

The USDA logo is located in the top left corner. It consists of the letters "USDA" in a bold, blue, serif font. Below the text are three horizontal green lines of varying lengths, creating a stylized wave or field effect. The entire logo is set against a white rectangular background.

USDA

The background of the slide is a close-up photograph of a pecan leaf. The leaf is mostly green but has a large, irregularly shaped area on the left side that is yellowed and shows signs of damage, likely from an aphid infestation. A small, dark, oval-shaped insect, the Black Pecan Aphid, is visible on the leaf's surface near the center. The leaf's veins are clearly visible, and the overall texture is detailed.

A Management Strategy for the Black Pecan Aphid

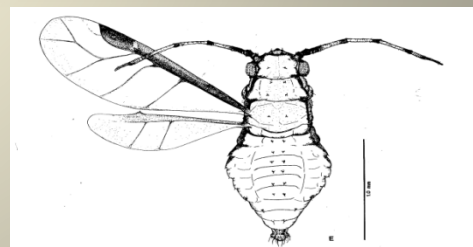
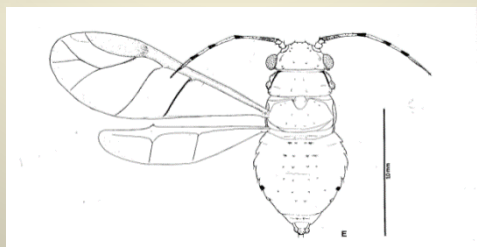
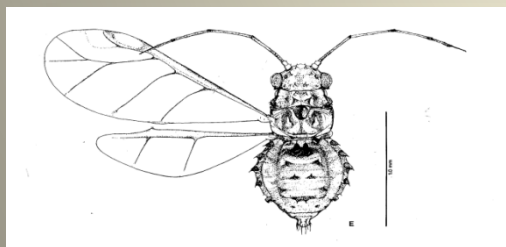
Ted E. Cottrell

**USDA, Agricultural Research Service
Southeastern Fruit & Tree Nut Research Laboratory
Byron, GA**

Aphids that Feed on Pecan Foliage

‘Black Aphid’

‘Yellow Aphids’



**Black Pecan Aphid
(BPA)**

**Yellow Pecan Aphid
(YPA)**

**Blackmargined Aphid
(BMA)**

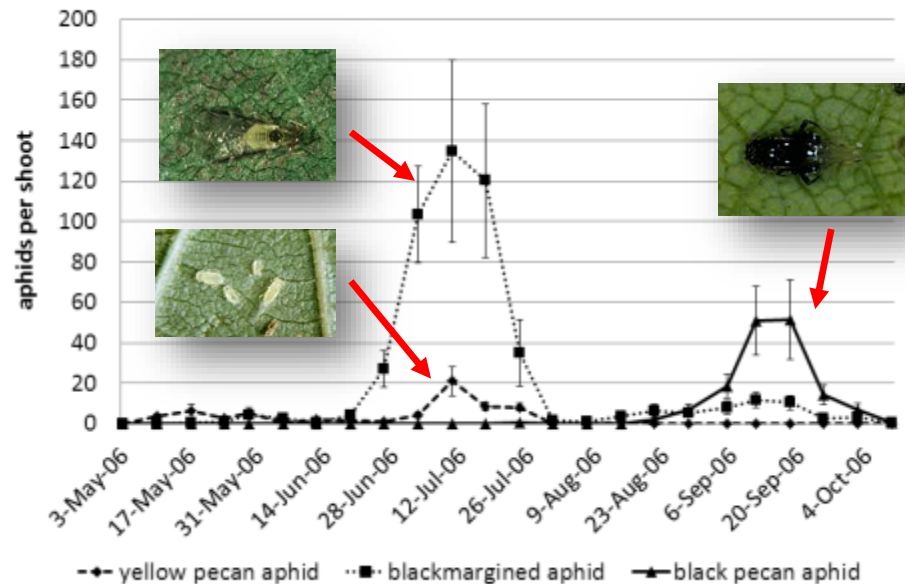
Seasonal Abundance of Aphids

Before mid-July:

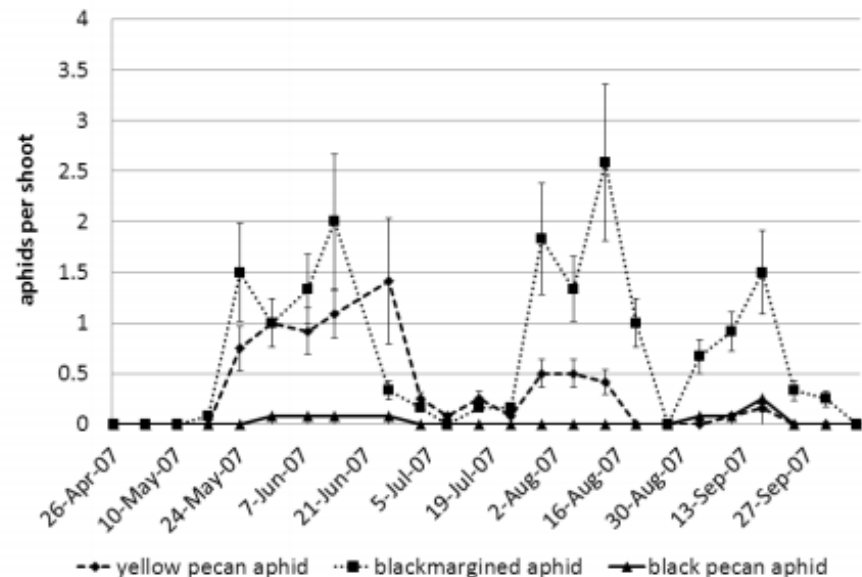
If you have a population of ‘yellow’ pecan aphids, you rarely have black pecan aphid issues at that time.

Beware - low populations of ‘yellow’ aphids before mid-July can lead to early black pecan aphid problems, especially on susceptible cultivars.

(a) Aphid and aphidophaga counts on shoot samples in the 2006 season.



(b) Aphid and aphidophaga counts on shoot samples in the 2007 season.



Seasonal Abundance of Aphids and Aphidophagous Insects in Pecan

James D. Dutcher^{1*}, Haider Karar² and Ghulam Abbas³

Insects 2012, 3, 1257-1270; doi:10.3390/insects3041257

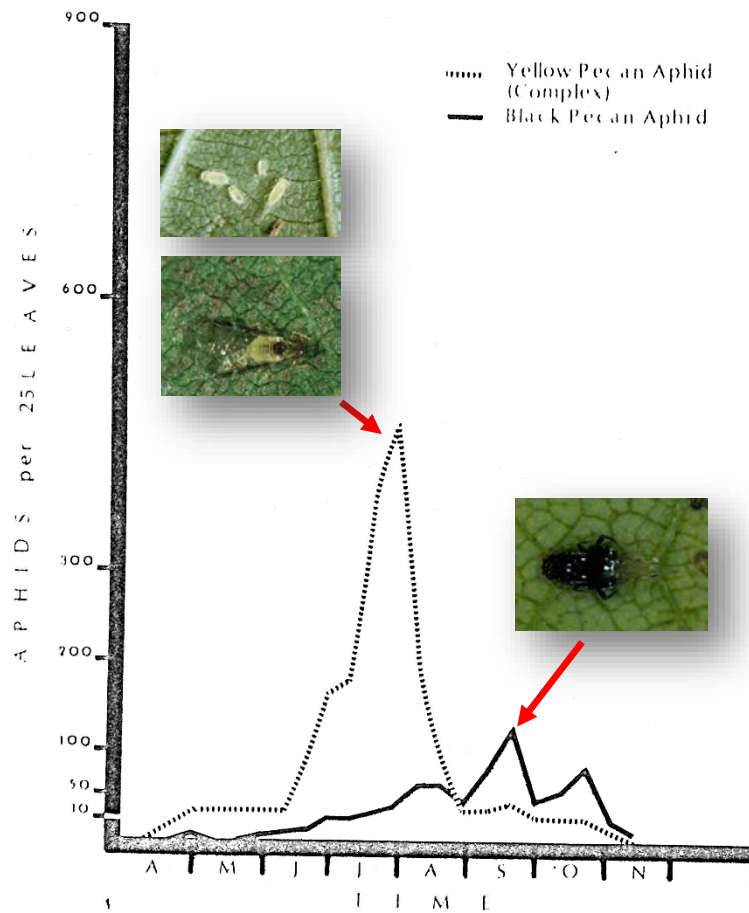


FIGURE 1. Pecan aphids population fluctuations in a neglected orchard in the College Station area. The figure represents the average of two tree samples.

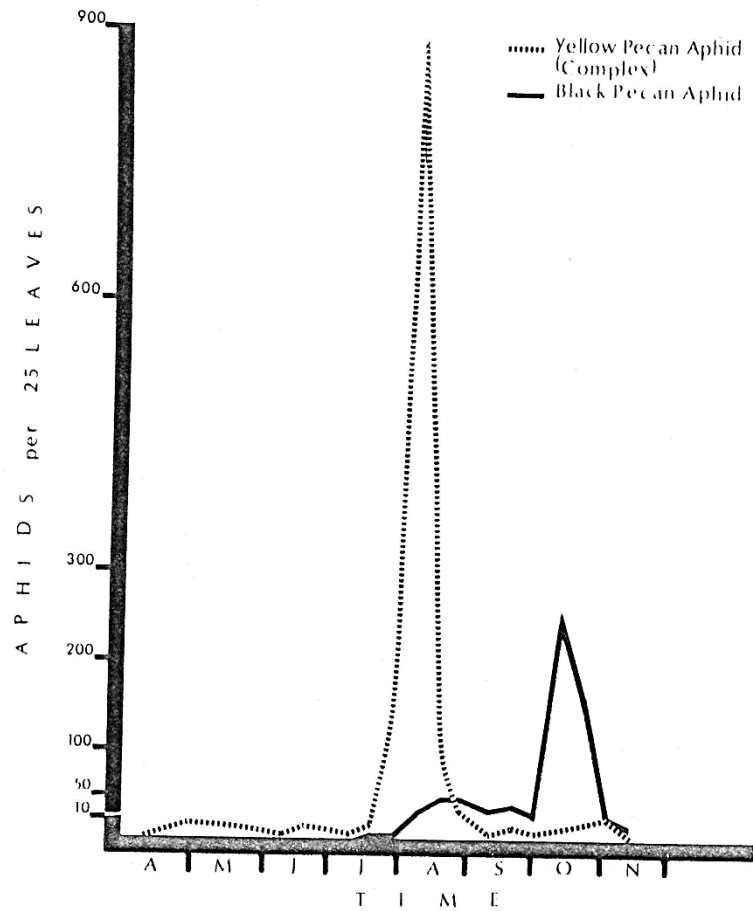


FIGURE 2. Pecan aphids population fluctuations in yard trees in the College Station area. The figure represents the average of three tree samples.

Seasonal Trends of Pecan Aphid Populations

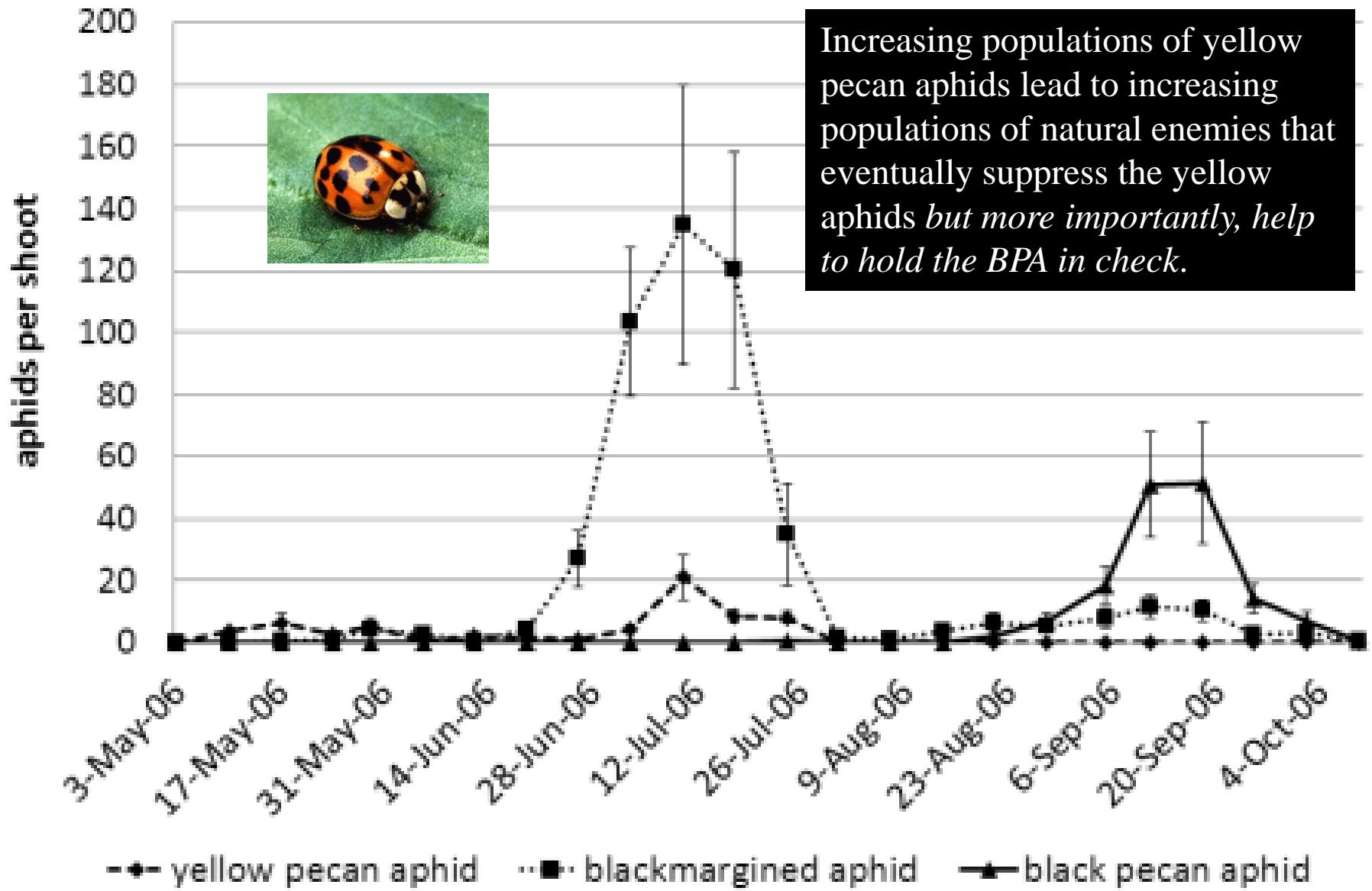
R. Flores-Flores and H.W. VanCleave

1975 Proceedings of the TPGA

Pecan Aphids – Seasonal Populations



Increasing populations of yellow pecan aphids lead to increasing populations of natural enemies that eventually suppress the yellow aphids *but more importantly, help to hold the BPA in check.*



Natural Enemies of Aphids

Lady Beetles



Natural Enemies of Aphids

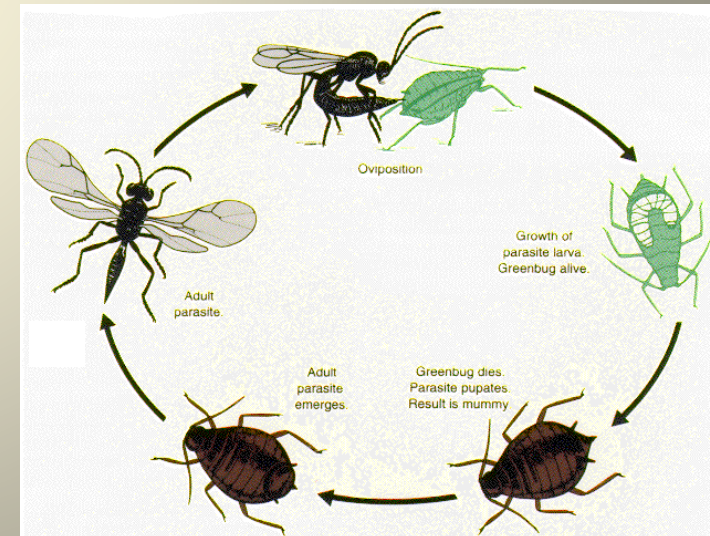
Lacewings

Images courtesy of numerous photographers (Bugwood.org)



Natural Enemies of Aphids

Images courtesy of numerous photographers (Bugwood.org)

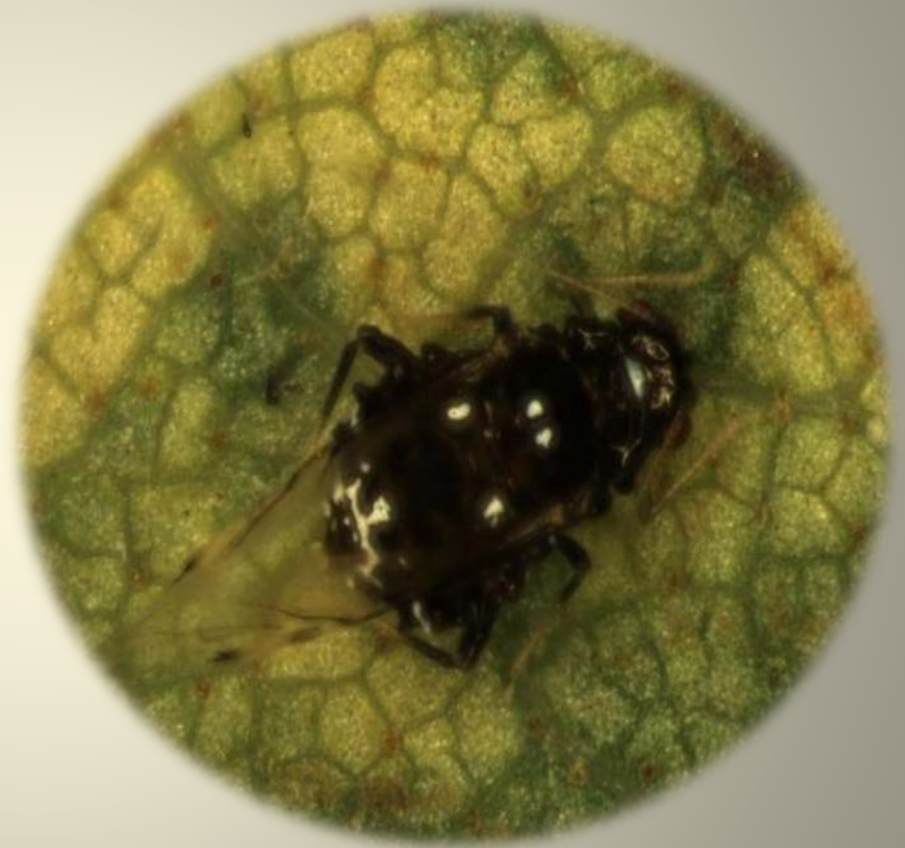


Managing the Black Pecan Aphid

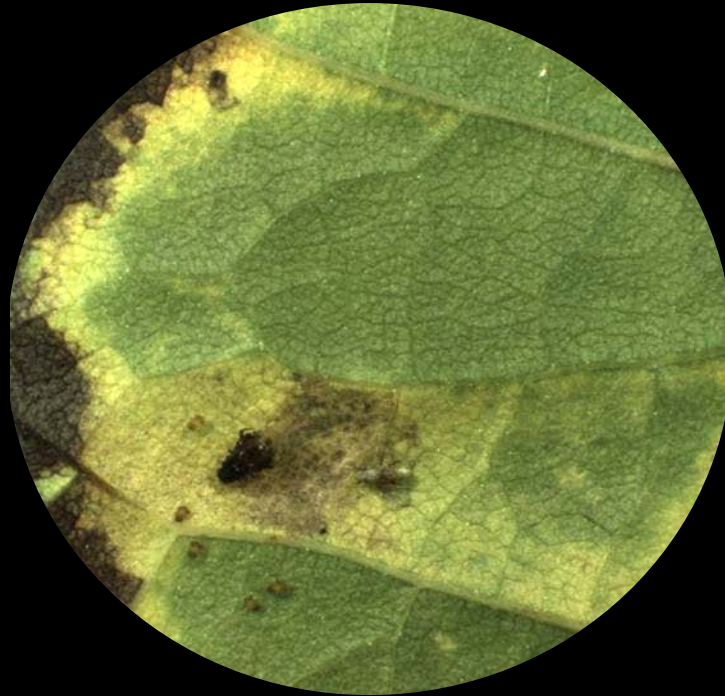
Leaf damage is not just a symptom of BPA feeding.

The black pecan aphid must elicit these yellow feeding spots in order to feed!

Prevent the development of these yellow feeding spots and you've interrupted the expected biological cycle of the aphid.

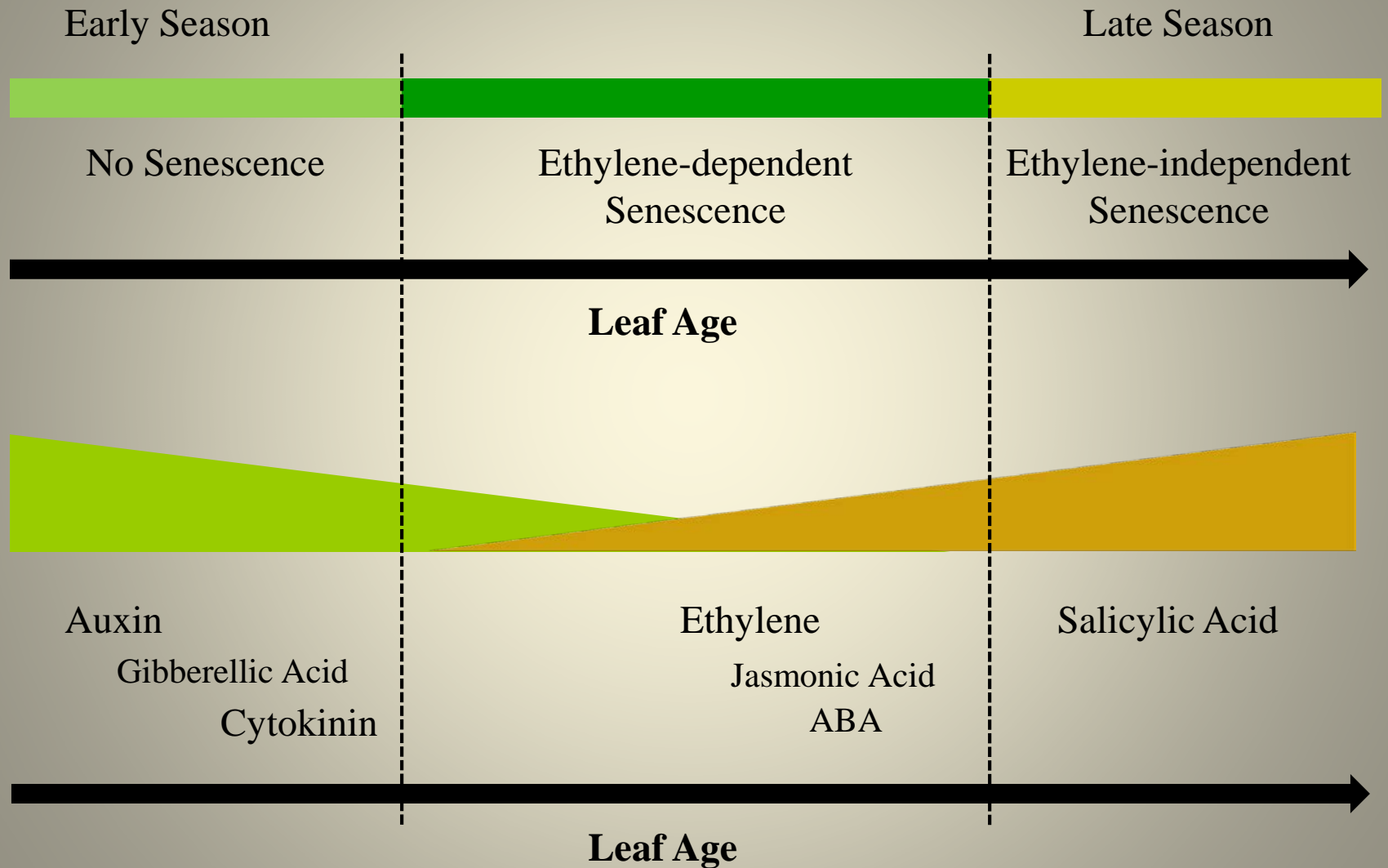


Importance of Leaf Chlorosis on Black Pecan Aphid Development and Survival.



Black pecan aphid-induced chlorosis: 1st instar to Adult

Seasonal Life of a Leaf Leading to Senescence



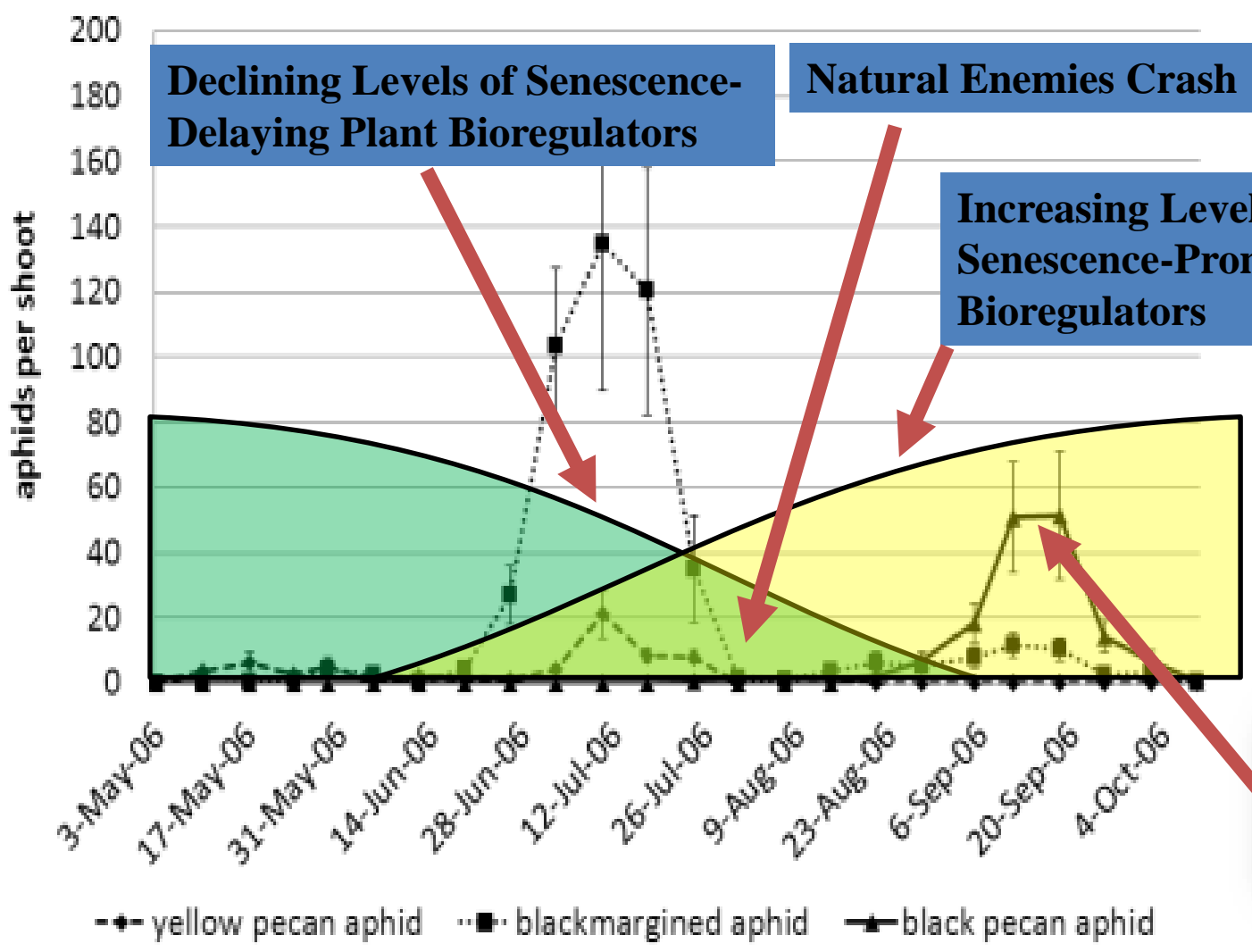
Senescence Retarding Bioregulators

Senescence Promoting Bioregulators

Seasonal Abundance of Aphids and Aphidophagous Insects in Pecan

James D. Dutcher ^{1*}, Haider Karar ² and Ghulam Abbas ³

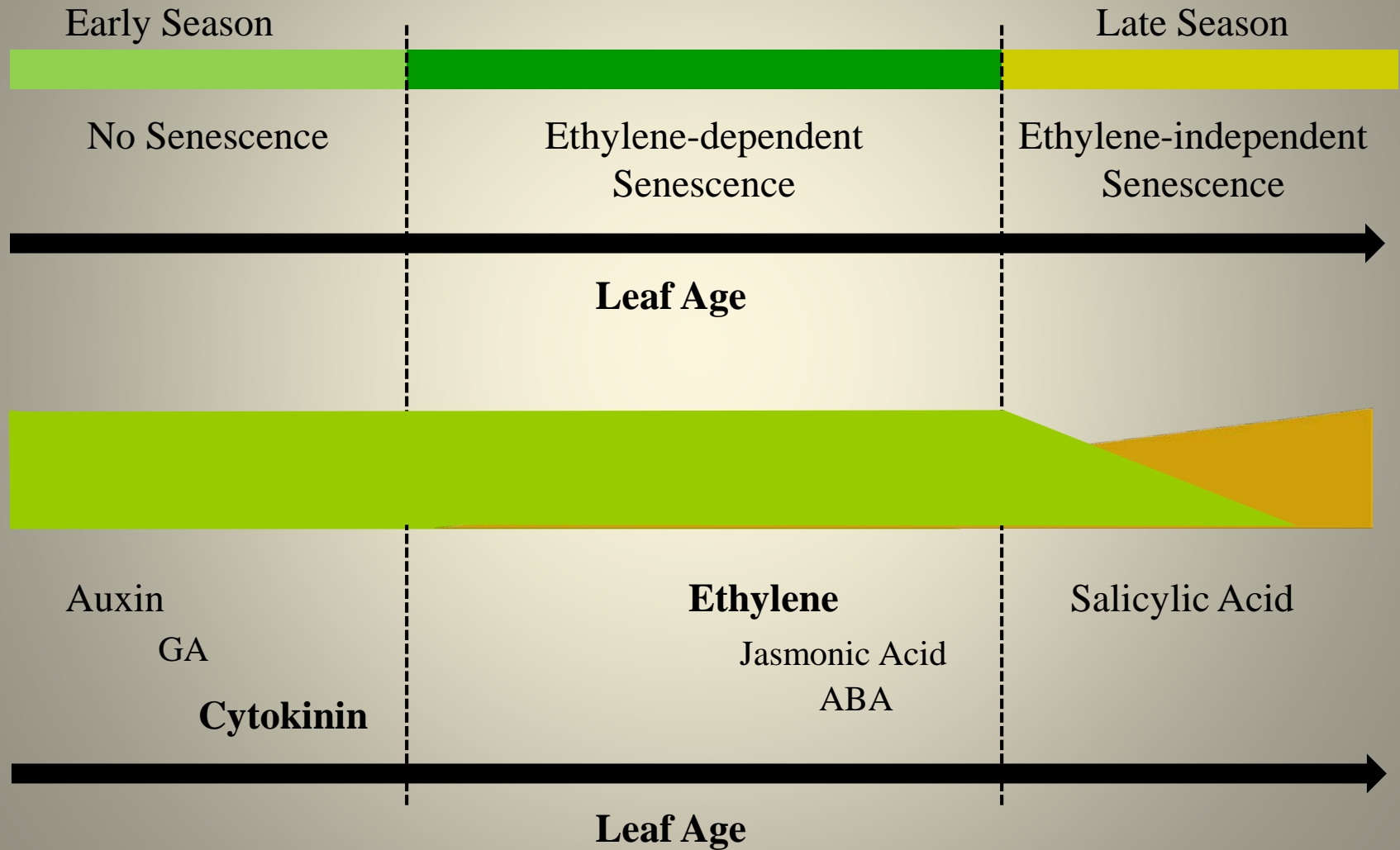
Insects 2012, 3, 1257-1270; doi:10.3390/insects3041257



Pecan Foliage is Primed for BPA to Explode

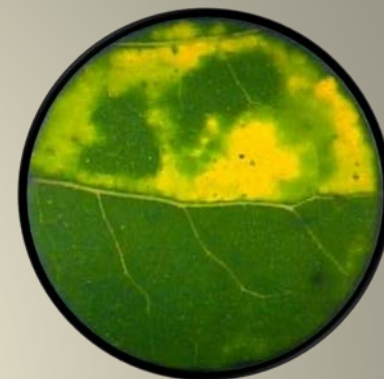


If levels of senescence-delaying hormones remained higher for a longer period, would the BPA's ability to elicit chlorotic feeding injury be impacted? YES!!!!



2016 (similar in 2017) ProGibb LV Plus Orchard Study

Controlling the pecan weevil *AND* managing BPA

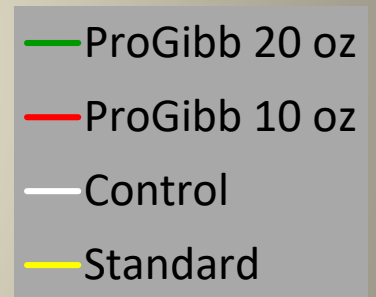
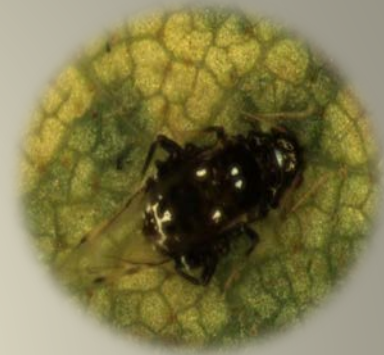
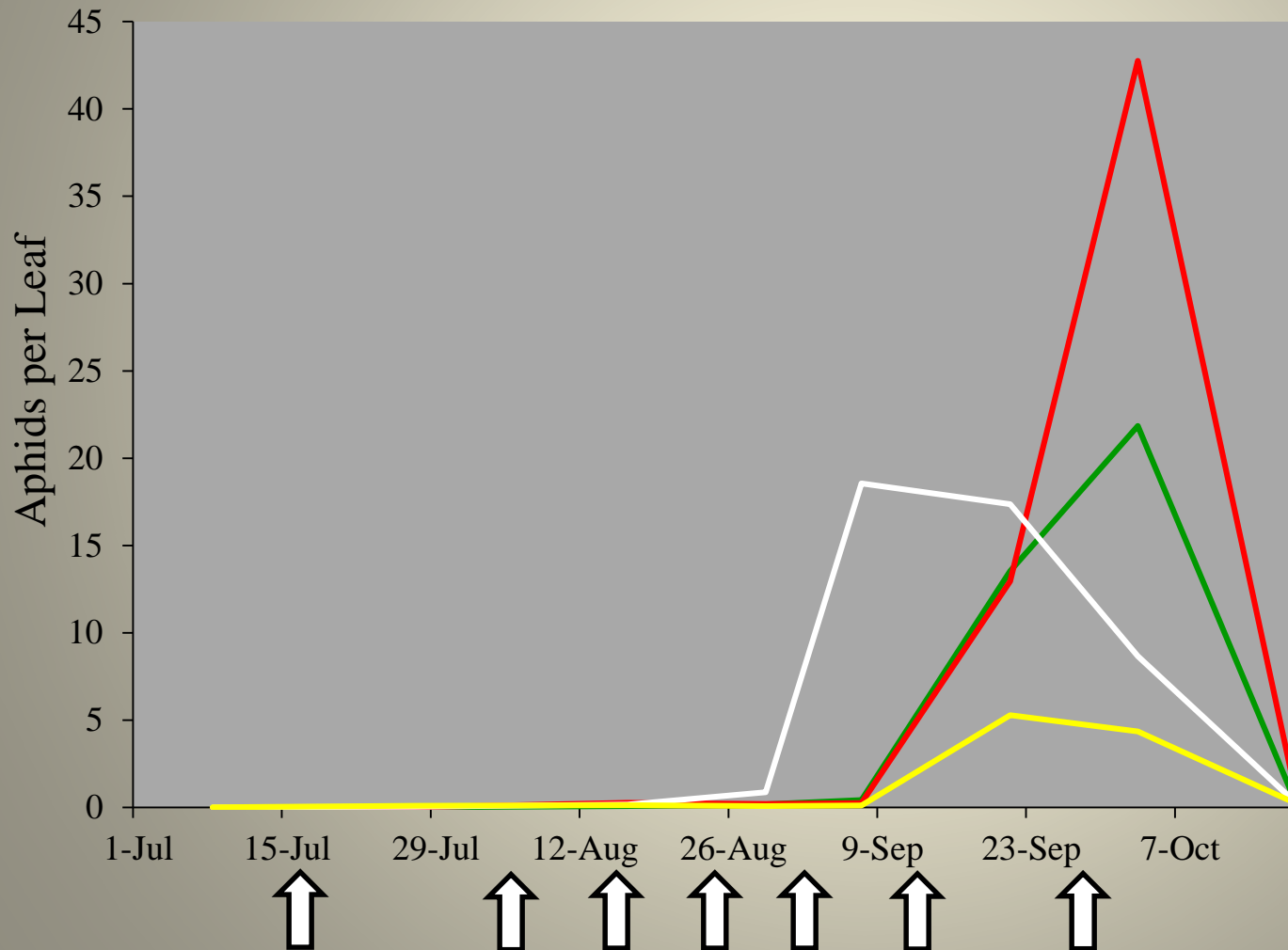


Treatments and Application Dates

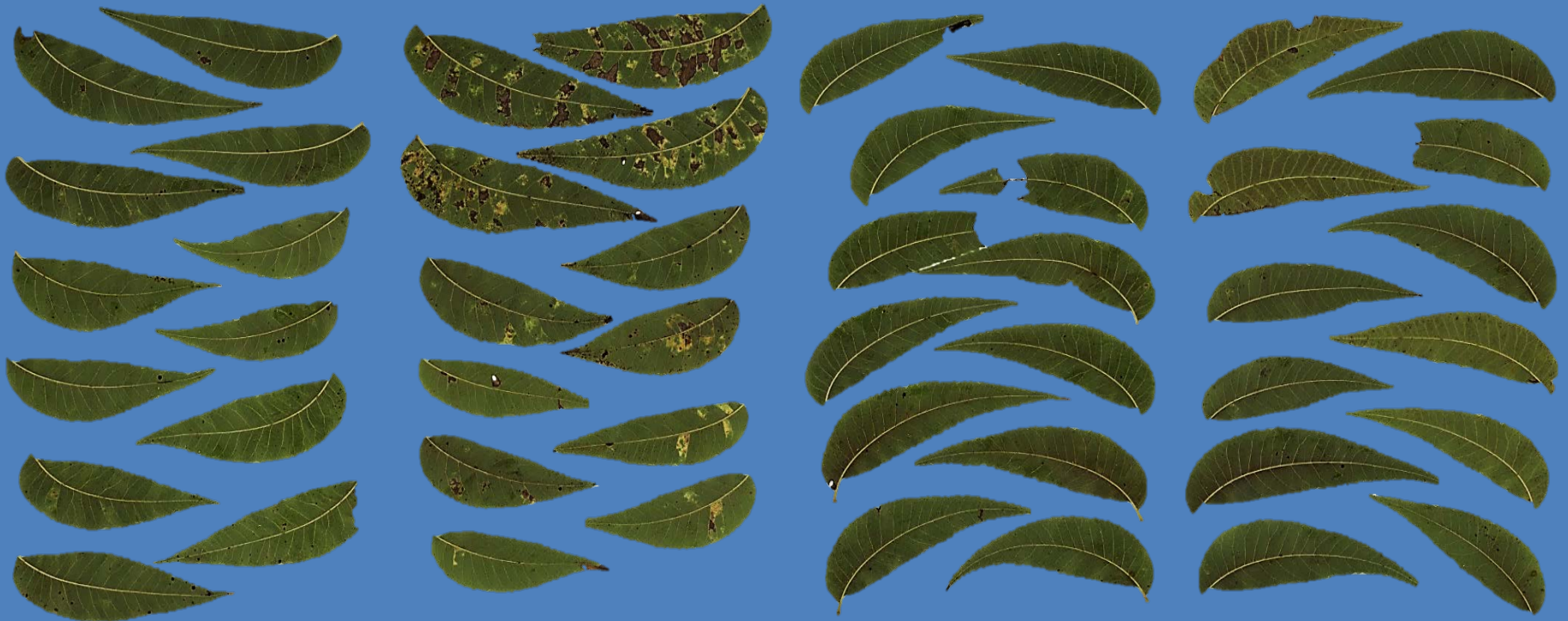
Trtmnt	Jul 15 & Aug 4	Aug 19	Aug 23	Aug 31	Sep 14	Sep 28
Standard	PG 10	Imdclprd 3oz Carbaryl 5qt	Floncmd 2.8oz Bifenthrn 6.4 oz	Imdclprd 3oz Carbaryl 5qt	Floncmd 2.8oz Bifenthrn 6.4 oz	Imdclprd 2.8 oz Abamectin 10 oz
ProGibb 10 oz rate	PG 10	PG 10 Carbaryl 5qt	PG 10 Bifenthrn 6.4 oz	PG 10 Carbaryl 5qt	PG 10 Bifenthrn 6.4 oz	PG 10 Abamectin 10 oz
ProGibb 20 oz rate	PG 10	PG 20 Carbaryl 5qt	PG 20 Bifenthrn 6.4 oz	PG 20 Carbaryl 5qt	PG 20 Bifenthrn 6.4 oz	PG 20 Abamectin 10 oz
Control	-	-	-	-	-	-

2016 ProGibb LV Plus Orchard Study

BPA Adults + Nymphs



BPA Injury with Gibberellic Acid (GA₃) = ProGibb LV Plus
leaf samples collected Sept. 14



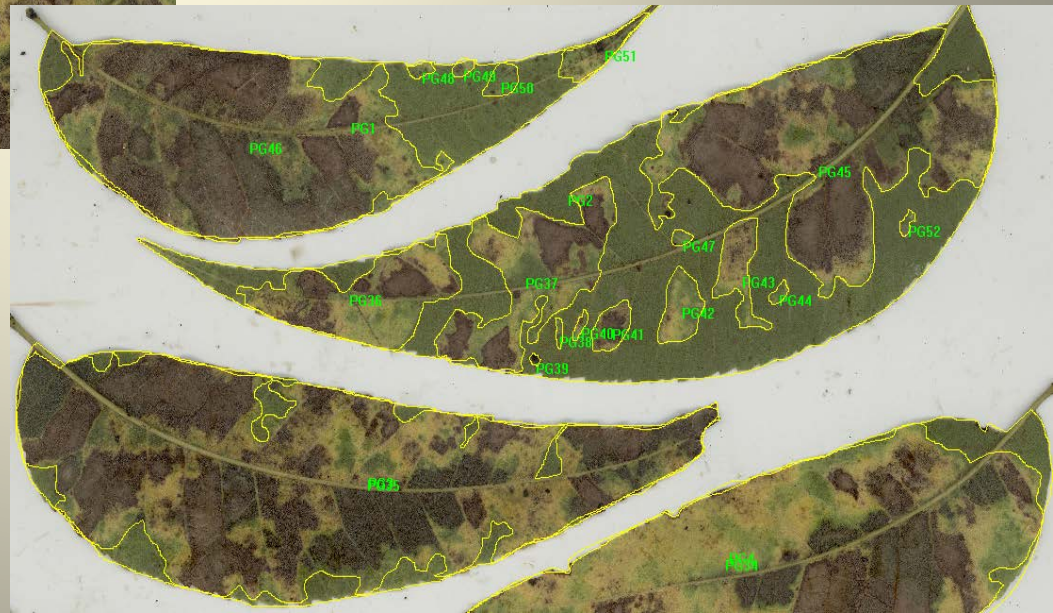
Standard

Control

ProGibb 10 oz

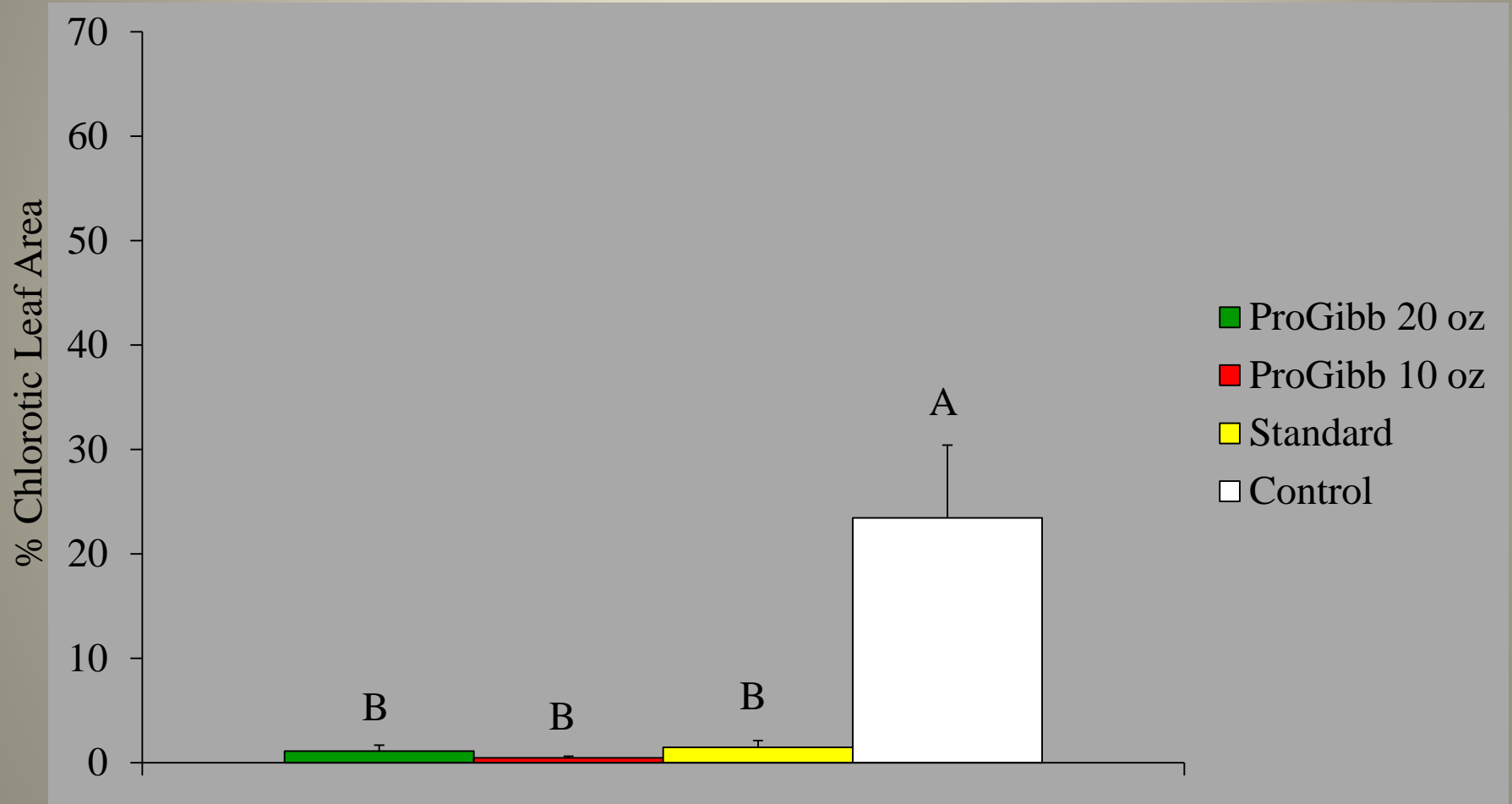
ProGibb 20 oz

Calculating Black Pecan Aphid Leaf Injury



% Chlorotic Leaf Area

September 14, 2016

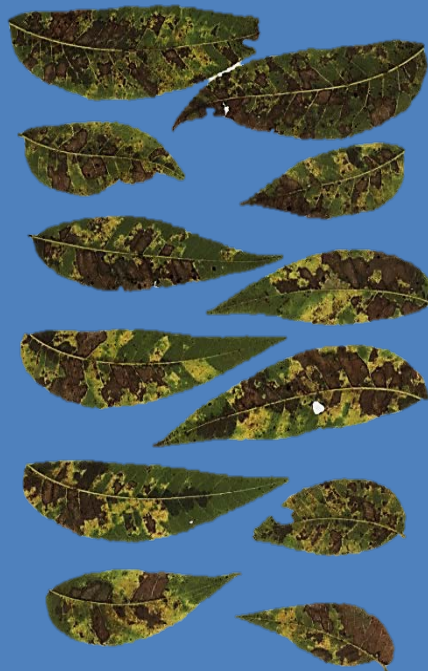


BPA Injury with Gibberellic Acid (GA₃)

leaf samples collected Oct. 5, 2016



Standard



Control



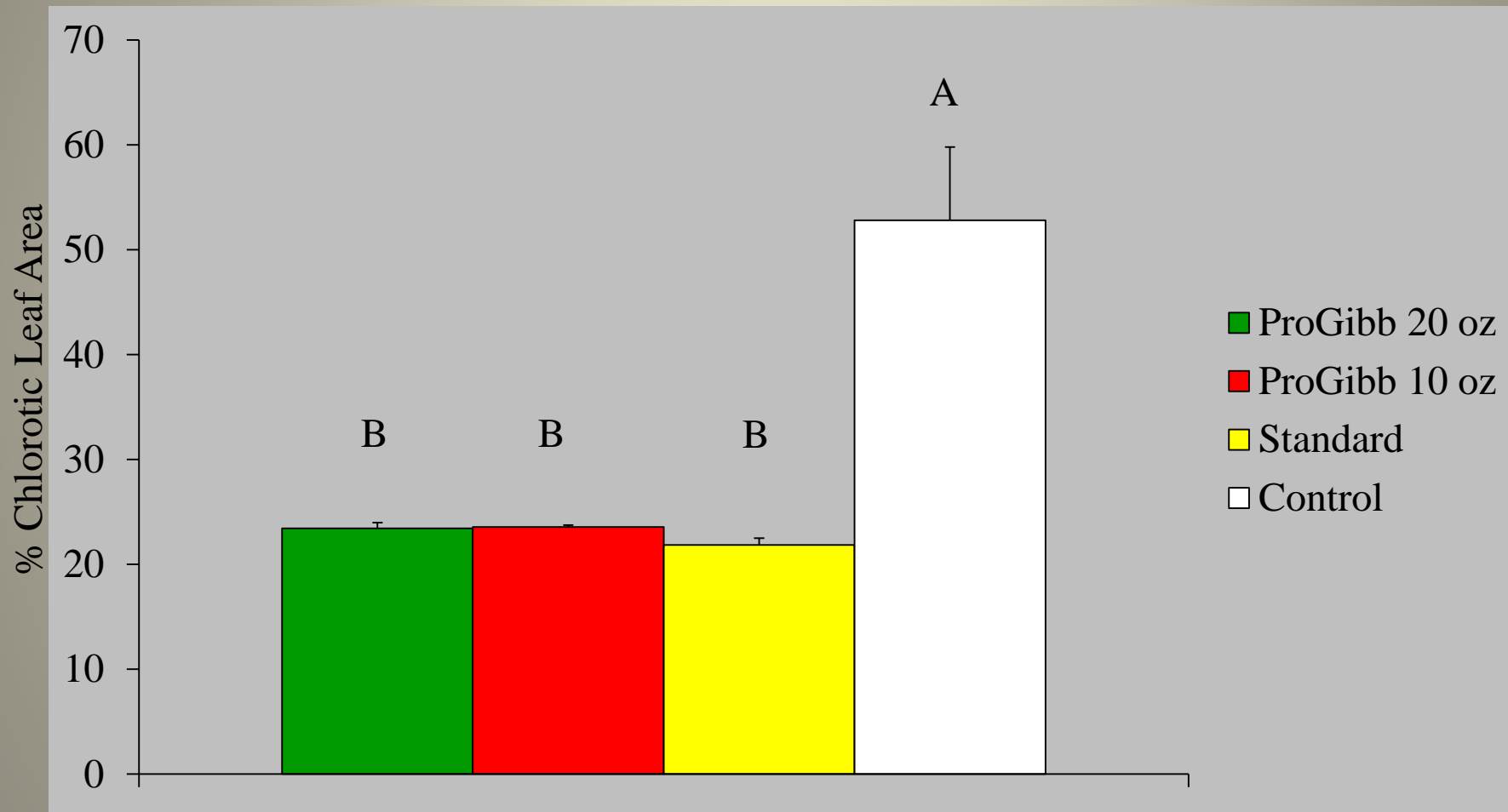
ProGibb 10 oz



ProGibb 20 oz

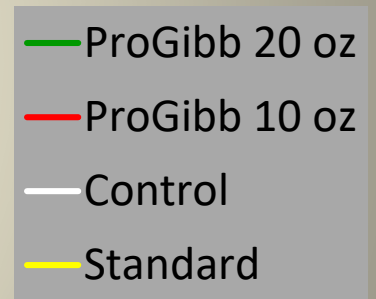
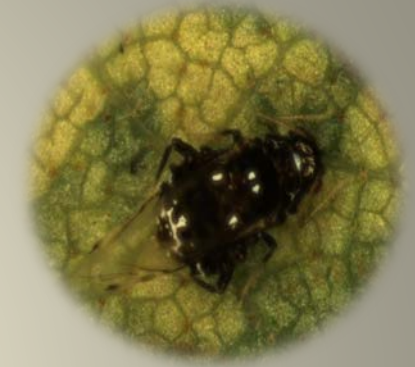
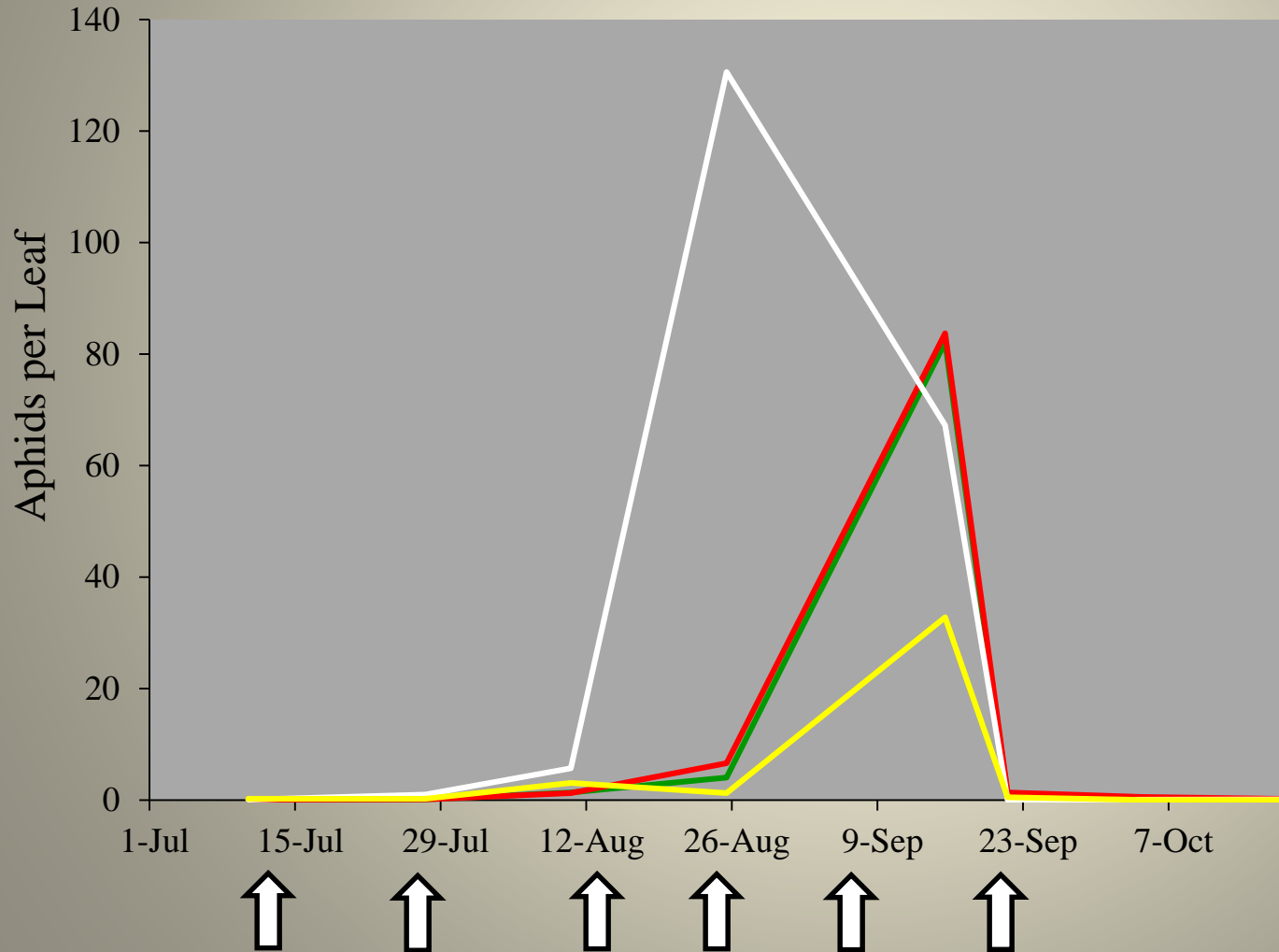
% Chlorotic Leaf Area

October 5, 2016



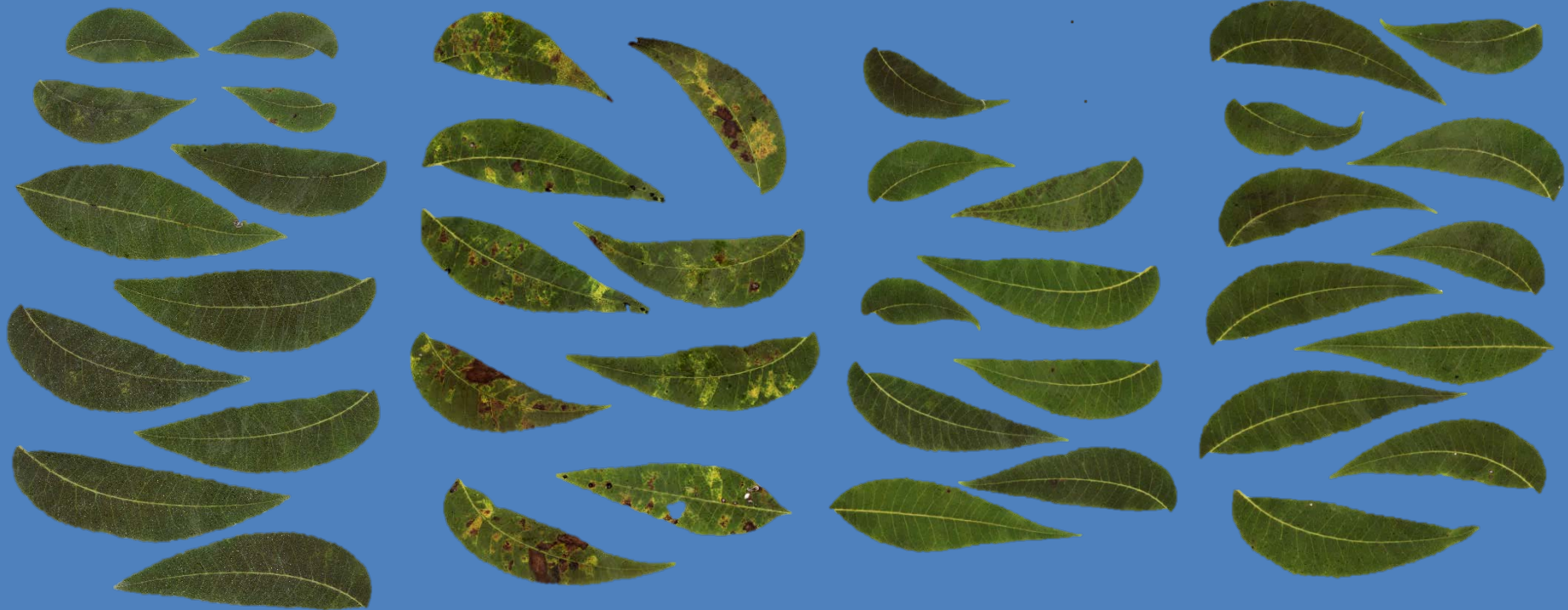
2017 ProGibb LV Plus Orchard Study

BPA Adults + Nymphs



BPA Injury with Gibberellic Acid (GA_3)

leaf samples collected Aug 26, 2017



Standard

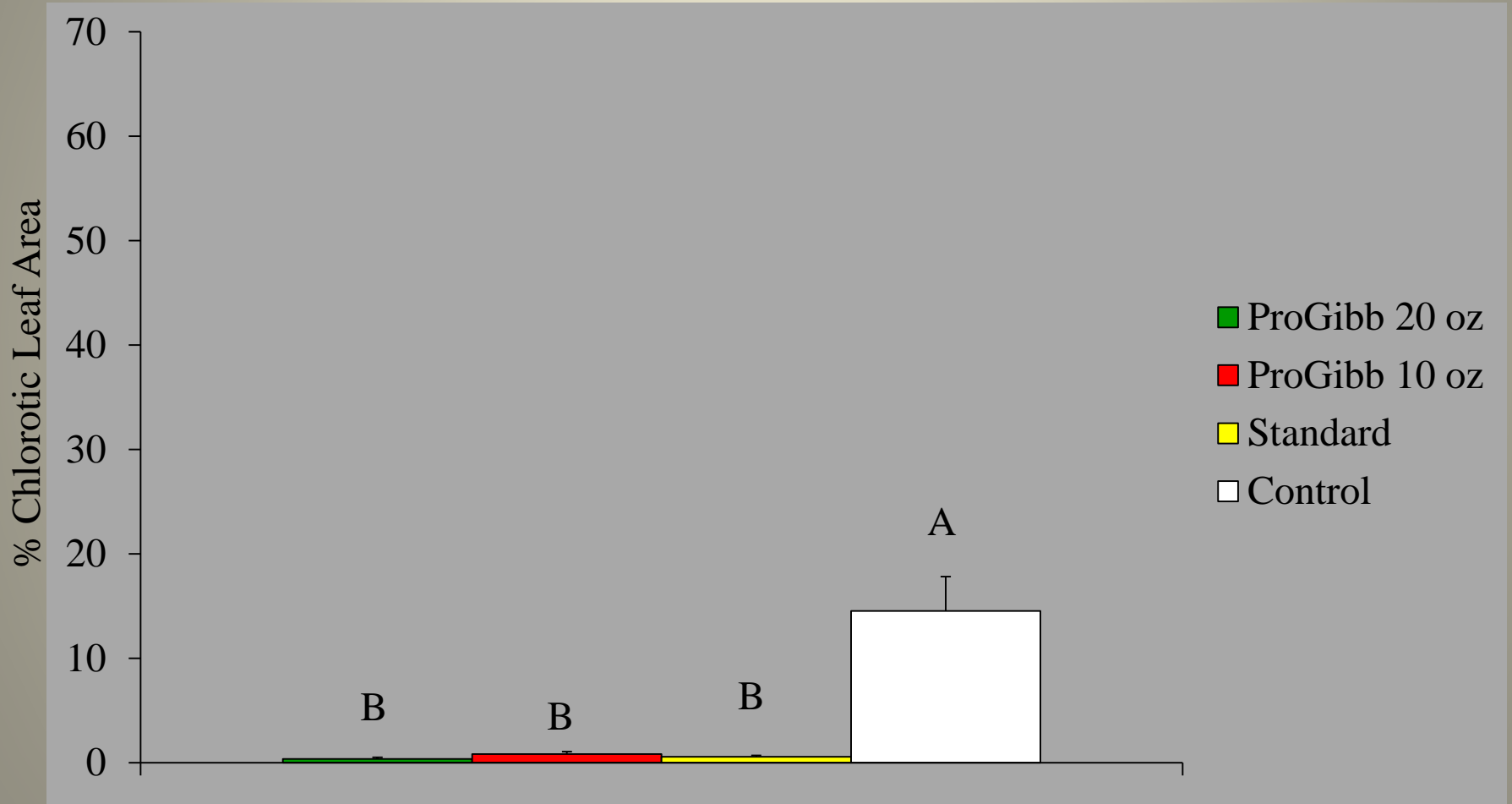
Control

ProGibb 10 oz

ProGibb 20 oz

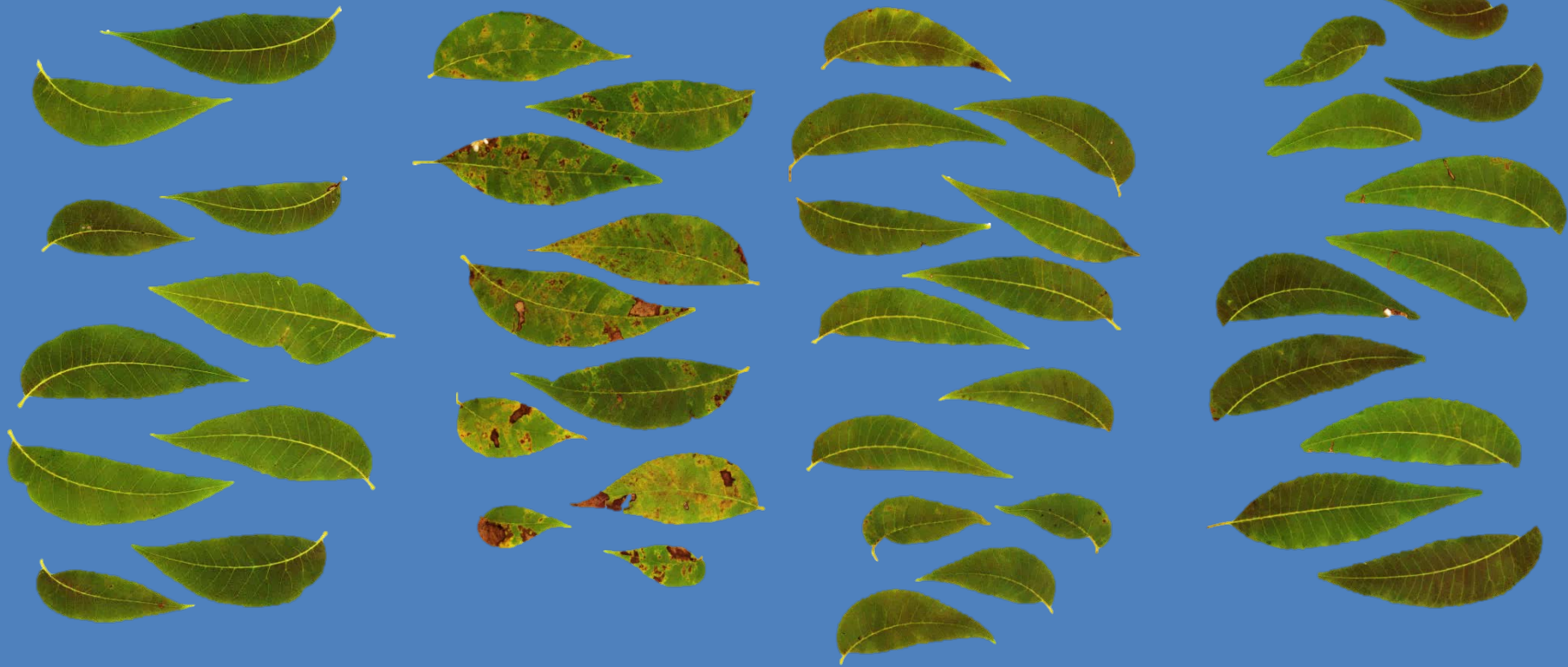
% Chlorotic Leaf Area

August 26, 2017



BPA Injury with Gibberellic Acid (GA_3)

leaf samples collected September 28, 2017



Standard

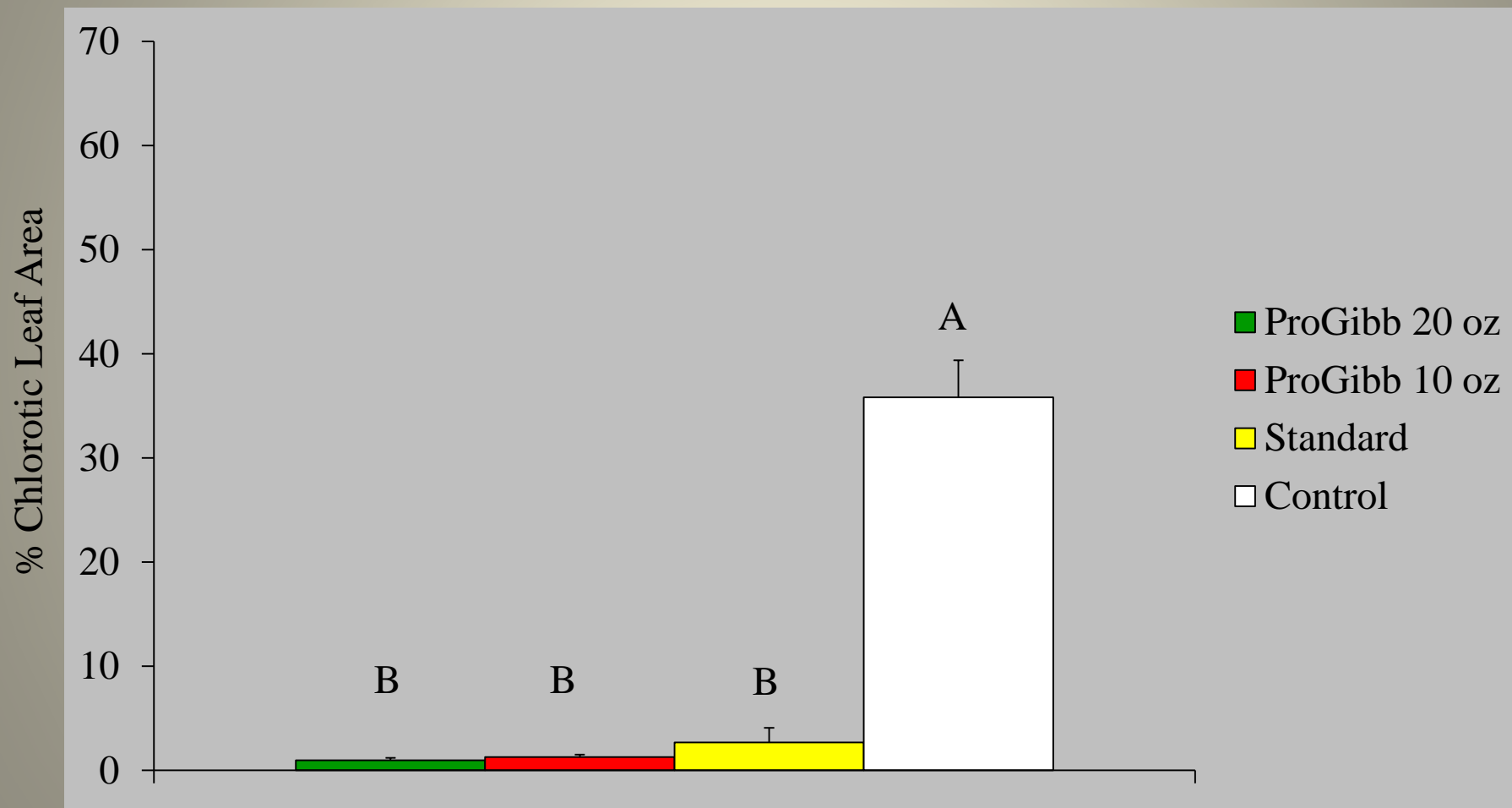
Control

ProGibb 10 oz

ProGibb 20 oz

% Chlorotic Leaf Area

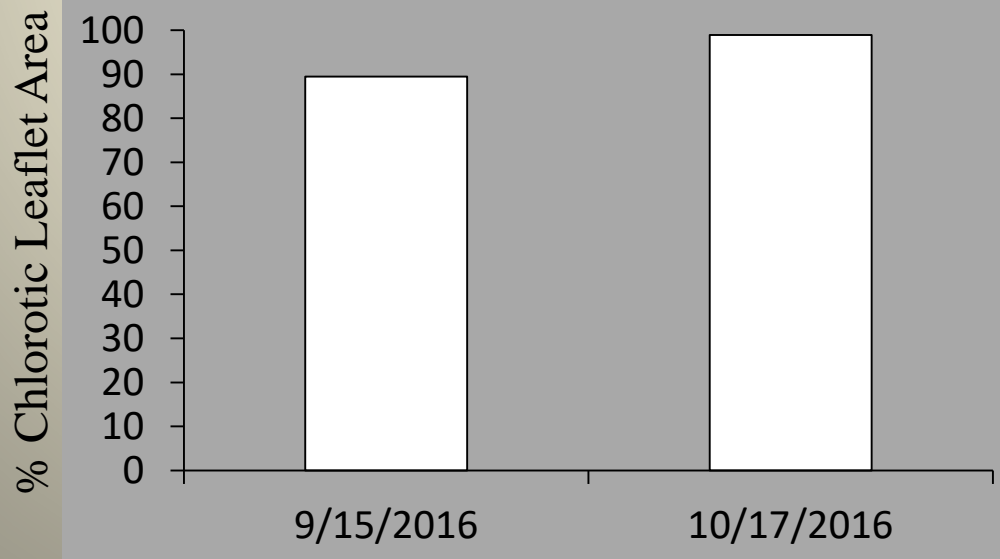
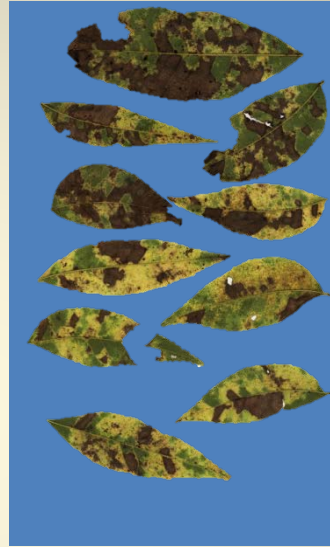
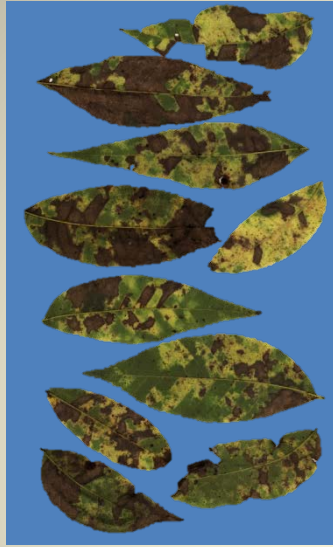
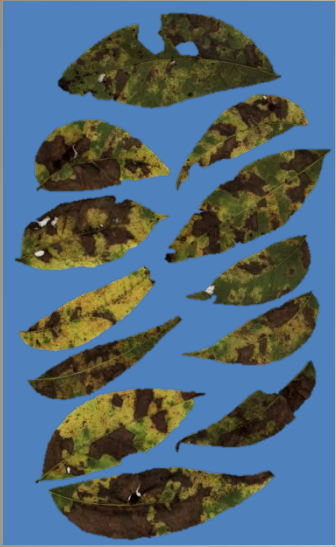
September 26, 2017



Just in case you were wondering.....

% Chlorosis to Induce Leaflet Abcission

Falling leaflets collected Sept. 15 and Oct. 17, 2016



Seasonal Black Pecan Aphid Management Awareness

Month	Black Pecan Aphid Concern Level	Management Action
April to mid-June	NONE – VERY LOW	None
Mid-June to Mid-July	<p>If low/moderate yellow aphid populations are present - VERY LOW</p> <p>If no yellow aphid populations present, beware early black pecan aphid – CAUTION!</p>	<p>None</p> <p>BPA control <i>likely</i> needed</p>
Mid-July – Late Sept	BPA increase is imminent – WARNING!!	BPA control needed
Early Oct – Frost	None	None

PEST	PESTICIDE	MOA	AMOUNT PER ACRE	REI/PHI (Hours or Days)	TIMING AND REMARKS
Black Pecan Aphid	SAME INSECTICIDES AS FOR YELLOW APHIDS or <i>chlorpyrifos</i> Lorsban, generics	1B	Check label	24 H/ -	Black pecan aphids may cause damage as early as May but are usually a serious problem only in late season. Damage appears as yellow spots on leaflets. Damaged spots later turn brown and 2-4 damaged spots per leaflet can cause leaflet drop. Carefully check all compound leaves on 10 terminals per tree, on at least 10 trees per orchard for the presence of black pecan aphids. Prior to July 1, treat if 25% of terminals have 2 or more black aphids. After July 1, treat if 15% of terminals have more than one black aphid and nymph clusters are found. Concentrate checks on susceptible cultivars such as Schley, Sumner and Gloria Grande. Be sure to check all compound leaves on each terminal examined.
	<i>gibberellic acid</i> ProGibb 4%	N/A	10 oz	N/A	Gibberellic acid is a plant growth regulator that prevents damage from black pecan aphid feeding and inhibits establishment in the orchard. It does not affect aphids directly and will not control any other pest, including yellow aphids. Three applications should be made at 2-week intervals, beginning in mid-July, applying 10 oz each time.

ProGibb LV Plus

Yellow Aphids	FOLIAR APPLICATIONS				<p>Yellow aphids may be present in orchards throughout the growing season. Populations are usually highest in April-May and again in August-September. In early season, DO NOT treat yellow aphids if they are the only insect problem. Rely on beneficial insects to suppress early season populations.</p> <p>In prolonged dry periods, lower, chronic aphid populations may require treatment to prevent the build-up of unacceptable levels of honeydew and sooty mold. WEEKLY SCOUTING IS VERY IMPORTANT IN TIMING APHID SPRAYS, ESPECIALLY IN LATE SEASON. Rotate among classes of insecticides between treatments to avoid resistance development.</p> <p>It is suggested that pyrethroid materials (cypermethrin, bifenthrin, etc.) not be used, alone or in combination, in early- or mid-season applications.</p> <p>Many generic formulations of imidacloprid are available. Read label carefully for recommended rate. Imidacloprid alone may not control yellow and black-margined aphids.</p> <p>Admire can be applied through a drip irrigation system, as an emitter spot application, or as a shanked-in emitter adjacent application. <u>See label for complete details.</u> Apply Admire only to orchards where drip irrigation has been established for at least 5 years.</p> <p>DO NOT apply more than 1 application of Apta, no more than 27 oz/A/season.</p>
	Assail 30SG	4A	2.5-9.6 oz	12 H/ -	
<i>clothianidin</i> Belay	4A	3-6 fl oz	12 H/ -		
<i>flonicamid</i> Beleaf, Carbine	9C	2-2.8 oz	12 H/ -		
<i>flupyradifurone</i> Sivanto 200 SL	4D	7.0-10.5 oz	4 H/ 7 D		
<i>imidacloprid</i> Provado, many generics	4A	See label	12 H/ -		
<i>pymetrozine</i> Fulfill	9B	4 oz	12 H/ -		
<i>pyridaben</i> Nexter	2I	5.2-10.67 oz	24 H/ -		
<i>sulfoxaflor</i> Closer	4C	1.5-2.75 oz	12 H/ 7 D		
<i>thiamethoxam</i> Centric	4A	2-2.5 oz	12 H/ -		
<i>tolfenpyrad</i> Apta	21A	17-27 oz	12 H/ -		
SYSTEMIC APPLICATIONS					
Admire Pro	4A	7-14 fl oz	12 H/ -		

Use the 14 oz rate for black pecan aphid control.

A Black Pecan Aphid Spray Program

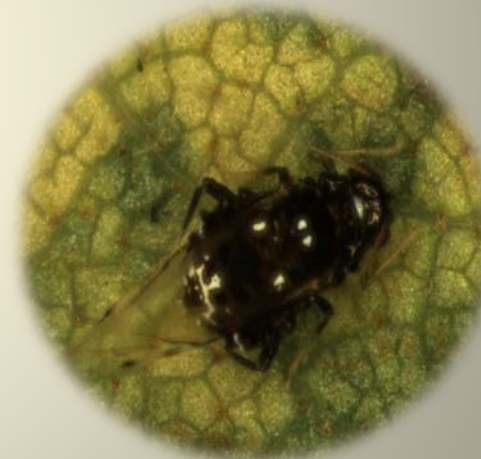
Mid-July: 10 oz ProGibb LV Plus

Aug. 1: 10 oz ProGibb LV Plus

Mid-August: If spraying for pecan weevil, 10 oz ProGibb LV Plus and an aphicide. *Scout for mites.*

Sep. 1: If spraying for pecan weevil, 10 oz ProGibb LV Plus, an aphicide and a miticide (*if needed*).

Mid-September: If spraying for pecan weevil, 10 oz ProGibb LV Plus, an aphicide and a miticide (*if needed*).



Remember: *For the aphicides, switch between products with different IRAC numbers for resistance management.*

Acknowledgments

- Funding from the Georgia Agricultural Commodity Commission for Pecan – *Thank You!!*
- USDA Collaborators – Dr. Bruce Wood (retired) and Dr. Xinzhi Ni (Tifton).
- Technical support – Mason Anderson, Merry Bacon, Rebekah Hartley, Chace Morill, Saleah Starks.