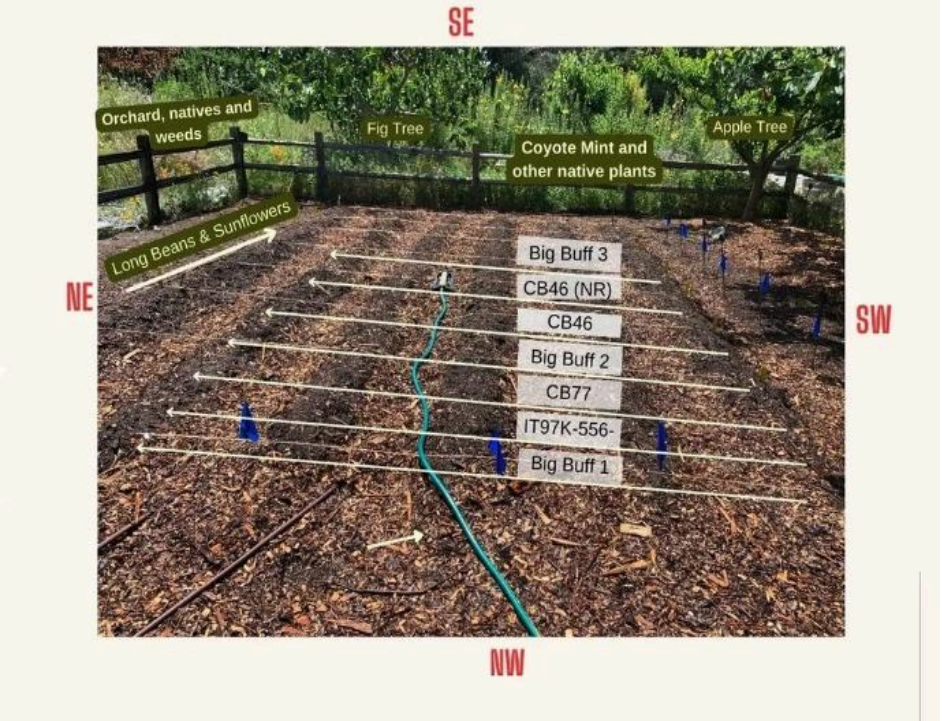
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# Evaluating Cowpeas for Aphid Resistance at The Huntington Ranch Experimental Garden

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## Findings

1. CB77 grew well and did a good job resisting aphids.[1]
2. One of our goals was to learn how to irrigate cowpeas deeply and infrequently. We couldn't advance this goal due to many problems with the irrigation system. Another reason was we didn't have the knowledge to identify signs of drought stress. (Until Dr. Bao-Lam Huynh's visit, we thought we were observing signs of plant stress due to pests or disease.)
3. We didn't collect data on crop yield due to considerable loss from gophers as well as aphid infestation on the remaining plants. It was also difficult to collect data on CB77 yield because IT97K-556-6's vines had grown over them.
4. Unexpected finding: IT97K-556-6 could be an excellent choice for a warm season cover crop due to its vining and late flowering characteristics.

[1] CB77 is available for production under PVP license. Interested parties should contact UCR Research and Economic Development.

Planet Earth Observatory
12/20/2023

**In Future, We Would:**

1. Continue to compile reference materials on plant growth stages, signs of plant stress and disease and identifying likely pests and predators.
2. Produce outreach and educational materials on cowpeas (as per materials PEO produced on fava beans.)
3. Design our trial well in advance, agree on data to be collected, create a datasheet with supplementary materials. Consider **point 14** in the design.
4. In the same size plot, we would test CB77 against fewer varieties.
5. Decide who and when data and photos will be collected and uploaded. [2]
6. Allow adequate time for site preparation.
7. Check irrigation lines. Make sure the automatic irrigation system is running properly. Install filter and fresh batteries, if needed. Train volunteers on monitoring the system.
8. Decide day/s to collect data based on availability of volunteers.
9. Ensure we have enough volunteers or interns as team members.
10. Ensure a system for gopher and other rodent abatement.
11. Conduct a training session before the investigation. Cover how to collect data; go over information contained in the reference materials. Train team to identify signs of gophers and other rodent activity.
12. Decide a strategy for communicating with the public about growing cowpeas. This would include a cowpea seed packet and outreach materials giveaway at farmer's markets, community gardens and schools (as per our Great Fava Bean Giveaway)
13. Know that we will encounter frustrations, failures, and unexpected results.
14. Consider taking a wider view when creating the trial's design. One of Planet Earth Observatory's goals is to learn how to tend the space as a healthy garden ecosystem where we will be mindful of nurturing diversity above and below ground.
    Covid left The Ranch with far fewer volunteers and paid gardeners. As a result, the site was overgrown during the runup to the trial. There was quite a lot of clean up activity: weeds in the orchard were mowed down, trees pruned, native plants cleared, sorghum that had been growing in the row crop areas for at least a year was cut down, a honeybee hive was removed. We didn't consider the effect all this activity might have had on the presence or absence of aphid predators, for example. Nor did we consider possible disruption of below ground diversity when removing the sorghum roots. Going forward, we would be more mindful of ways to integrate our trials into our broader goal of tending a healthy garden ecosystem and ensuring biodiversity above and below ground.

[2] Suggested data: irrigation, germination rate, emergence, trifoliate, flowering, pods, yield. Presence of pollinators, pests. Signs of plant stress. Leave space for questions and comments. Make data sheets available online to team members.

Planet Earth Observatory
12/20/2023

**Questions We Asked Ourselves Along the Way**

1. How do we know if the cowpeas are getting too much or not enough water? What are signs of drought stress in cowpeas? How does that compare to other signs of plant stress and how are they related?
2. Is this an aphid egg or something else?
3. Is this evidence of a gopher or mole?
4. What does the term “late flowering” mean?
5. Why are there so few ladybugs?
6. How do honeybees pollinate cowpea flowers? Could honey bees contribute to higher yields (even though cowpeas are self-watering) Why does there seem to be fewer honeybees as the summer progresses?
7. Could the weed whacking in the orchard have affected the numbers and types of pests and predators on the cowpeas? Removal of bees’ nest? Weeding in the native
8. Why are there more aphids on the plants in the southeast side of the plot? (CB46, CB46 nematode resistant and Big Buff 3)
9. Why are there more gophers and aphids along all varieties across the southwest line of the plot?
10. What is the best way to collect, identify and store on-line data and photos from the trial?
11. Could we consider a mid-June planting, allowing the termination date to better coincide with fall planting?
12. What other cover crops might we mix in with the IT97K-556-6?
13. Do we post on Instagram as we go along in the trial? Who, if anyone, might be interested in following us with this trial?