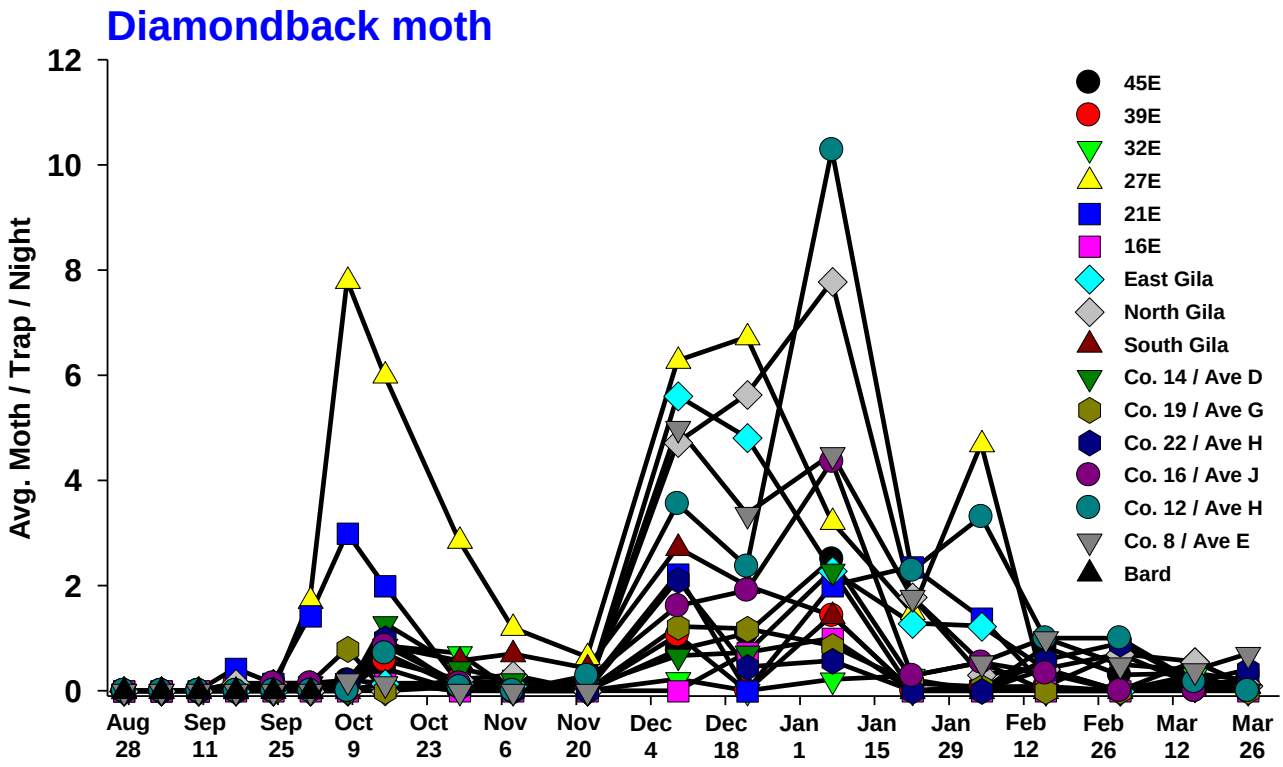
Beet armyworm (BAW): Cooler fall temperatures likely account for the below- average trap catches during the fall and winter of 2022-23. Similarly, BAW larval infestions in lettuce during September were low compared to previous years. Overall, BAW trap catches this season were the lowest we've experienced in the past 10 years and activity was unusually light for most of the growing season. The desert drought conditions associated with the lack of monsoon activity last year may account for low BAW incidence. Moth activity remained light throughout the summer.

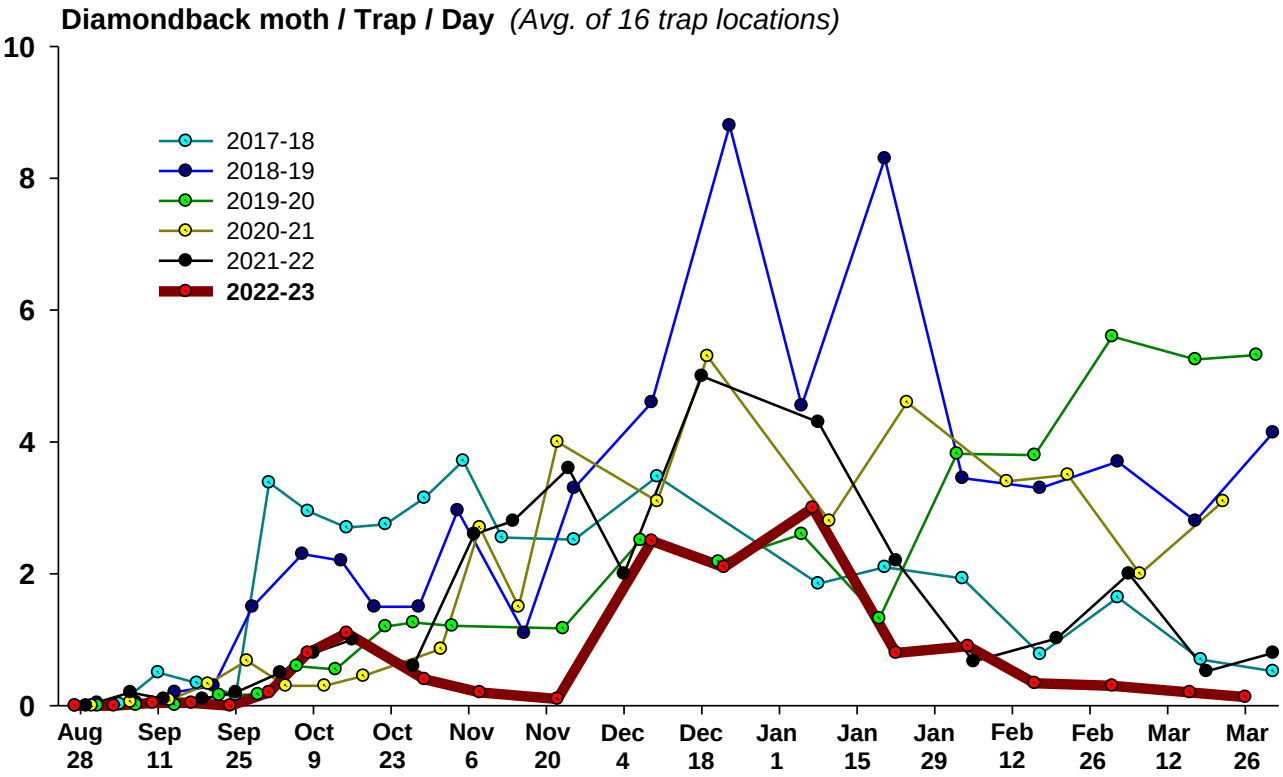

Cabbage looper
Avg. Moth / Trap / Night
0
10
20
30
40
50
60
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26
45E
39E
32E
27E
21E
16E
East Gila
North Gila
South Gila
Co. 14 / Ave D
Co. 19 / Ave G
Co. 22 / Ave H
Co. 16 / Ave J
Co. 12 / Ave H
Co. 8 / Ave E

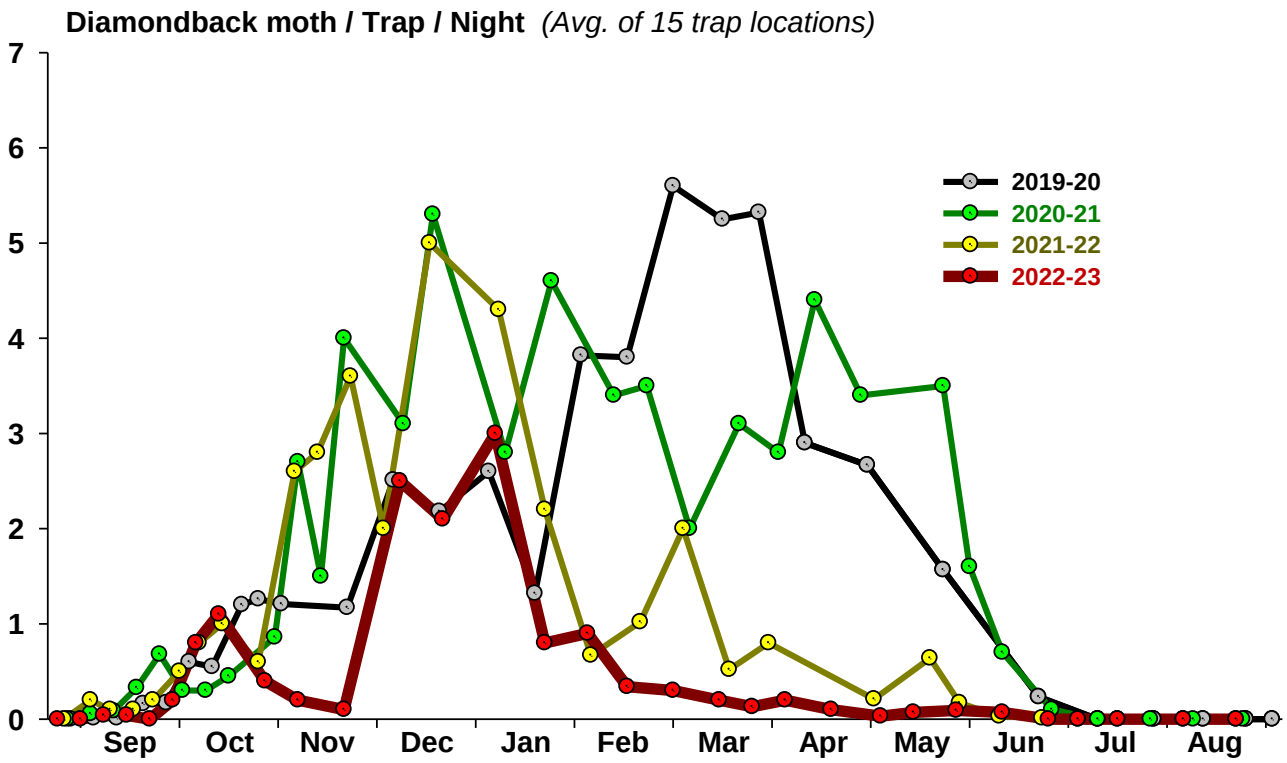

Cabbage looper Moths / Trap / Night (Avg. of 16 trap locations)
0
10
20
30
40
50
60
70
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26
2013-14
2014-15
2015-16
2016-17
2017-18
2018-19
2019-20
2020-21
2021-22
2020-23



Cabbage looper (CL): CL moths were more active in fall 2022 than the previous two fall growing seasons. They peaked in October as is normal, but quickly declined in November with the unusually cool weather experienced this past winter. PCA's reported a lower abundance of CL during the fall, except for an early infestation occurring in early October. CL larval populations more active in the late spring and virtually disappear during the summer.

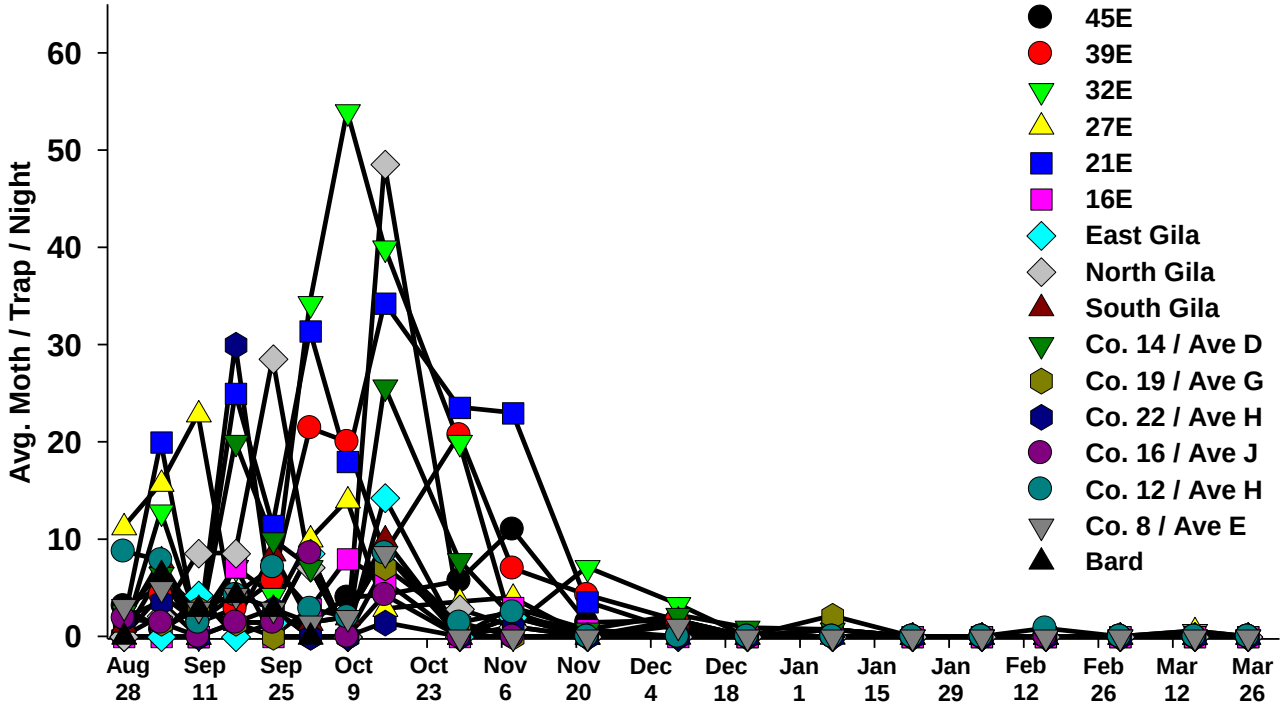

Diamondback moth
Avg. Moth / Trap / Night
0
2
4
6
8
10
12
Aug 28
Sep 11
Sep 25
Oct 9
Oct 23
Nov 6
Nov 20
Dec 4
Dec 18
Jan 1
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26
45E
39E
32E
27E
21E
16E
East Gila
North Gila
South Gila
Co. 14 / Ave D
Co. 19 / Ave G
Co. 22 / Ave H
Co. 16 / Ave J
Co. 12 / Ave H
Co.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


Diamondback moth / Trap / Day (Avg. of 16 trap locations)
0
2
4
6
8
10
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
2017-18
2018-19
2019-20
2020-21
2021-22
2022-23

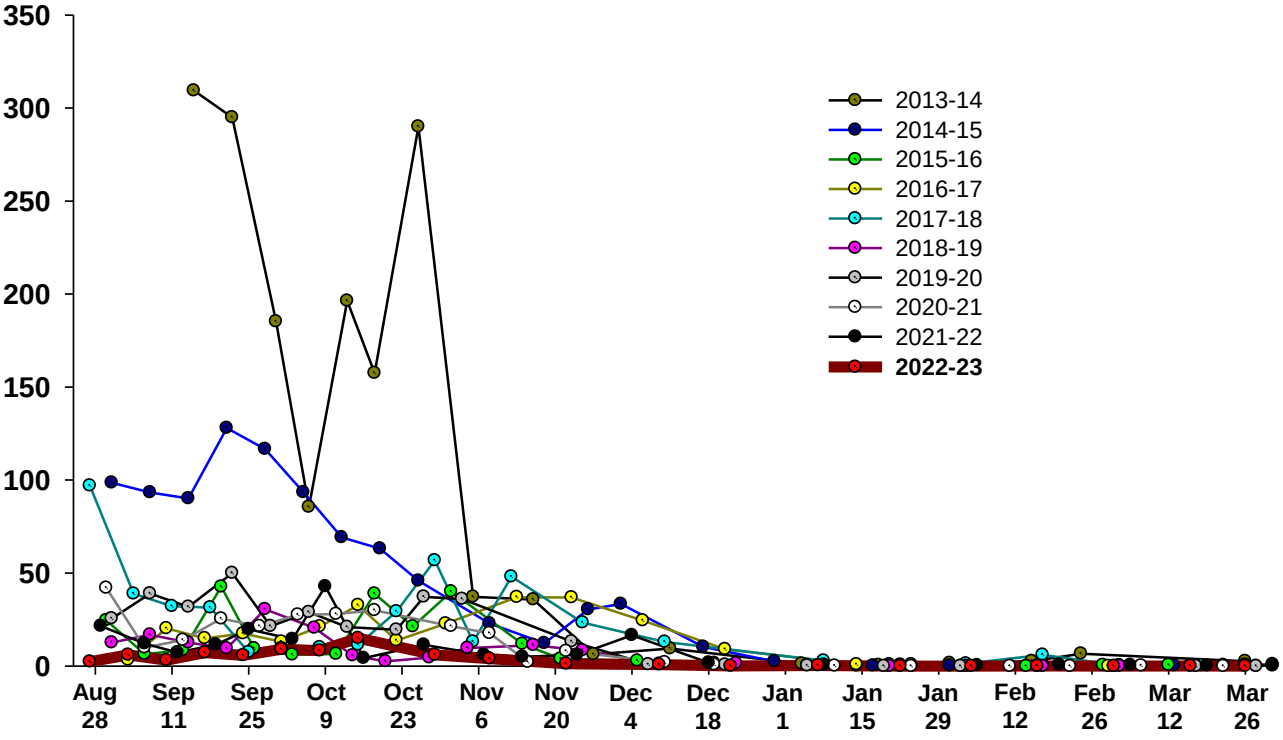


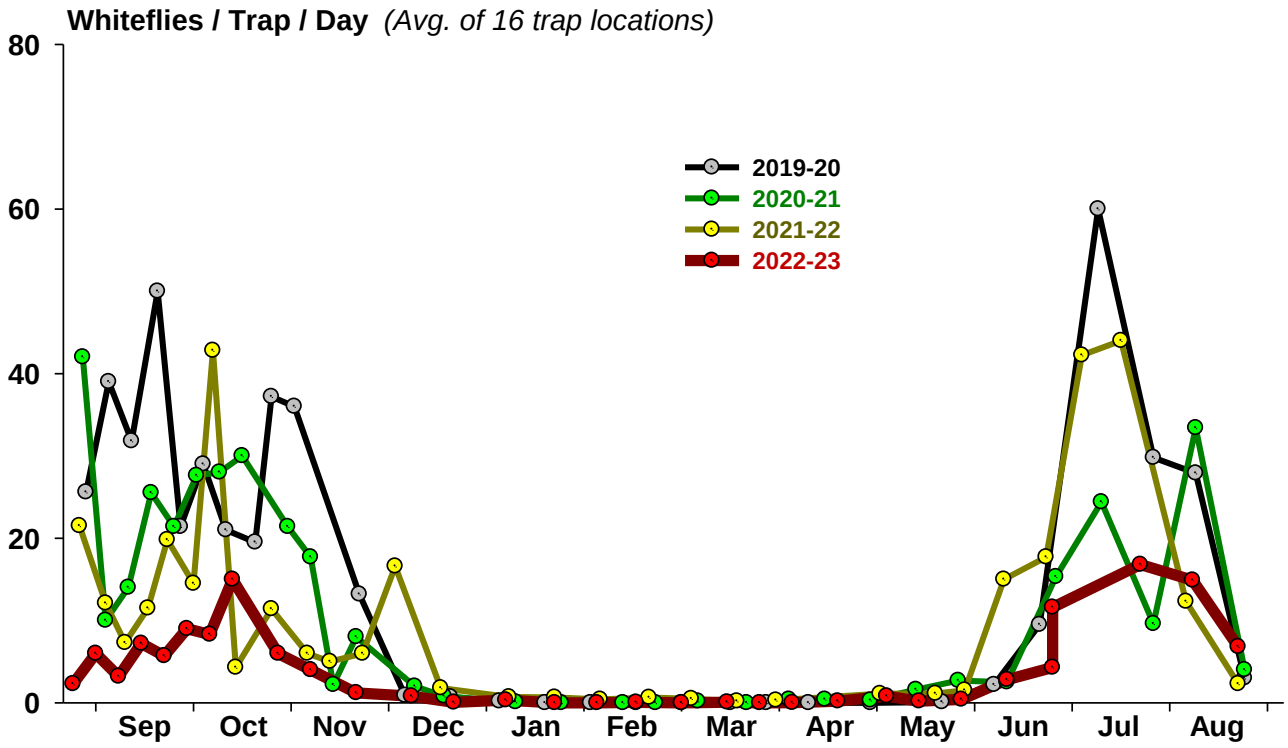
Diamondback moth (DBM) moths became evident in mid-October, followed by reports of DBM larvae infesting area brassica crops in November. Similarly, DBM moth counts peaked in January, and reports of field infestation of larvae in March. Populations of both moths and larvae occurred in the Wellton/dome Valley areas. DBM disappear in the summer due to the lack of brassicas crop and weed host, only to reappear in the fall on transplants and carried into valleys on remnants of hurricanes and tropical storms originating in Mexico.

Whiteflies



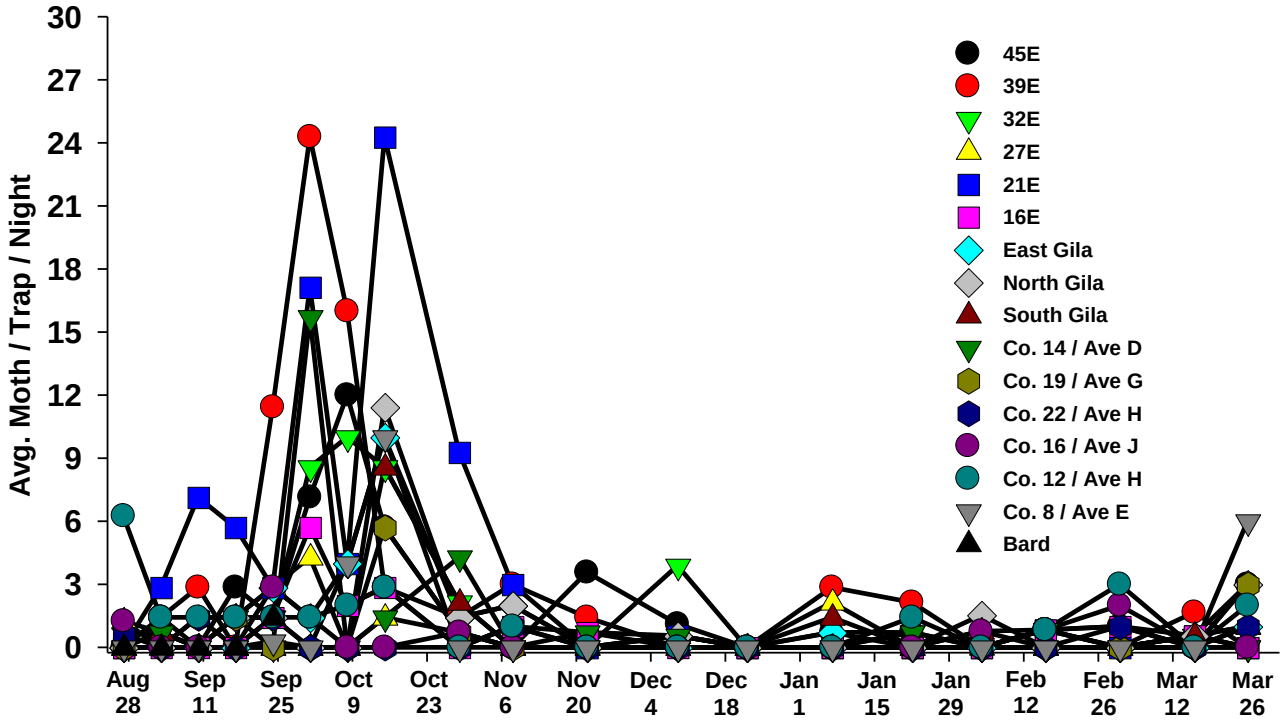
Whiteflies / Trap / Day *(Avg. of 16 trap locations)*



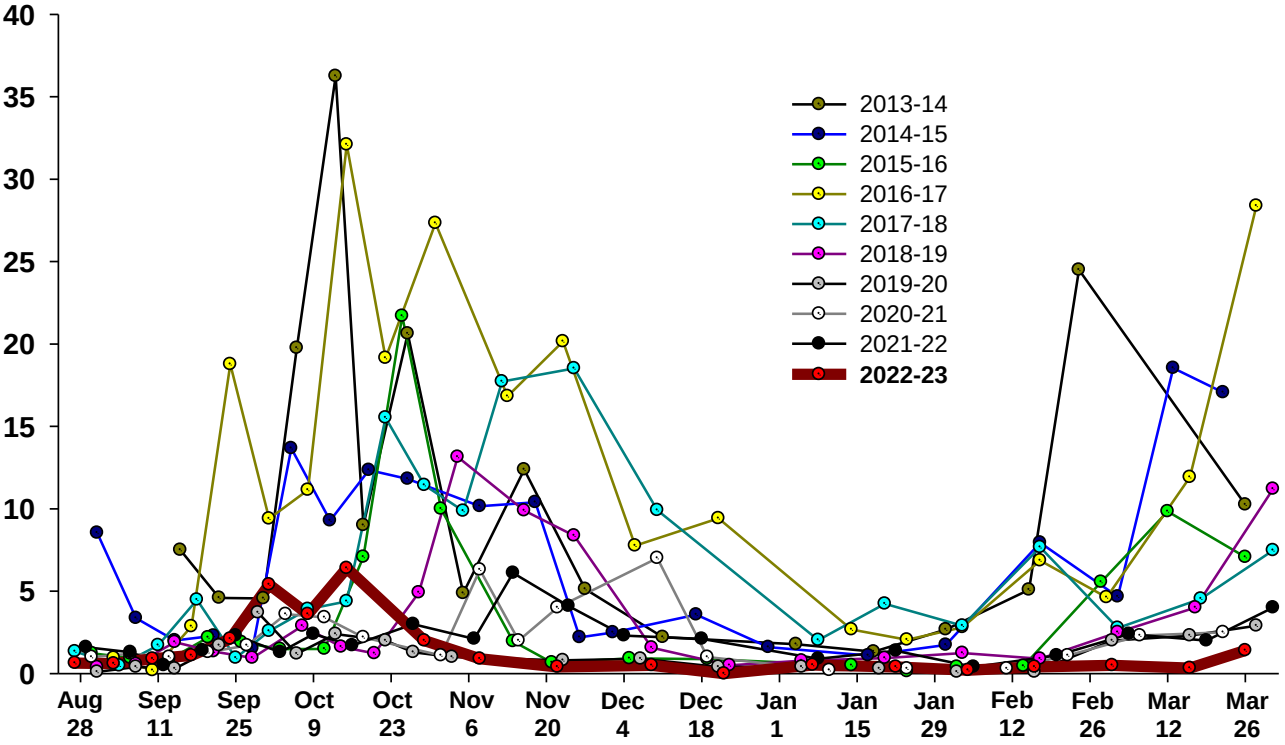


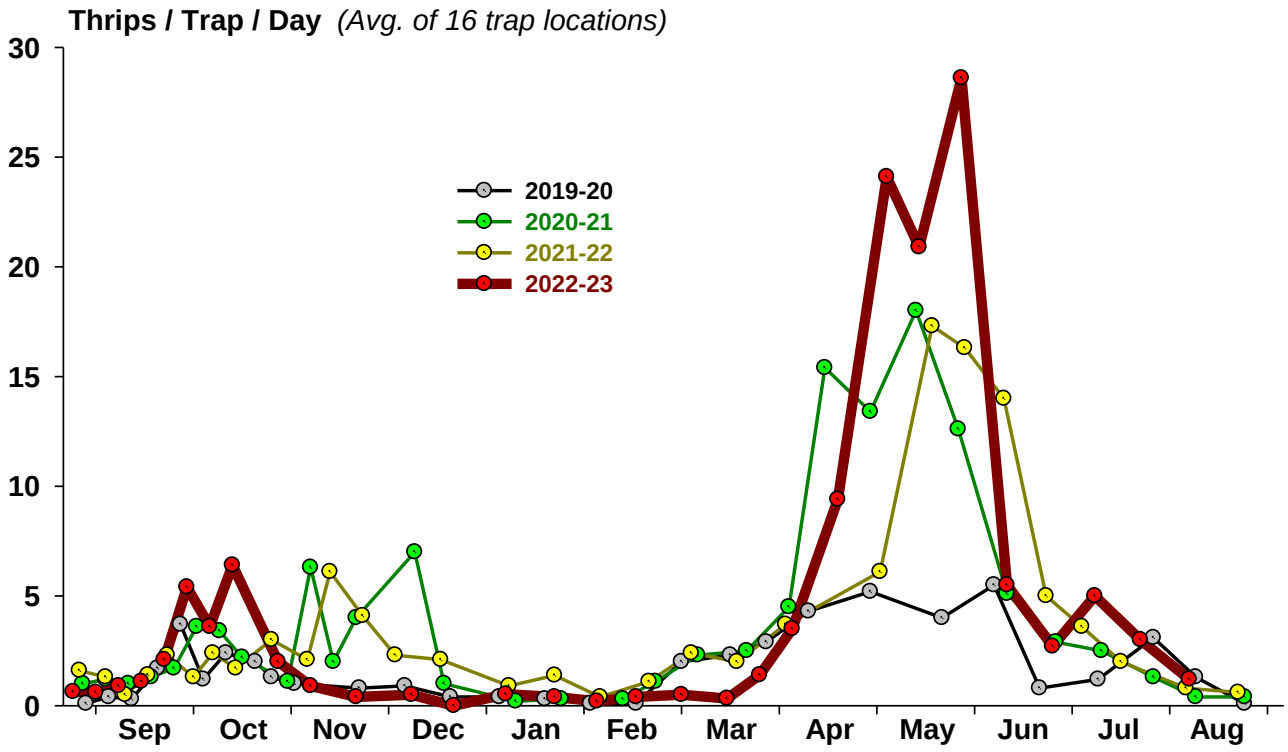
Sweetpotato Whitefly: Whitefly movement is greatest during the fall when adults are migrating out of cotton, alfalfa and melons onto lettuce. In contrast, whitefly move very little during the spring. In 2022-23, whitefly movement was well below average throughout the year compared with the previous 9 growing seasons. Traps peaked in October this year, near recently harvested cotton, melon and alfalfa fields, particularly in Dome and Gila Valleys. Traps counts also coincide with PCA reports of light infestations in lettuce fields. Summer trapping shows that a second peak in movement occurred in July consistent with spring melon harvest and early cotton termination.

Western Flower Thrips



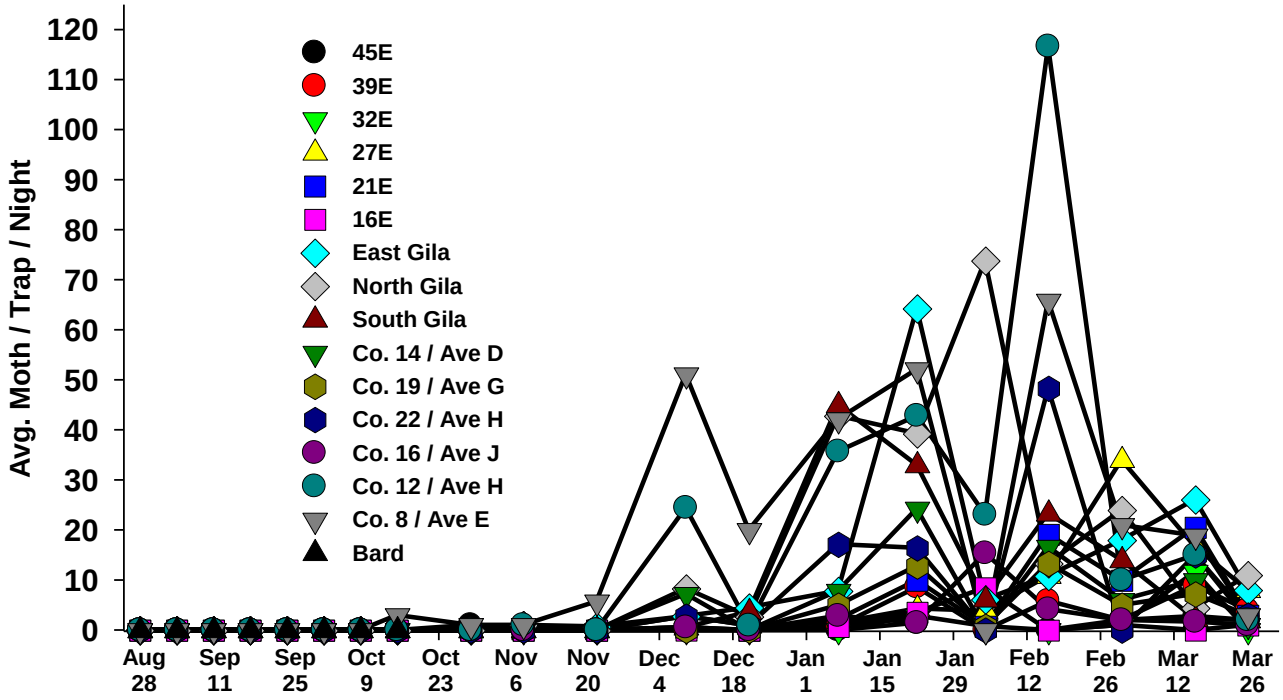
Thrips / Trap / Day *(Avg. of 16 trap locations)*



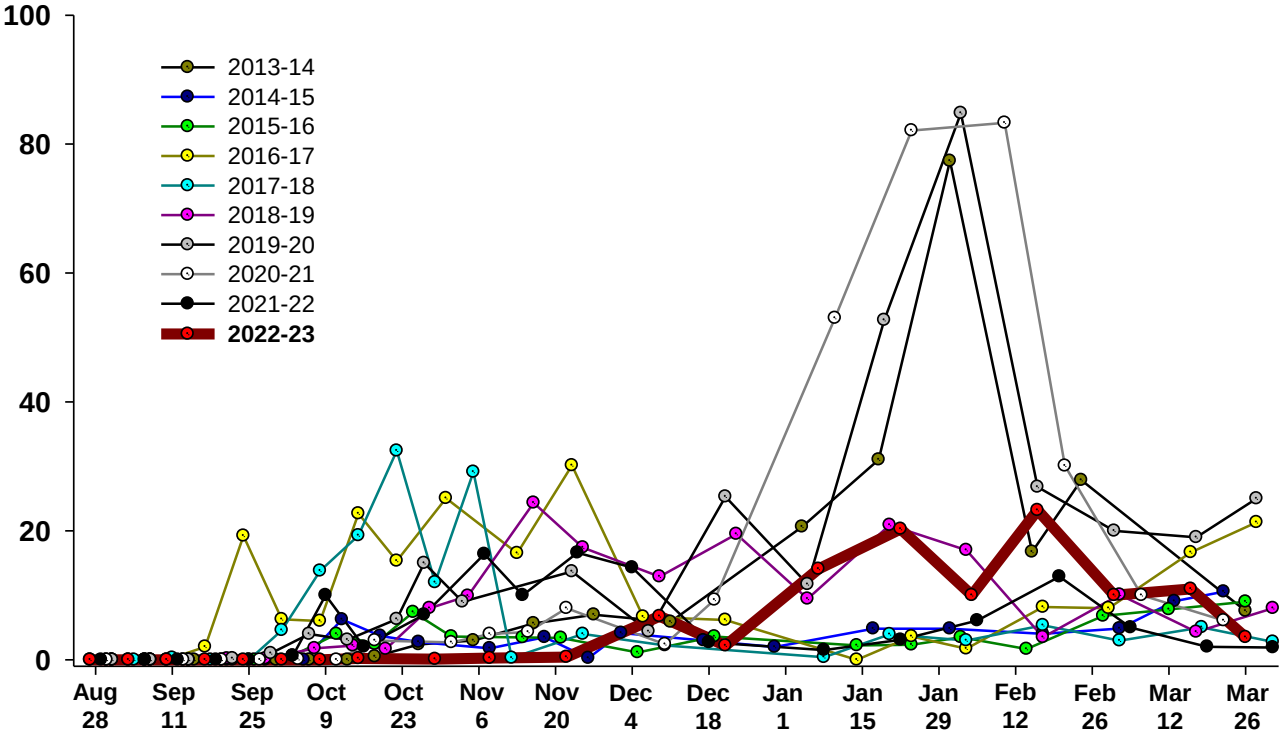


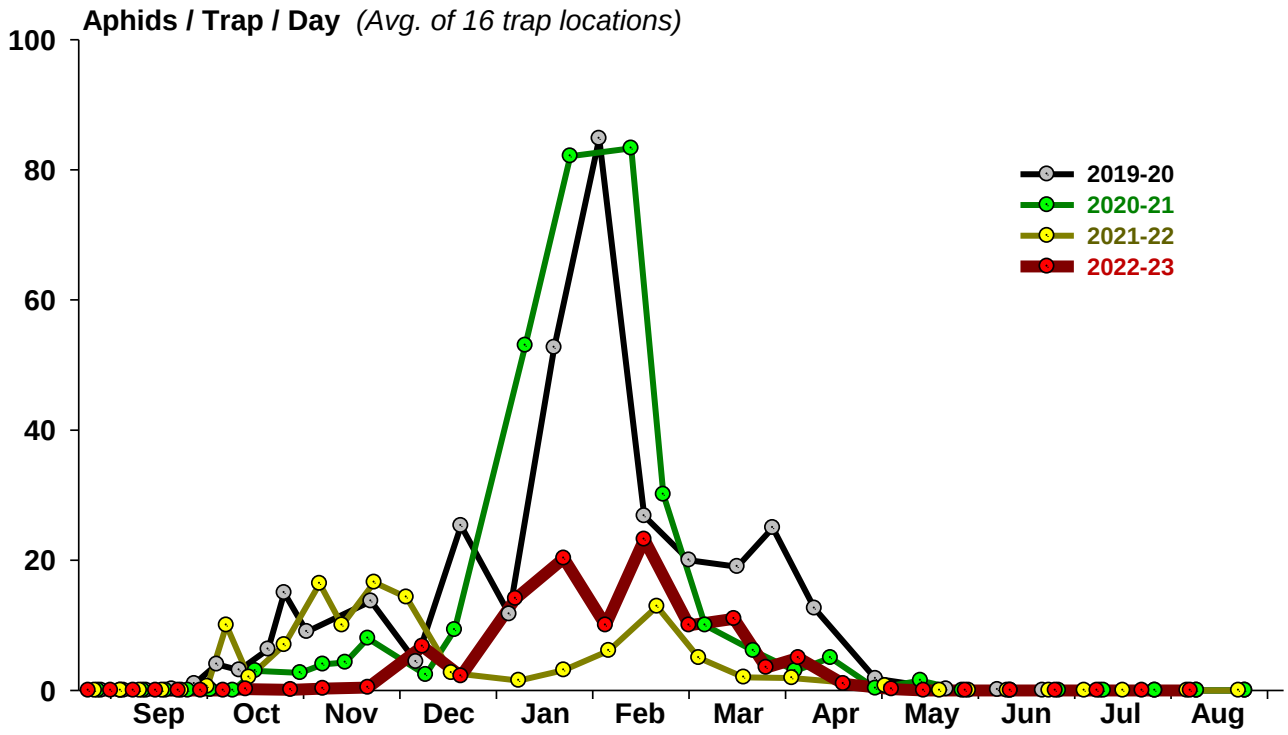
Western Flower Thrips: Based on previous observations, adult thrips tend to move primarily in October/November (from alfalfa, melons and cotton) and then again in Apr-May (with the reduction in produce acers). Thrips trap captures in 2022-2023 were well below average throughout the growing season. Activity was about average in the fall consistent with cooler temperatures. Activity in the spring was extremely light, consistent with the unusually cool weather we experienced through March . Summer trapping showed that annual thrips activity peaked in May-June, declining sharply for the duration of the summer.

Aphids



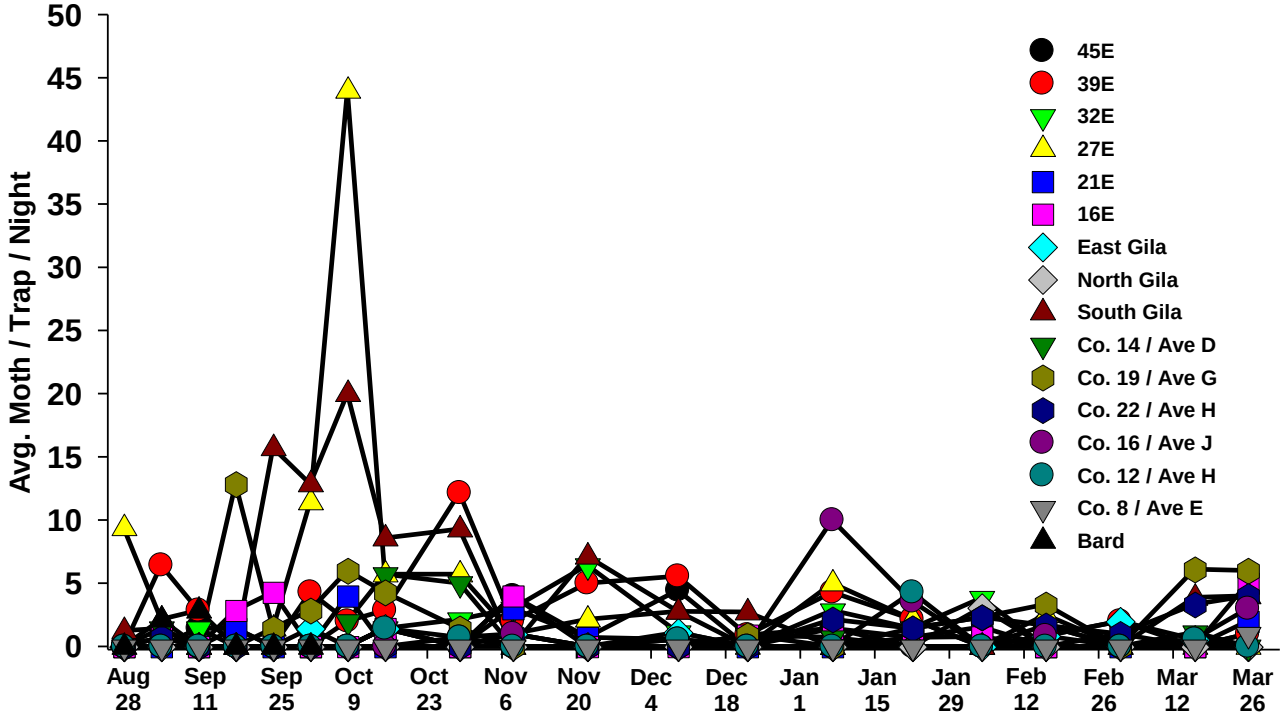
Aphids / Trap / Day *(Avg. of 16 trap locations)*

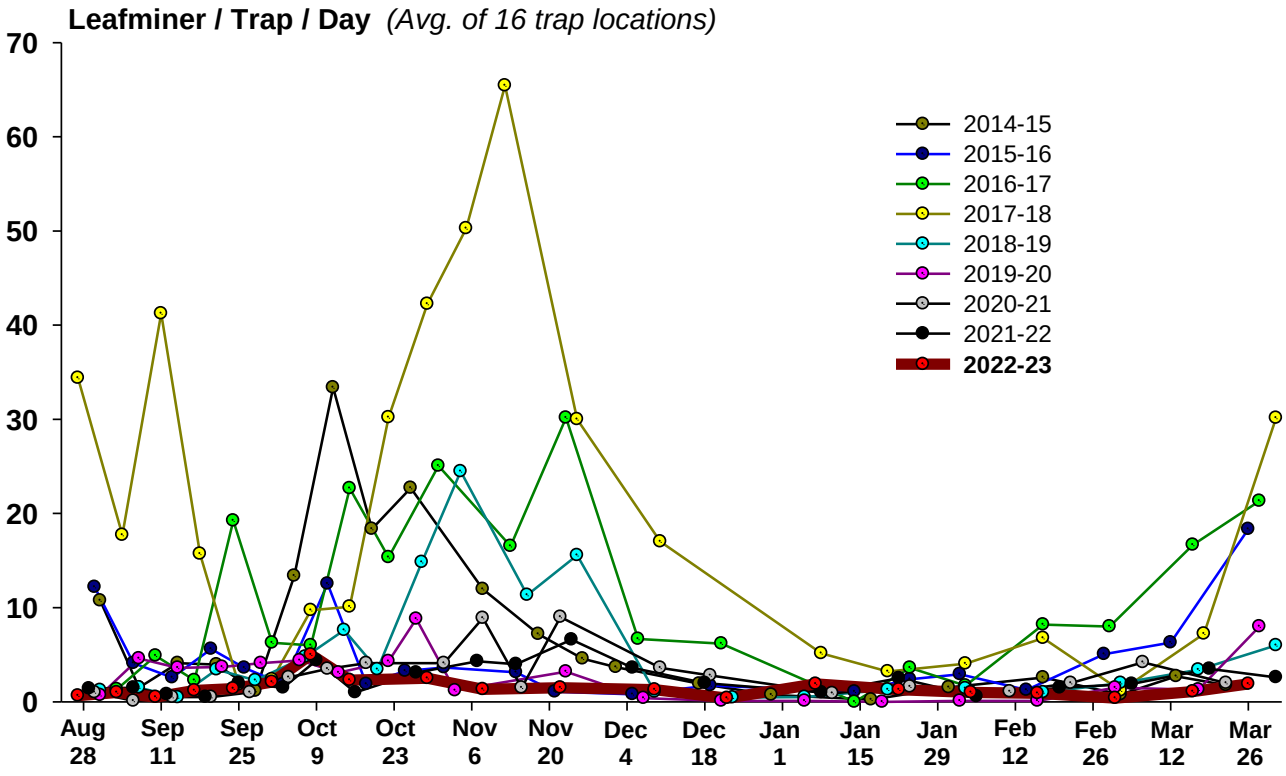


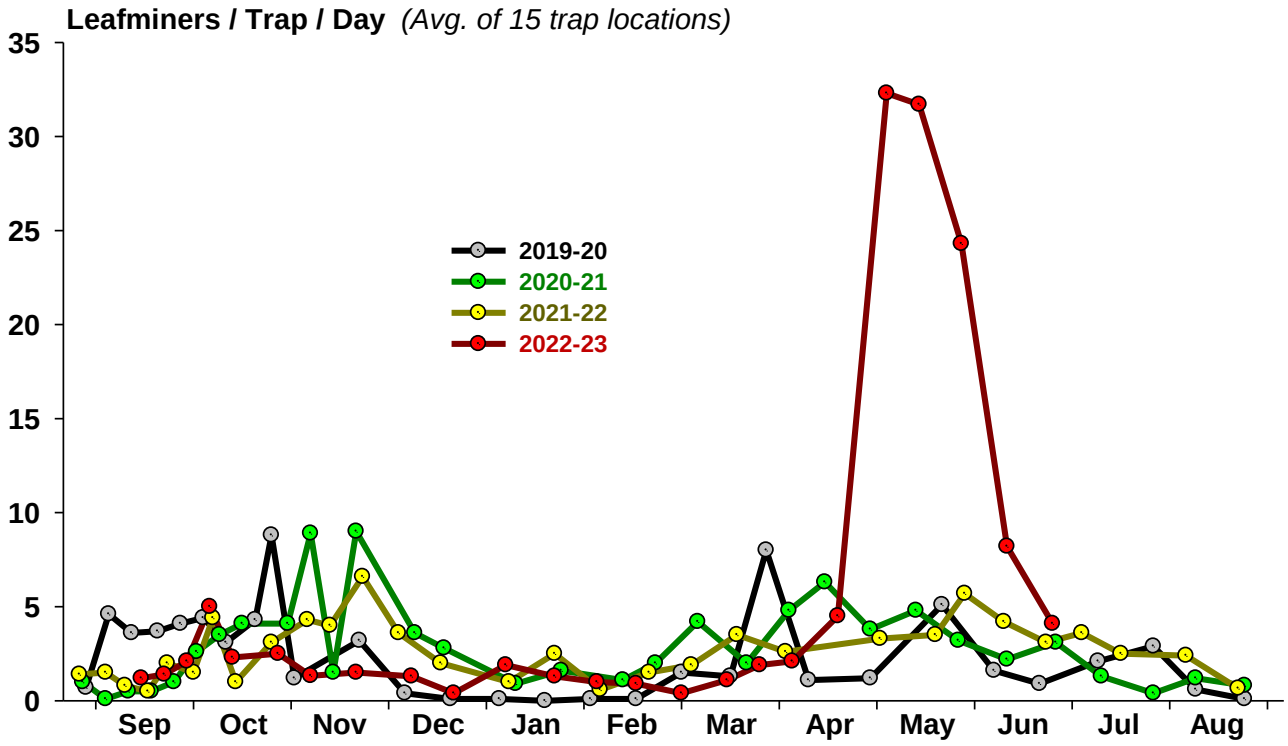


Aphids: Areawide, fall movement of aphids was slightly late fall 2022 compared with previous seasons, not increasing significantly until Dec. Aphid flights were about average during the winter, peaking in late-Feb, and consistent with cooler and drier weather conditions. This is likely why aphid colonization 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
50
45
40
35
30
25
20
15
10
5
0
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


Leafminer / Trap / Day (Avg. of 16 trap locations)
70
60
50
40
30
20
10
0
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
2014-15
2015-16
2016-17
2017-18
2018-19
2019-20
2020-21
2021-22
2022-23



***Liriomyza* Leafminers:** Leafminer adult activity was below average for most of last season, likely a reflection of the cooler fall temperatures. Overall, leafminer activity was as low as we've observed in the past 10 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. Leaffminer counts peajed in May following the produce season. The heavy use of product such as Radiant, Coragen, and Minect Pro, which are used for worm and whitefly control in produce crops, have excellent control of leafminers and likely contributed to the low abundance the past few years.