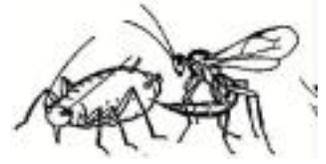


# Using Banker Plants



What are banker plants????

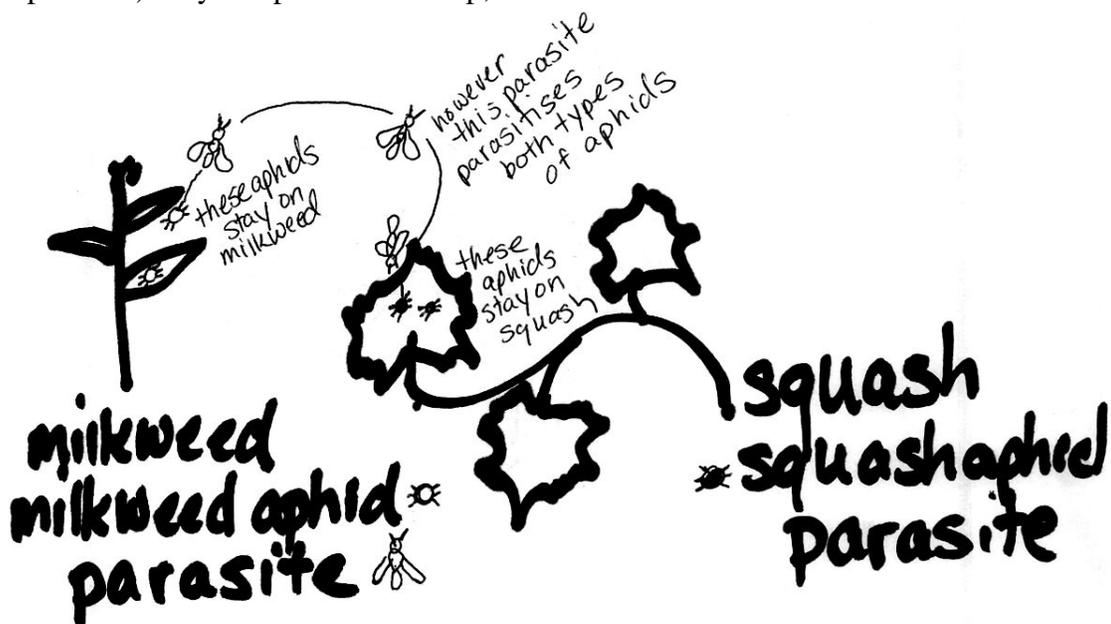
Welcome to the cutting edge of the pest world. Recently, entomologists (bug experts) have been using banker plants in their fight against unwanted insect pests. Here is a short course in banker plants for those not “in the know” about this new technique.



The banker plant system introduces established parasite colonies that have been reared on already infected plants to a crop. Although you can purchase parasitoids and release them in your yard, the parasites often leave after they have killed off your pest.

The difference with banker plants is that the parasites have more pests to feed on, so they stay around longer, and you can replace the banker plants (which house the parasites) periodically, rather than buying a whole new batch of parasites. We will be working with 2 banker plant systems to combat aphids and whiteflies on squash. Let's start with explaining the aphid system.

In a not so secretive lab in Apopka, FL, aphid parasites are being raised on milkweed. When this milkweed plant is brought into your yard, the milkweed aphid parasites will also parasitize your squash aphids; however, the milkweed aphids, being specific to milkweed, won't bother your squash. These parasites can then parasitize the squash aphids, while continuing to multiply in the milkweed aphid. (it's a little complicated.) Maybe a picture will help;



In addition to this aphid system, we will also be using papaya plants, which harbor a specific type of whitefly (that won't affect your squash), but that are infected and killed by a general whitefly parasite. This parasite will also parasitize the whiteflies found on your squash. There will be two different groups

1. People who receive papayas with the whitefly parasite.
2. People who receive milkweeds with the aphid parasite.

However, everyone will be taking data for both aphids and whiteflies, the question is: Will there be a difference between the two groups???

## **DAY 1**

Today you need to “set up” your garden.

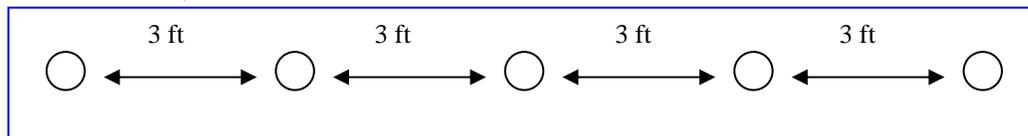
1. Choose the area for planting your squash. You can incorporate the squash into a pre-existing garden so long as you spray **NOTHING** in your garden. It may be better to keep this project separate if you know you will feel the temptation to spray. Choose an area 3ft by 15 ft that will receive direct sunlight for most of the day.

2. Weed your area, and till the ground. Form a raised bed 3ft wide and 15ft long.

3. Sprinkle the supplied fertilizer on top of your 3 by 15ft area.

4. The use of some method of weed control is recommended. At the extension office we use black plastic, but newspaper mulch also works. If you do not want to put down a form of weed control, be forewarned that you will be dedicating time to weeding.

5. Now you are ready to plant the seeds. Use a yardstick to help measure off the distance between seedlings. The goal is to have 5 squash plants 3ft. apart. Mark off holes in this manner;

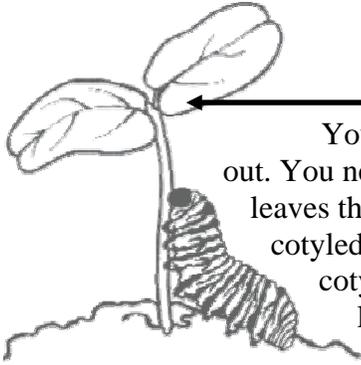


You have been provided with 15 squash seeds. If they are colored (red or green) this means they have been coated in a fungicide to stop seedling rot. **VERY IMPORTANT-** do not touch the seeds. Handle them with gloves.

6. While wearing gloves, plant three seeds in each hole (you will thin these out later). Plant them ½-1 inch below the surface. Cover the seeds with soil.

7. Water in your seeds, and stand back to admire your work!

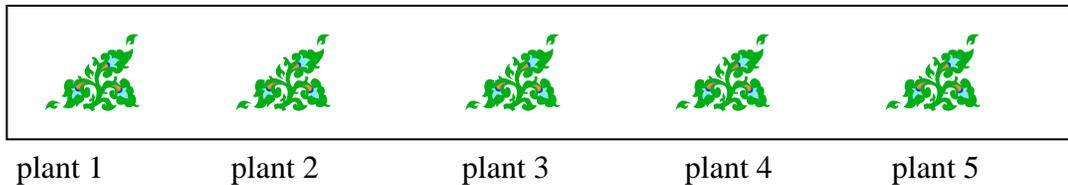
## WEEK 1- WEEK 2



Your squash seeds should now be emerging, and you must thin them out. You need to wait until the seedlings have at least 2 true leaves. The first leaves that come up when a seedling germinates are called cotyledons. They are shaped like this. A few days after the cotyledons emerge you will notice the development of true leaves (these have the more characteristic look of a squash.) To the right is a picture of a seedling with 2 cotyledons (oval shaped) and 2 true leaves (maple leaf shaped).



When your squash plants are this size, you can thin them out to one seedling per hole. This should leave you with a total of 5 squash seedlings. Now, all you need to do is water and wait!



## WEEK 2

At this time, come back the extension office and pick up your banker plants. You have been randomly be assigned either a papaya or milkweed. You will receive 2 banker plants. Place them between plants 1 & 2 and plants 4 & 5. Remember to water the banker plants when you water your squash. You may plant the pots in the ground if you find that they keep falling over. If your plants begin looking ragged they can be replaced just notify your extension agent.

**WEEK 4** - Time for the first data collection. By now, your squash plants should be well on their way. No matter which banker plant you received, you will take data for both aphids and whiteflies. *Record your name, the date, the time you are taking this data (ie- 10:00 a.m.), and whether you received a milkweed or a papaya banker plant.* When you look at your squash plants, you will notice that you can count the leaves from youngest to oldest. Count the newest and smallest leaf as #1, the second newest and smallest leaf #2 and so on. The leaves tend to come out in a circular pattern.

For your data collection today, decide on the age of the leaf you will count. For the whitefly counts it is better to count on a middle-aged leaf (the 4<sup>th</sup> or 5<sup>th</sup> leaf) because they are rather large. However, for aphids you may find that most of the aphids stay on the younger leaves (the 1<sup>st</sup> or 2<sup>nd</sup> leaf). The age of the leaves you count doesn't matter as long as you are consistent.

1. Standing at your first squash plant, choose an age of leaf to count (for example number 4). *Write this number on your data chart in the leaf number blank.* Quickly turn this leaf over to look for whiteflies on the underside of the leaf. Sometimes, this is better to do this with a partner. One person can turn the leaf over while the other looks for

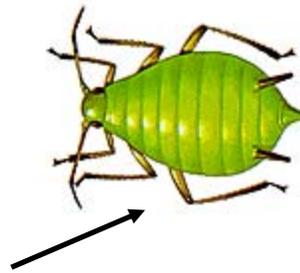
whiteflies. Whiteflies are very small, about 1 mm long. However, they are quite easy to see on the squash leaf because they are white. You are not likely to confuse them with another insect. If you are in doubt that something is a whitefly, give it a poke to see if it tries to fly away. If it is small, white, and flies; it's a whitefly. You must be careful when you first turn the leaf over because sometimes the whiteflies fly away when the leaf is disturbed (this is why this is a good activity to do with a partner). Whiteflies are less likely to fly away if you take data counts early in the morning or near sunset (hint, hint). *Record the number of whiteflies on the underside of this leaf in the data chart.*



2. After you finish counting whiteflies on your first plant, move on to the second plant (make sure to use the same age leaf on this plant also). Continue with all 5 plants, making sure to stay consistent, using the same age leaf for each count.

3. Now you are going to estimate aphid densities. Pick an age leaf upon which to do your aphid counts. Often younger leaves are better. *Record this number in the leaf number area of your data chart.* Examine the leaf and award it one of the following place depending on how many aphids are there.

- 0= no aphids on this leaf
- 1= 1-10 aphids on this leaf
- 2= 10-30 aphids on this leaf
- 3= more aphids than anyone really cares to count



*Record this number, 0-3, on your data chart.*

Here is a picture of an aphid for reference.

They can be either green or brownish/black and, can have wings or no wings, and they are 1-2 mm in length.

4. After estimating aphid levels on your first squash plant, continue estimating aphid levels on the four remaining plants, making sure to use the same age of leaf.



**WEEK 6-**

Another round of data collection.

**WEEK 8-** Last data collection. When finished, bring your data to the extension office, and wait and see how everyone's results turned out!

**CONCLUSIONS**

Don't forget to write any comment you noticed during this project. If you have no whitefly or aphids, don't worry, simply write a 0; a 0 is still good data. If you would like to learn more about whiteflies and aphids, check out the Featured Creatures website at

*<http://creatures.ifas.ufl.edu>*

If you have any questions, feel free to contact your extension agent!

Name \_\_\_\_\_

Date \_\_\_\_\_

Type of Banker Plant \_\_\_\_\_

Time \_\_\_\_\_

squash plant	Count number of whiteflies	Rate aphid density 0-3	Comments
	<b>whiteflies</b>	<b>aphids</b>	
	Leaf Number _____	Leaf Number _____	
1			
2			
3			
4			
5			

Name \_\_\_\_\_

Date \_\_\_\_\_

Type of Banker Plant \_\_\_\_\_

Time \_\_\_\_\_

squash plant	Count number of whiteflies	Rate aphid density 0-3	Comments
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