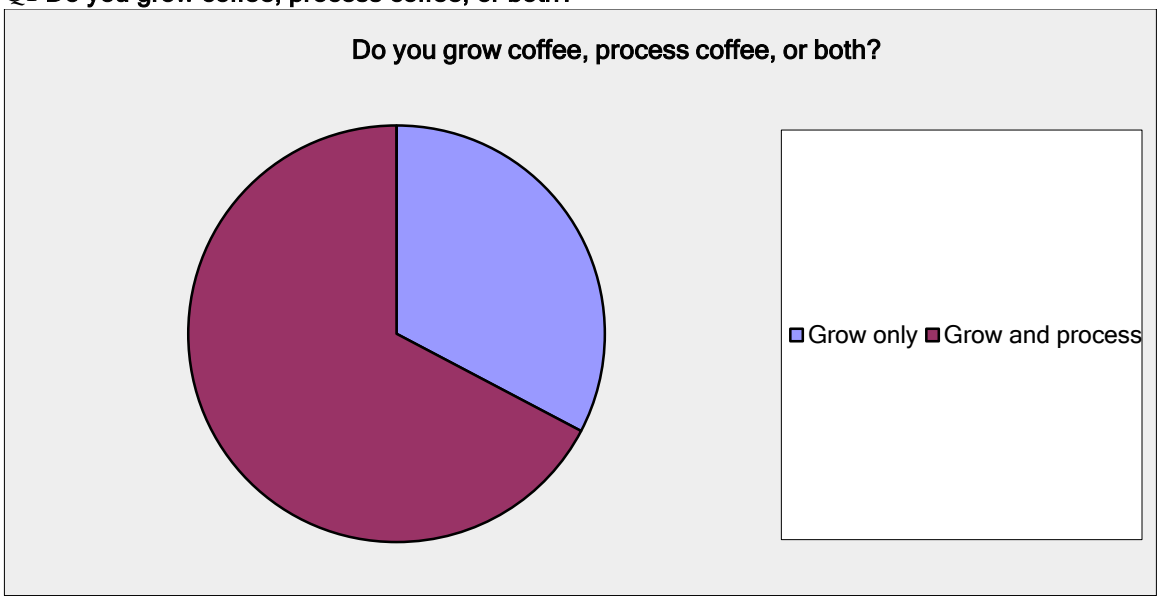
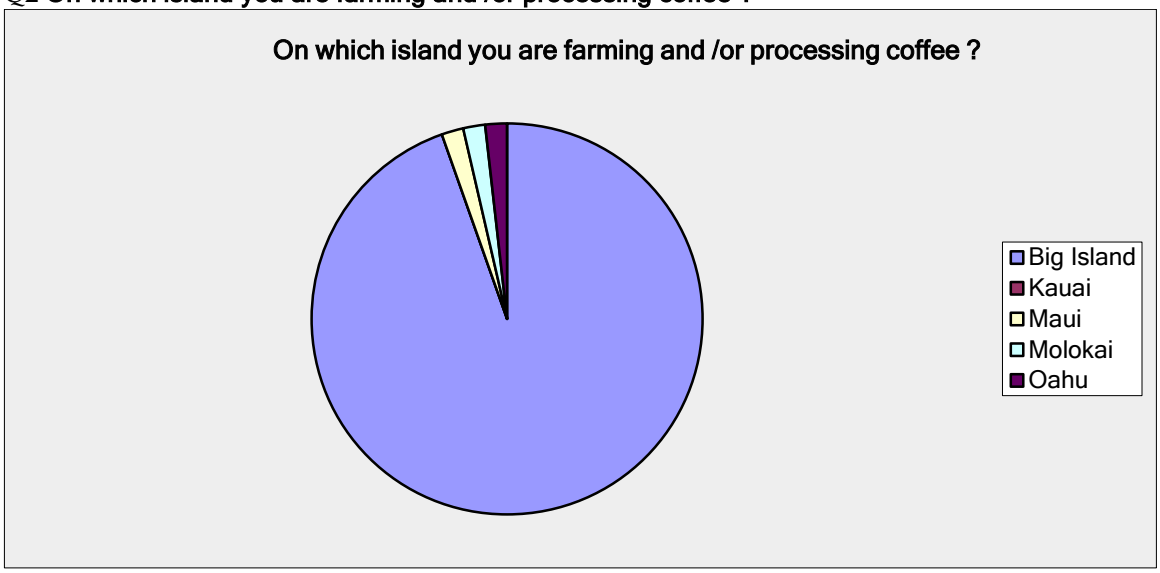
Comparison of responses between 2011 and 2012 CBB surveys.
HC Bittenbender, E. Burbano Greco, and A. Kawabata, CTAHR.
Survey period was mid September 2012.

Q1 **Do you grow coffee, process coffee, or both?**



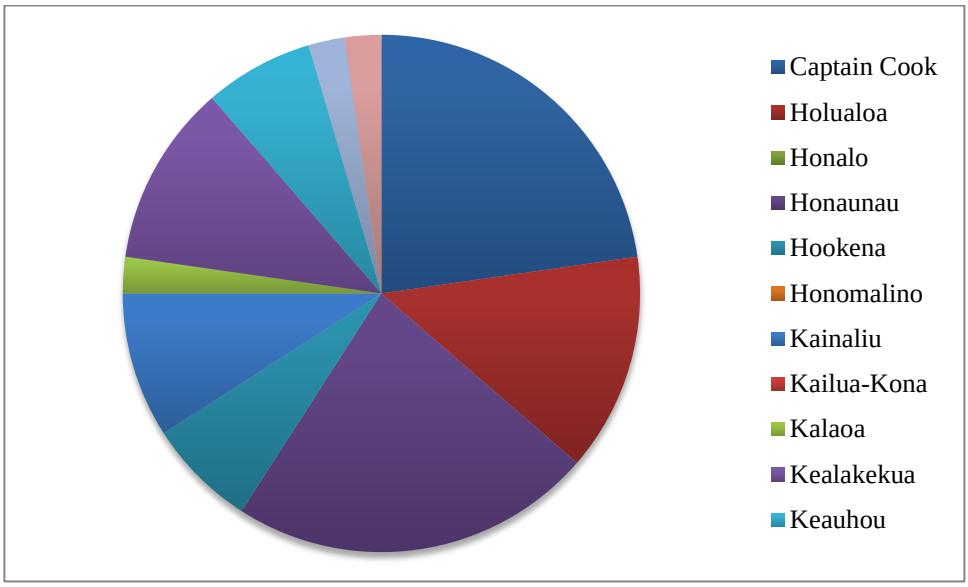
In 2012 18 only farm coffee and 37 farmer processors responded, in 2011 49 only coffee farmer and 77 coffee farmer processors responded.

Q2 **On which island you are farming and /or processing coffee ?**



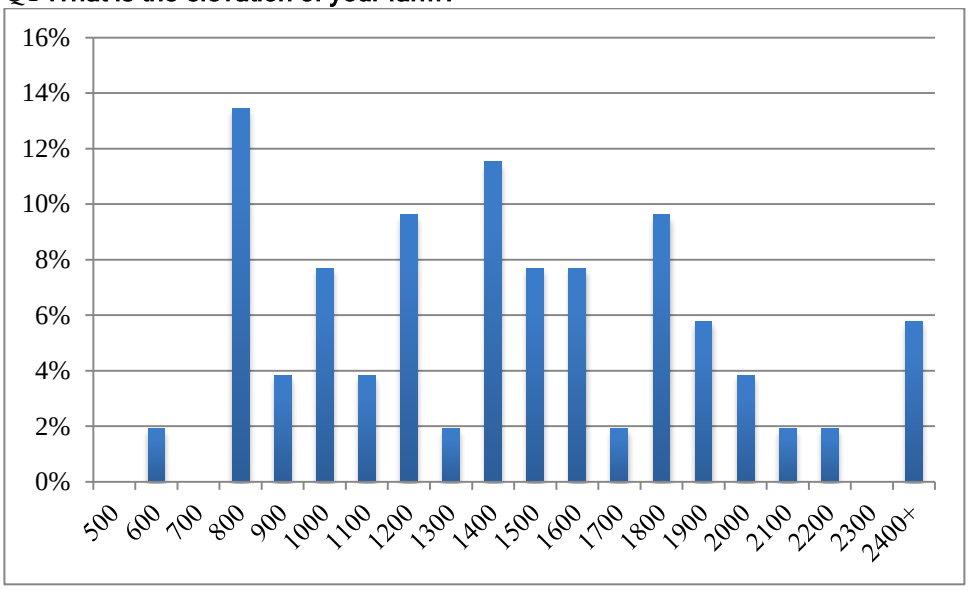
In 2012 94% of respondents were in Kona, in 2011 97% were in Kona.

Q3 **If you are growing coffee in Kona, please select the name of the area from the drop down menu below that is closest to your farm.**



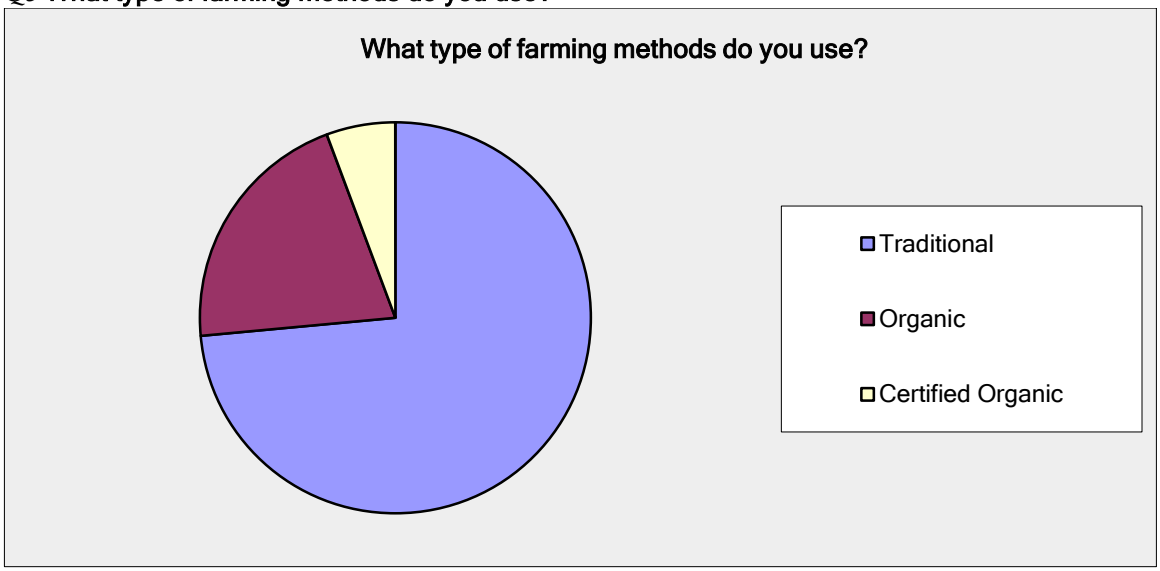
In 2012 22% of respondents were in Capt Cook and Honaunau, followed by Holualoa at 14%. In 2011 30% of respondents were from Capt. Cook, 21% Holuloa, and 17% Honaunau.

Q4 **What is the elevation of your farm?**



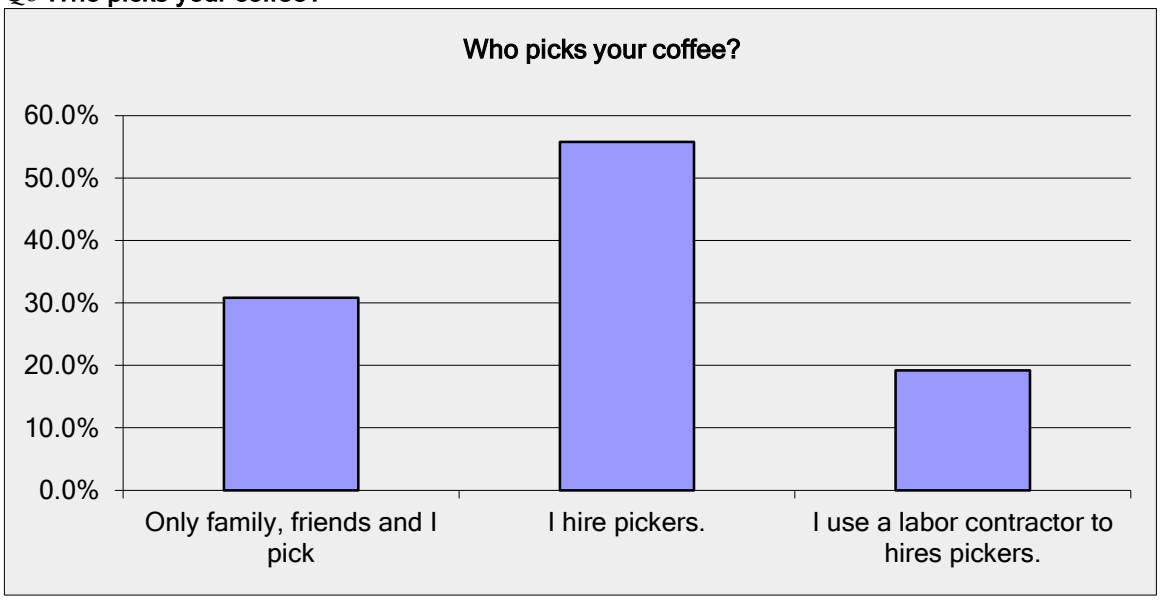
In 2012 13% respondents were at 800 ft elevation, 11% at 1400 ft, and nearly 10 % at 1200 and 1800 ft, and 6% at 2400 ft or higher. In 2011 18% of respondents in Kona were 1400 to 1600 ft elevation, 16% at 800 to 1000 ft, and 4 % above 2200 ft.

Q5 **What type of farming methods do you use?**



72% of respondents were farming with traditional methods, in 2011 70%,

Q6 **Who picks your coffee?**



In 2012 30 % of farmers did not hire pickers, in 2011 34% did not hire.

Q7 **How big is your coffee farm ?**

In 2012 average farm size reported was as 12 acres or 5,400 trees, in 2011 reported farm size averaged 6 acres or 3,000 trees. Several large farms responded raising the average farm size.

Q8 **Did you have CBB on your farm in the 2011-12 season?**

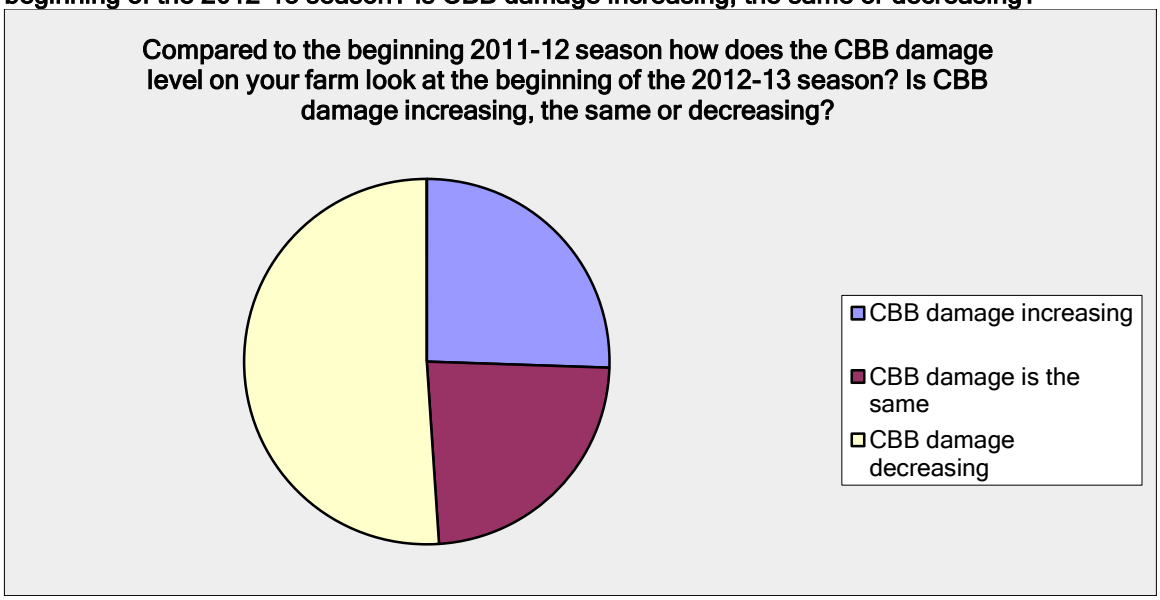
78% of farms report having CBB in the 2011 season; in 2010 56% farmers had CBB.

Q9 **What was the 2011-12 season's marketable green bean recovery ratio (cherry weight divided by marketable green bean weight)?**

Average MGBRR reported for 2011 by 28 farmers was 6.3 or 20% green bean loss, the highest was 8.9 or 42% green bean loss. 14 farmers said they didn't know. The average MGBRR reported in the 2010 crop was 5.7 or 13% green bean loss, but this number is questionable as it was similar to before CBB.

Q10 **If you sell only cherry but your buyer samples your cherry and tells you the percent CBB damage please list all the damage percents given to you for the 2011-2012 season.**
Farmers who sell cherry say their buyer found on average 22% cherry loss; versus 15% in 2010.

Q11 Compared to the beginning 2011-12 season how does the CBB damage level on your farm look at the beginning of the 2012-13 season? Is CBB damage increasing, the same or decreasing?

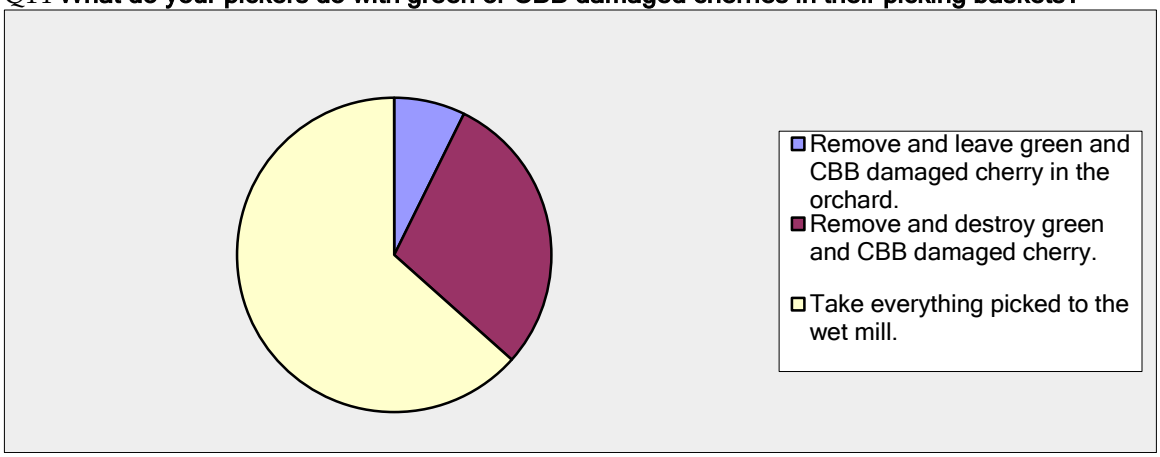


51% of farmers felt their CBB damage in 2012 season was decreasing.

Q12 **Do your pickers make an effort not to drop cherries on the ground when picking?**
In 2012 86% farmers said their pickers make an effort not to drop cherries during harvest; versus 62% in 2011 year.

Q13 **Do your pickers make an effort to pick up dropped cherries?**
In 2012 54% said pickers make some effort to pick up dropped cherries; versus 37% in 2011.

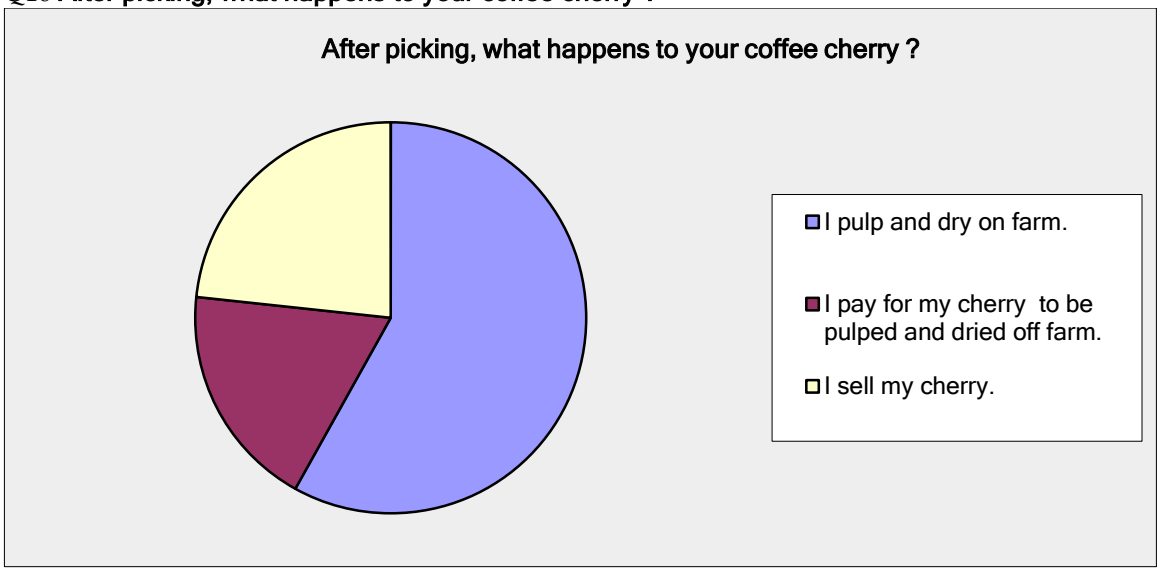
Q14 **What do your pickers do with green or CBB damaged cherries in their picking baskets?**



In 2012 63% of farmers said everything in pickers baskets goes to a wet mill, only 7% said pickers leave infested and green cherry in orchard. In 2011 51% took everything to the wet mill.

Q15 **Do you dump the picking baskets into bags or containers that prevent CBB escaping before reaching the wet mill?**
In 2012 48% of farmers used closed (CBB proof) containers to hold and to transport cherry to wet mill.

Q16 **After picking, what happens to your coffee cherry ?**



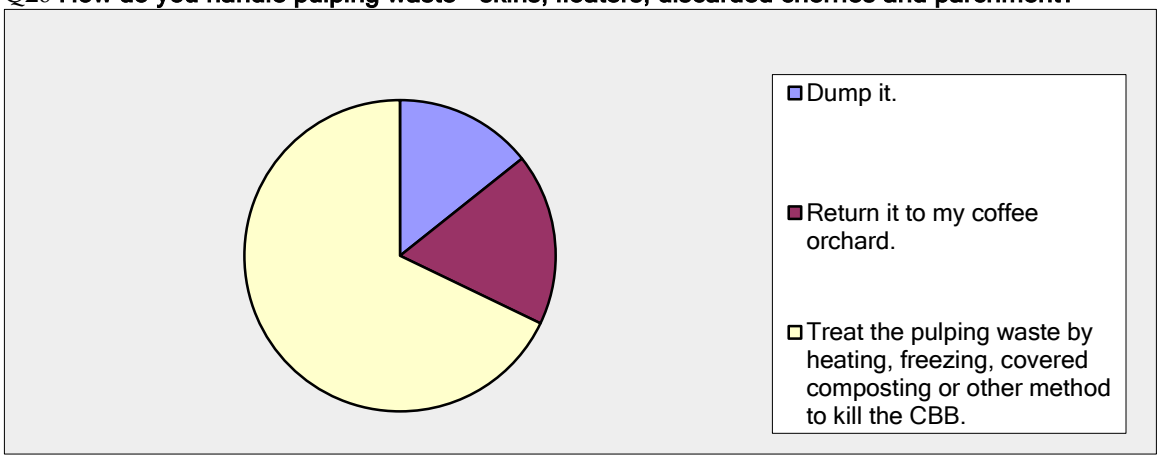
In 2012 23 % of farmers said they sold their cherry, 58% of farmers pulp and dry on farm.

Q17 **When you pulp, what happens to the floater cherries?**
In 2012 42% of farmers pulp everything, 58% discard cherry floaters; versus 39% pulped everything and 60% discarded floating cherries in 2011. CTAHR recommends pulping everything even floaters as one bean may be undamaged, we need to increase our message to pulp floaters.

Q18 **After pulping do you process all parchment coffee or do you discard floating parchment coffee without processing?**
In 2012 81% discard floating parchment coffee, versus 79% in 2011. No change but an opportunity to completely destroy CBB-infested parchment.

Q19 **Are the pulping and fermentation areas at the wet mill completely screened in to prevent escape of CBB?**
In 2012 no farmer screened in the wet mill, 8% screened the fermentation tank.

Q20 **How do you handle pulping waste - skins, floaters, discarded cherries and parchment?**

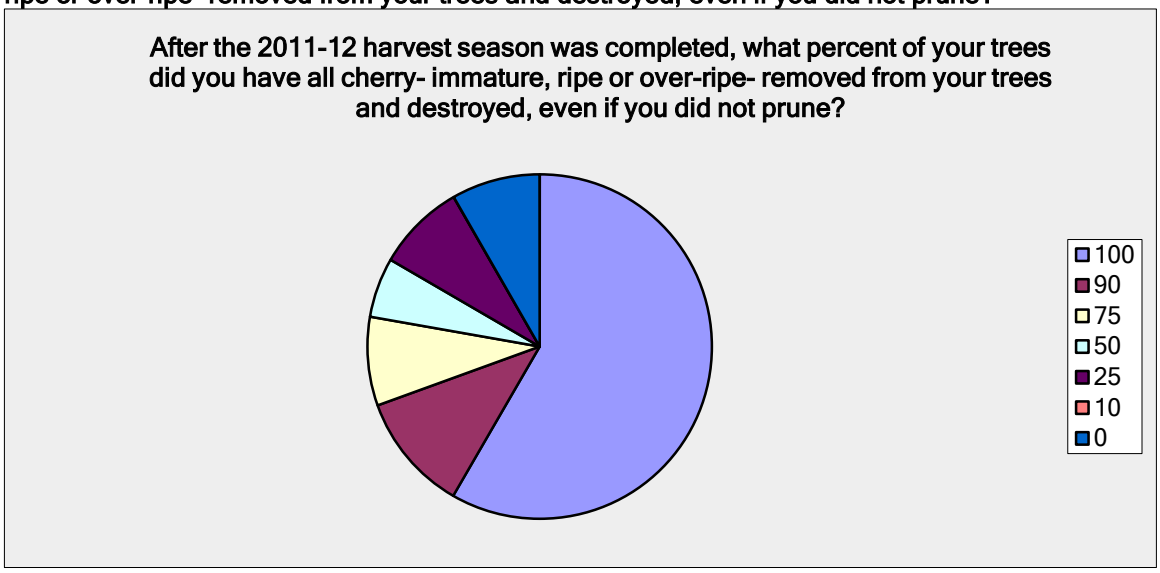


In 2012 68% of farmers treat mill waste to kill CBB, but 18% return it to the orchard presumably untreated, and 14% dump it. Last year 60% treated mill, 32% simply returned it to the orchard, 8 % take to dump. There is less CBB-infested waste being returned to the orchard but this needs to be reduced to 0% untreated mill waste and water returning to coffee orchards. Taking mill waste to the Dump should be discouraged unless mill waste is treated at dump due to the hazard for reinfestation of farms or feral coffee.

Q21 **Is your drying area screened to prevent CBB escape?**
Only 14% of farmers screen the drying area to contain CBB same as 2011. We need to encourage more screening. One grower reported placing a black tarp over his parchment coffee for 1hr daily to kill CBB.

Q22 **Do you attempt to contain and kill the CBB in the wet mill and drying areas, how are the CBB killed ?**
In 2012 60% of farmers attempt to contain and kill CBB in the mill area. The most common method to contain and kill is a CBB trap (35%) followed by sticky traps 22% and 18% spray Beauveria. One farmer each tried sticky screens, steam, electric bug zapper, black tarp covering the parchment coffee for 1 hr /day, and treating ferment waste and water. This is an improvement over 2011 when only 36% reported trying contain and kill in the mill areas.

Q23 **After the 2011-12 harvest season was completed, what percent of your trees did you have all cherry- immature, ripe or over-ripe- removed from your trees and destroyed, even if you did not prune?**



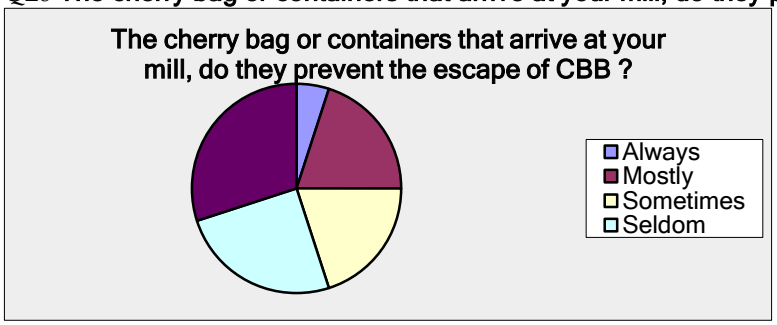
At the end of the 2011-12 season 60% of farmers striped all remaining cherry on 100% of their trees, 80% said 75 % of their trees were striped only 8 % did nothing. When asked their intentions in the 2011 survey 80% indicated that they would strip all trees at the end of the 2011-12 season. This is great improvement ! A the end of the 2010-11 season only 37% said they stripped their trees.

Q24 **After the 2012-13 harvest season will you have all cherry- immature, ripe or over-ripe- removed from all trees and destroyed, even if you don't prune.**
In 2012 84% percent of farmers said they will strip and destroy all cherry after 2012 harvest up from 60 % in 2011 !! We must encourage 100% of coffee stripped of all cherry at end of each harvest season.

Q 25 **What is your most effective sanitation tactic for your farm?**
Similar to the 2011 survey, farmers felt the sanitation tactics in order of effectives were stripping trees at the end of the harvest season, treating all mill waste to kill CBB, pulp all cherry picked, and contain and kill CBB in the mill area. Not dropping cherries while harvesting and picking up dropped cherry were somewhat effective.

Questions for wet millers.

Q26 **The cherry bag or containers that arrive at your mill, do they prevent the escape of CBB ?**



In 2012 25% of wet millers mostly receive cherry bags sealed to prevent CBB escape, 55% don't.

Q27 **When you pulp, what happens to the floater cherries?**

In 2012 55% of wet millers pulp all cherry received, this needs to be increased 100 % of floating cherry is pulped. This will save undamaged green bean. We need data to back up the assertion that floating cherry contains undamaged green bean.

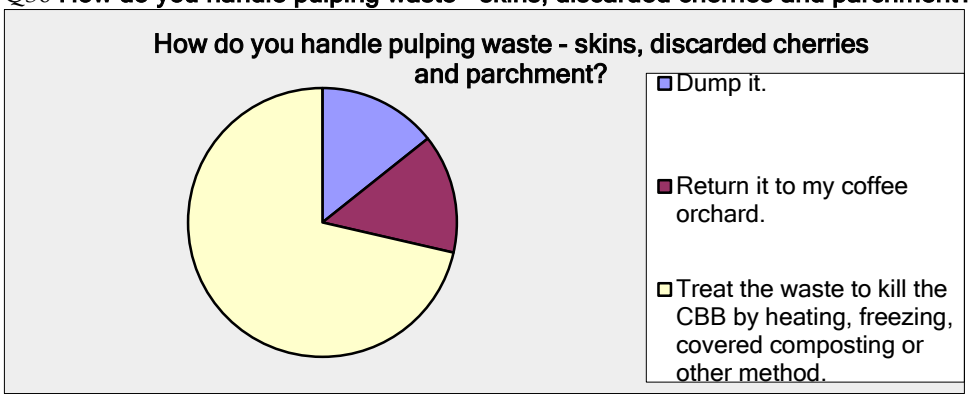
Q28 **After pulping do you process all parchment coffee or do you discard floating parchment coffee without processing?**

In 2012 86% of wet millers discard floating parchment; the remained processed all parchment coffee.

Q29 **Are the pulping and fermentation areas at the wet mill completely screened in to prevent escape of CBB?**

In 2012 only 5% of wet mills are screened to prevent CBB escape, we need to screen wet mill areas to contain CBB where they are most likely to escape.

Q30 **How do you handle pulping waste - skins, discarded cherries and parchment?**

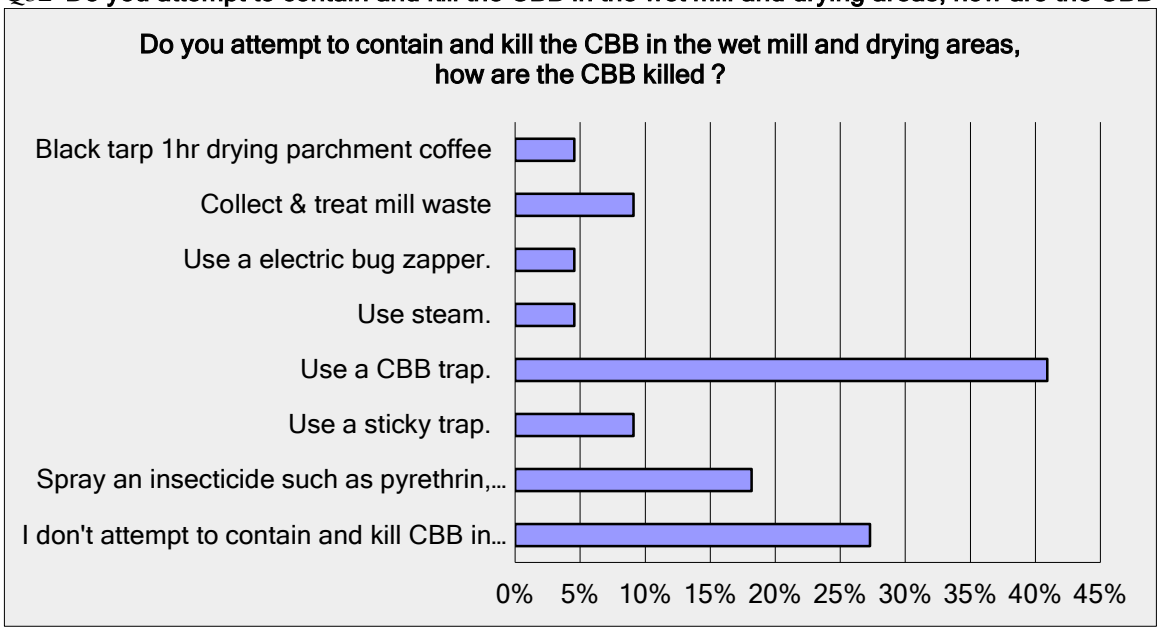


In 2012 71% of wet mills treat waste to kill CBB, but 28% either dump or return to their coffee orchard. All wet mill waste should be treated to kill CBB. Mill waste containers should be sealed to prevent CBB escape when transported to the dump. It is preferable to treat mill waste to kill CBB before it leaves the mill.

Q31 **Is your drying area screened to prevent CBB escape?**

In 2012 only 15% of wet millers screen their drying area. This needs to be increased to contain and kill CBB emerging from drying parchment.

Q32 **Do you attempt to contain and kill the CBB in the wet mill and drying areas, how are the CBB killed ?**



In 2012 27% of wet millers do not attempt to contain and kill in mill area. 41% use a CBB trap in mill area, followed by 18% who used an insecticide. All mills need to use some method to contain and kill CBB.

Q62 **How will you measure CBB damage on cherry you purchase in 2012-13 season?**
Most wet millers appear to use % damaged cherry (CBB hole) calculated by count or weight of damaged cherry. This can over estimate damage, if both seeds are not damaged.

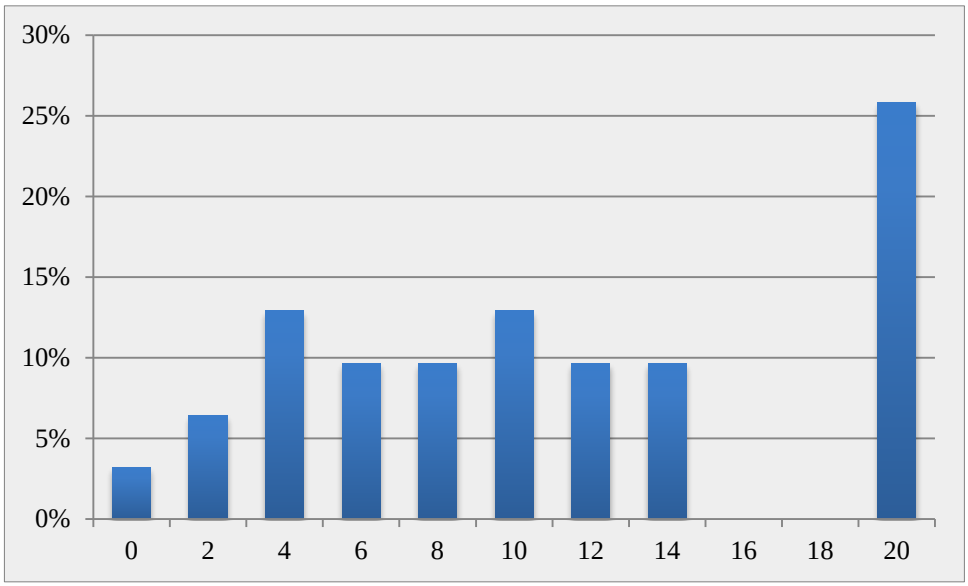
Q63 **Last season (2011-12) for the cherry I purchased I estimate the marketable green bean recovery ratio (cherry weight divided by marketable green bean weight was ...**
8 cherry buyers report the average MGBRR in their 2011-12 season purchases was 6.4 or about 22% green bean loss.

Use of CBB Traps by Farmers

Q33 **Will you use traps baited with methanol and ethanol to catch CBB this 2012-13 season?**

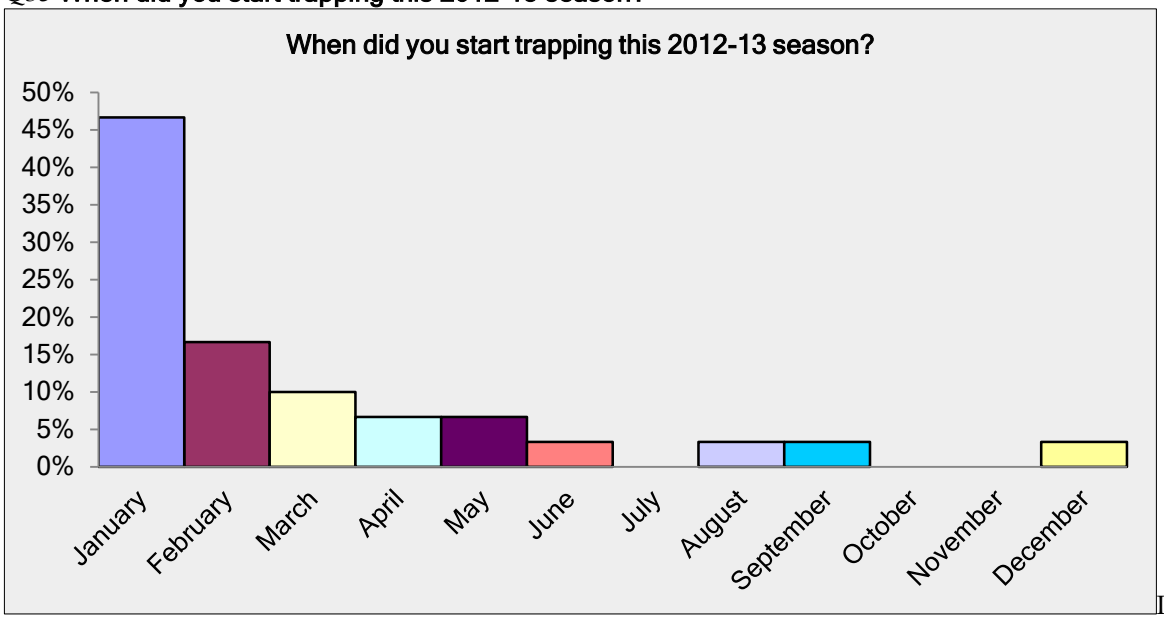
In 2012 trap use increased to 76% of farms, compared to 53% in 2011.

Q34 **How many traps per acre will you use in the 2012-13 season?**



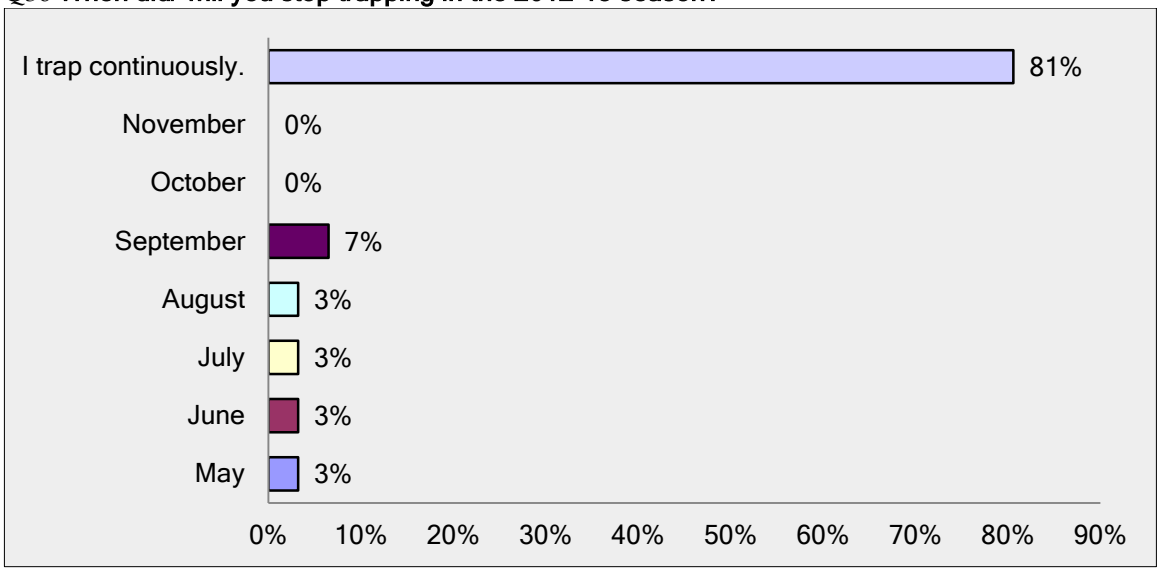
In 2012 25% of farms who trap said they use 20 traps per acre compared to 23% who used 12 traps /acre in 2011. There has been a tremendous increase in trap usage. Trapping is becoming more popular, we need to determine if there as control benefit.

Q35 **When did you start trapping this 2012-13 season?**



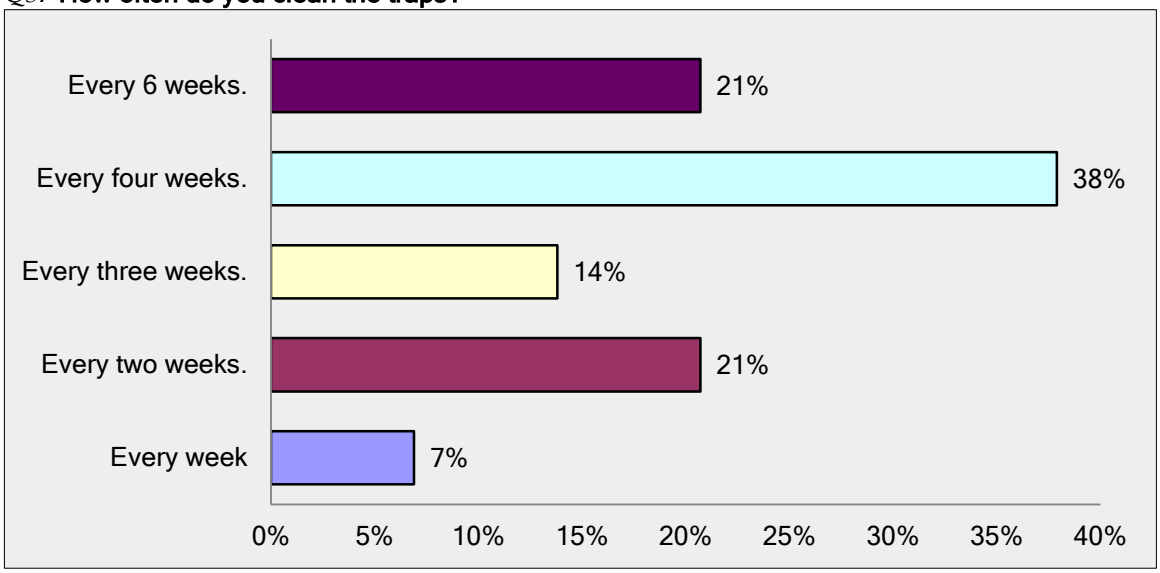
In 2012 47% of farmers began trapping in January for the 2012 season, 74% by March. In 2011 only 9% started trapping in January, 20 % started June. Farmers are trapping earlier and with more traps per acre.

Q36 **When did/ will you stop trapping in the 2012-13 season?**



In 2012 80% of farmers will trap continuously.

Q37 **How often do you clean the traps?**

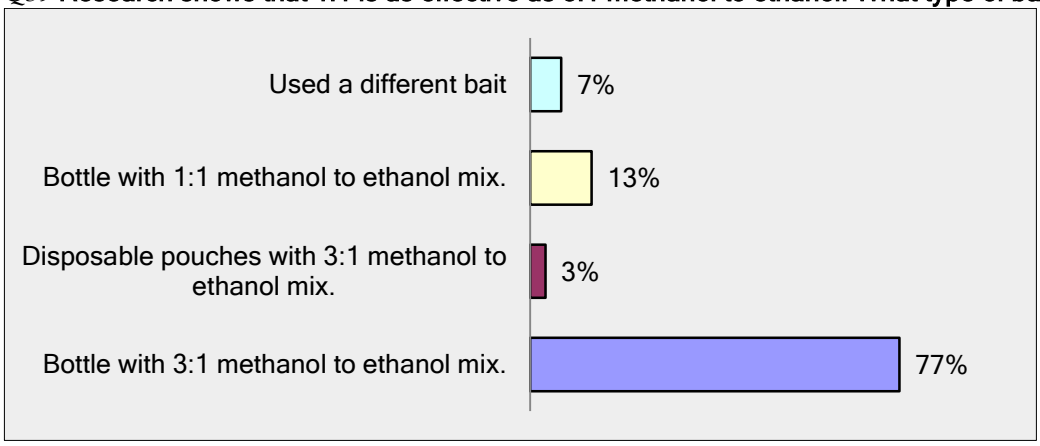


In 2012 38% of farmers clean traps once a month, compared to 2011 when farmers cleaned traps less frequently.

Q38 **How do you kill the CBB in the collection cup?**

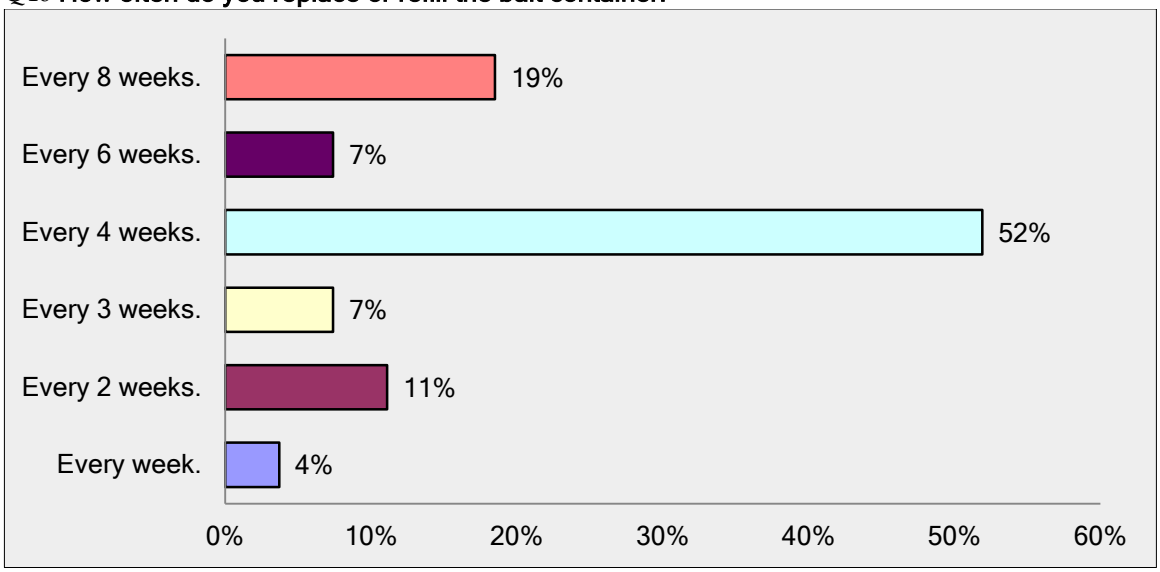
In 2012 97% of farmers use soapy water in traps, 3 % used a pest strip, none used antifreeze.

Q39 **Research shows that 1:1 is as effective as 3:1 methanol to ethanol. What type of bait are you using?**



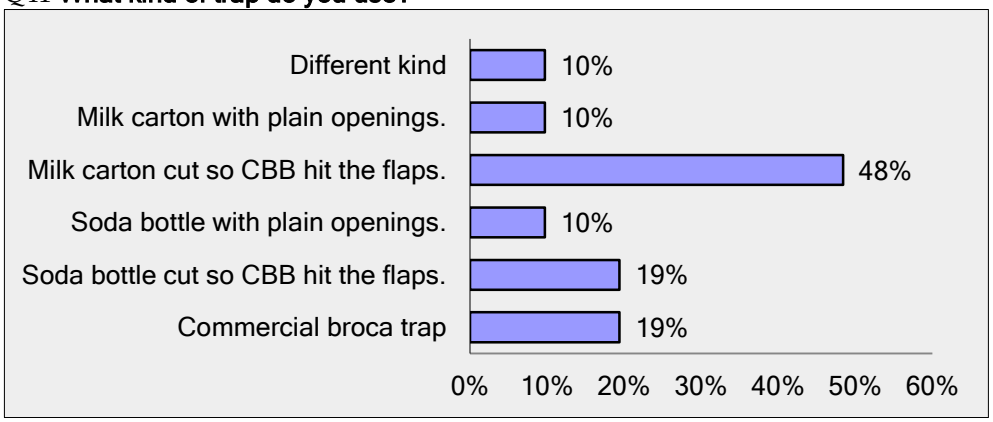
In 2012 77% of farmers use 3:1 methanol: ethanol, 13% a 1:1 mix. If 1:1 is less expensive we should encourage resellers like Greenwell Farms to change their ratio?

Q40 **How often do you replace or refill the bait container.**



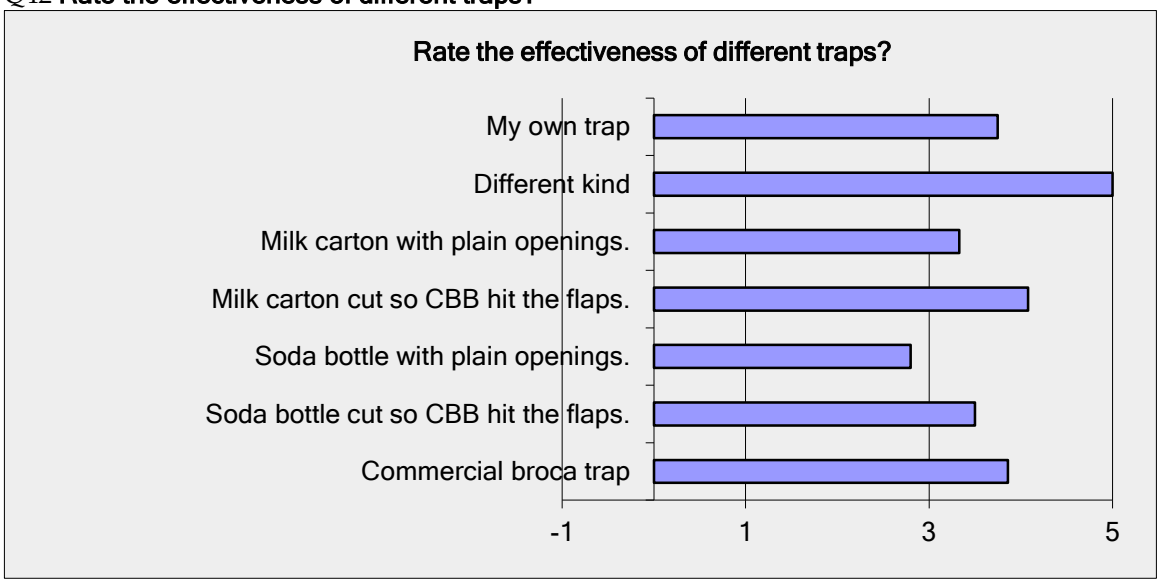
In 2012 52% of farmers replace bait in traps monthly, 26% change at 6 and 8 wk and 24% at 2 and 3 wk intervals. This is similar to 2011.

Q41 **What kind of trap do you use?**



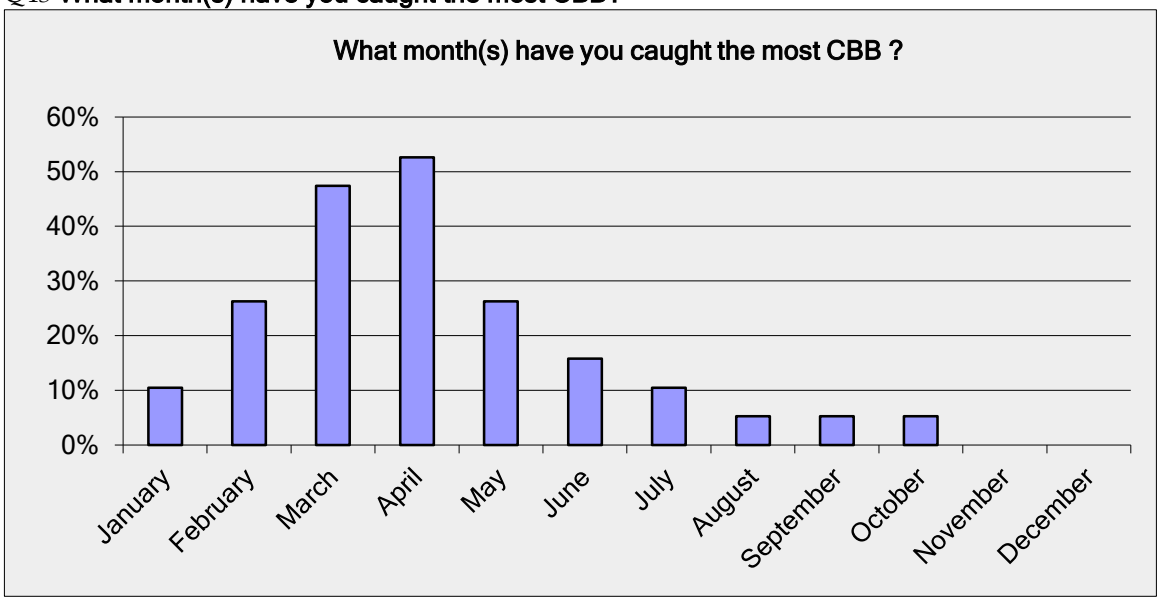
In 2012 86% of farmers use traps with flaps so CBB cannot fly through. Use of the commercial broca trap is 20%. This is big increase from 2011 when traps without flaps were more common.

Q42 **Rate the effectiveness of different traps?**



In 2012 86% of farmers rated traps with flaps as good to very good. From 2011 there has been wider acceptance of traps with flaps to prevent CBB flying through the trap.

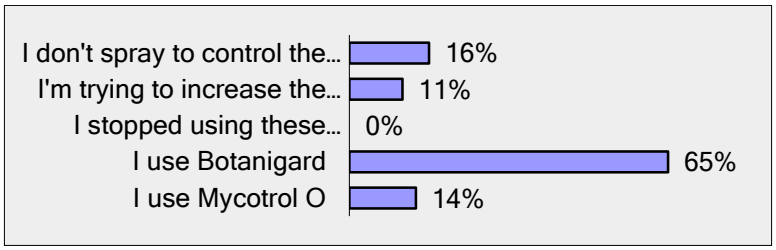
Q43 **What month(s) have you caught the most CBB?**



In 2012 50% of farmers indicate most CBB are caught in March and April, followed by February and April at 25 %.

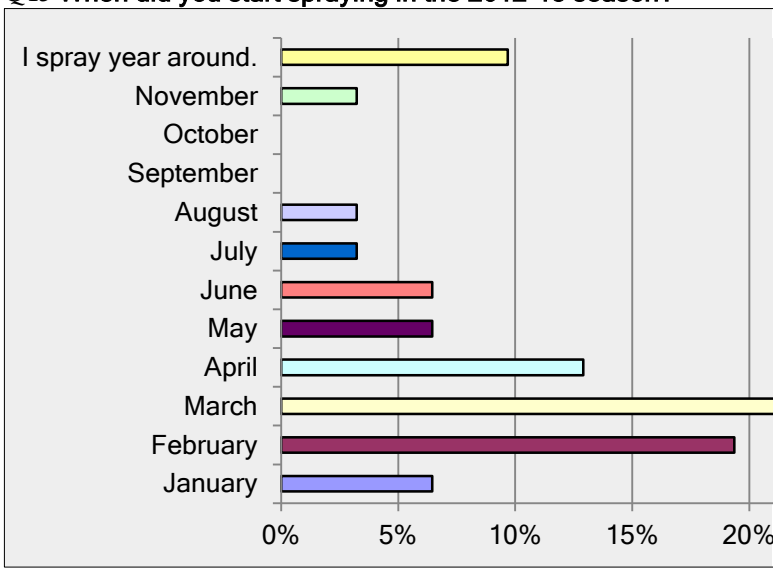
Spraying the fungus to control CBB

Q44 **Are you spraying commercial insecticides that contain spores of the fungus Beauveria bassiana?**



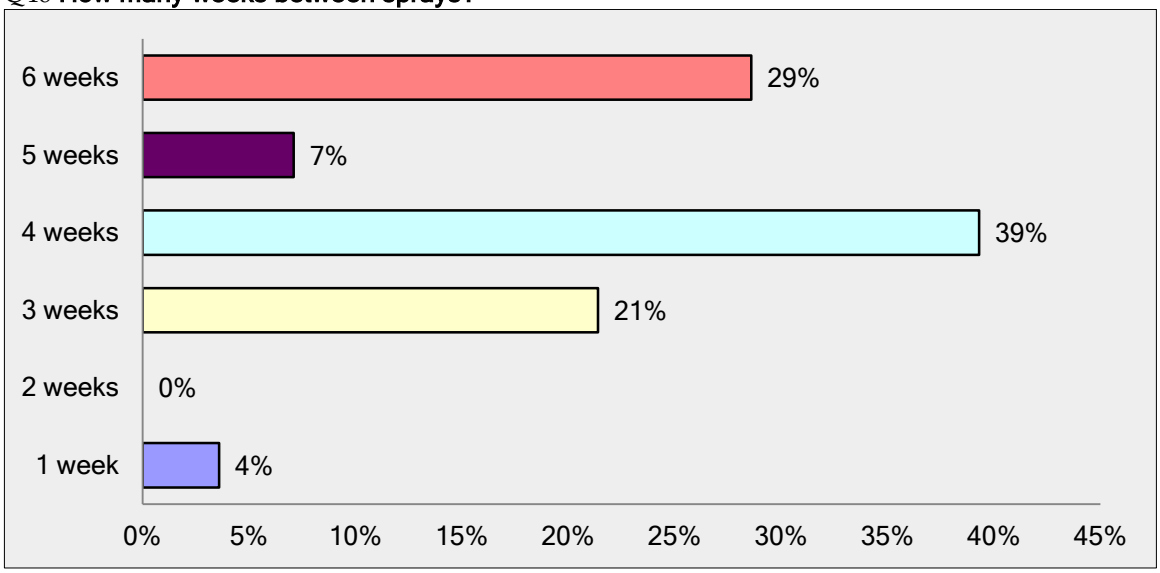
In 2012 80% spray a commercial Beauveria fungus insecticide Botanigard- this is 4 times more than Mycotrol. 16 % don't spray. This is a slight improvement of 2011 when 75% sprayed Beauveria and 24% did not spray. One farmer imports less expensive spray from India

Q45 **When did you start spraying in the 2012-13 season?**



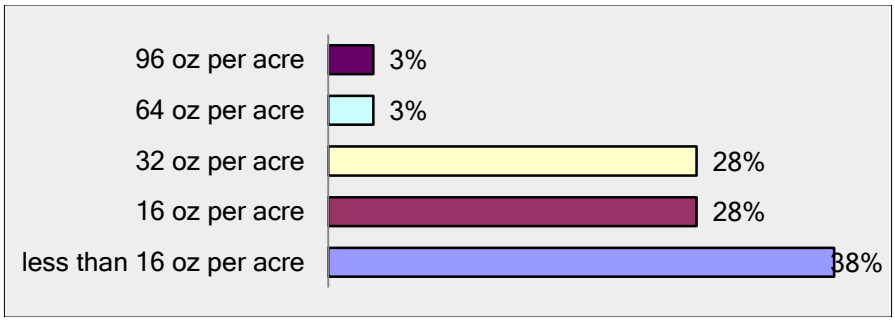
In 2012 48% of farmers begin spraying in February or March; 10% spray year around. In 2011 18% started spraying May and 14% in April.

Q46 **How many weeks between sprays?**



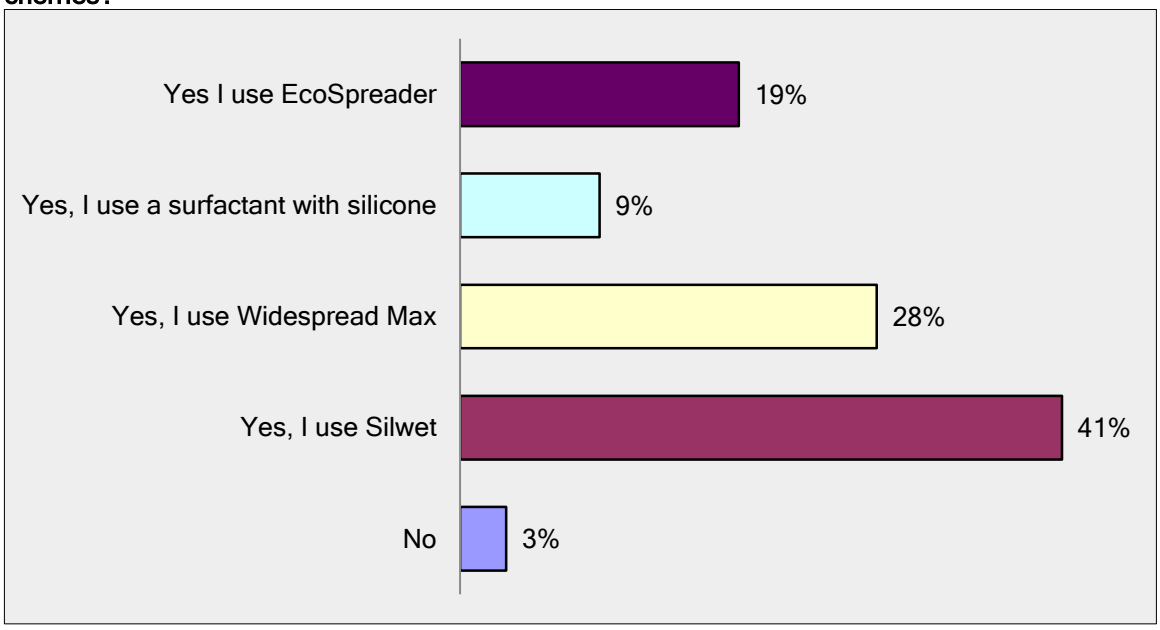
In 2012 39% of farmers spray every 4 wk, 29% every 6 wk. In 2011 27% sprayed every 6 wk followed by 20 % at 4 wk.

Q47 **How much commercial product are you using per acre?**



In 2012 38% of farmers spray less than 16 oz of Beauveria per acre per application, 28 % use 16oz, and 28% use 32 oz. In 2011 most sprayed 32 oz /acre. Beauveria rate per acre per application is decreasing while Beauveria per acre per year is increasing due to

Q48 **Do you add a surfactant or wetting agent to the spray solution to better penetrate the CBB holes in the cherries?**



97% of farmers who spray use a silicone based surfactant.

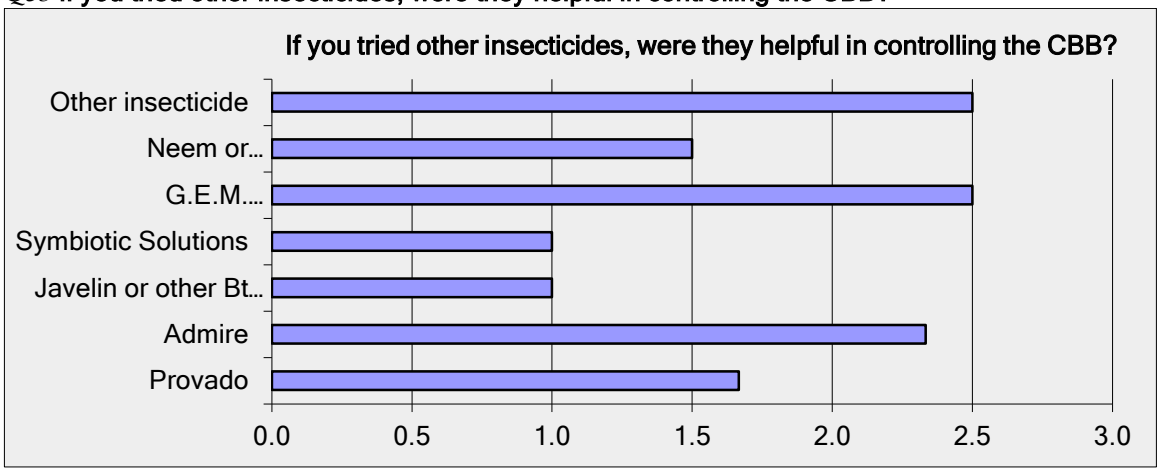
Q49 **If you use a surfactant or wetting agent, how much surfactant do you use**
A typical spray solution is 0.3% surfactant, 4 oz in 24 gallon spray solution. Rate averages 32 gal /acre.

Q50 **How much spray solution do you apply (gallons per acre)?**
Rate averages 40 gal /acre, but a 25% reported using 12 gal or less per acre.

Q51 **What type of sprayer do you use?**
50% of farmers who spray use a mist blower followed by 39% using a motorized pump. This an increase of mist blower and motorized pump sprayer over 2011.

Q52 **Is spraying Botanigard ES or Mycotrol O effective for you?**
55% of farmers felt the effectiveness of spraying the Beauveria was very good or good. This an increase from 2011 when 40% felt spraying was good to very good.

Q53 **If you tried other insecticides, were they helpful in controlling the CBB?**



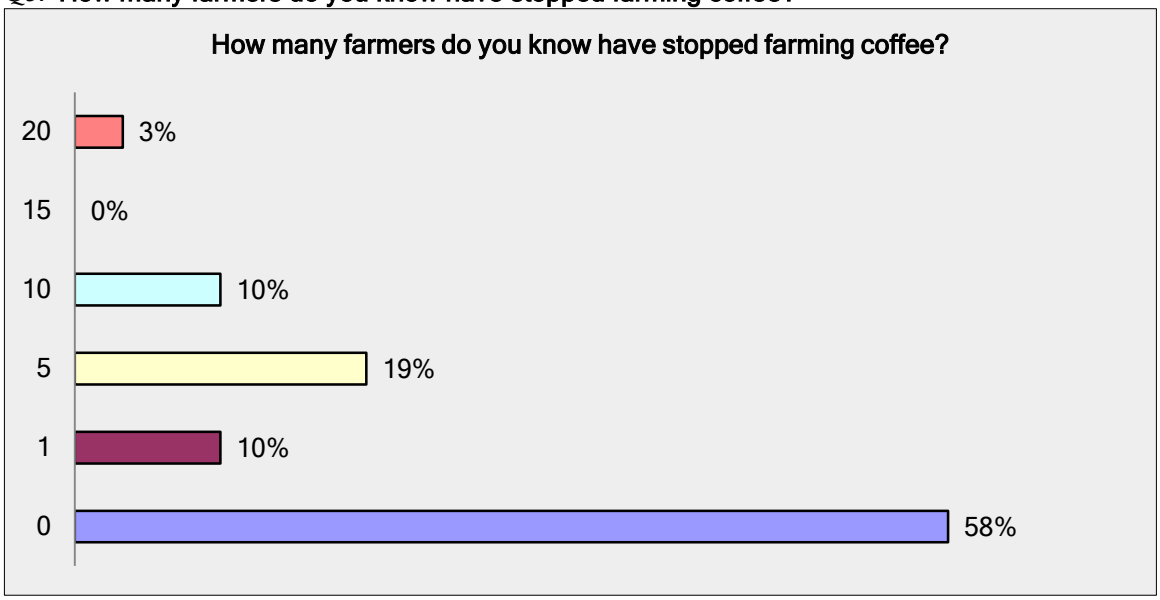
Most farmers have not tried other insecticides. Those that did rated Admire, and G.E.M. as somewhat effective. Also mentioned a soluble sulfur and Kaolin (Surround). Highly effective ratings were noted by couple farmers for Admire Pro and G.E.M. In 2011 few farmers had tried anything but Beauveria.

Questions about farmers leaving coffee due to CBB.

Q56 Are you planning to stop growing coffee because of CBB?

Only 3% of farmers responding are considering getting out of coffee.

Q57 How many farmers do you know have stopped farming coffee?



58% of farmers reported no one was quitting coffee, 19% knew of five, 10% knew of 10 quitting.

Questions about abandoned farms and feral coffee.

Q58 Does your farm border a farm that is not trying to control CBB?

60% of farmers have adjacent farms not trying to control CBB.

Q59 Does your farm border an area with wild, feral or abandoned coffee?

50% of farms border areas with feral or abandoned coffee.

Q60 Do you or someone you know need information on how to kill unwanted coffee trees?

34% knew of someone who needed information to kill coffee trees.

Q61 Where do you get information to control CCB?

Important sources of information to control are: other farmers (84%) , my coffee organization website (68%), CTAHR workshops (66%), CTAHR website (63%), and my coffee organization workshops (60%). Compared to 2011 CTAHR sourced information is increasing in importance.

Observations by farmers, millers .

Q54 Farmer/processor observations.

I am not sure -after participating in the August workshop- whether spraying should start 60 to 90 days after bloom, or go on as long as there is green cherry on trees.

Fungus works when sprayed at the right time. Traps are ineffective when measured by results versus labor time.

Correct timing of trapping and spraying seem to be the most important on my farm. Trap after trees are stripped. Spray at 60 days after blossom and monthly after for 3 months.

I use the 1.5 cups Botanigard 1 cup sticking agent and 3 gals of water in a mix Stihl blower at 1.8 micron setting. I spray 8 loads which covers about 1300 trees. 700 trees are stumped.

I have found spraying Botanigard to be extremely effective. 6 applications per year, at the max recommended application rate on the label, is approx. $130 per acre, per year for Botanigard & Silwet. Adding Admire Pro brings it to $170 per acre, per year to protect $10,000+ of coffee. This is a no-brainer.

We had a hot spot in one area. We picked nearly all the immature green bean from the trees there, placed AgBio traps in those trees and sprayed Botanigard @ 32 oz per acre. That was very effective at knocking it down.

Stripping at end of season works.

It is a lot of extra labor cost to keep and maintain orchards clean

It takes effort.

GEM has worked far better than Botanigard for all of the farms that I have applied it on. Last's a lot longer and is very effective.

The sulfur seems to be effective. I have only seen 2 active CBB and they were both moving very slow. Very few beans seem to be damaged this year as compared to last year even those that show an entry hole show little to no damage. I started spraying late this year so what damage I may have I believe may have occurred before the spraying. Placing the traps low to the ground after pruning and stripping the trees is where they need to be as I have caught a lot up until about May when I was catching fewer.

Best trap for B. bassiana is the cherry

Fungus is cheap if imported from India or cultivated from our own natural fungus. control laws are stupid. let us do it most cost effectively.

Initial invasive species boom seem to have peeked; natural occurrence of Beauveria bassiana increased.

Q55 Suggestions for research

We need effective research NOW. Not pie-in-the-sky on GMO solutions, singular flowering and other projects that have already failed in other regions. Nor do we need more pesticide research, which has also failed elsewhere. The scientists can help the farmers by doing add-on studies to research done elsewhere. For example, take data on rainfall patterns versus swarming behavior here, and compare it to other regions to determine our beetle's behavior.

The farmers' perspective is that researchers see this as a big payday boondoggle where they get to work on what they want, never mind what the farmer needs. One researcher even stated that CBB brought "employment for life". This mindset greatly upsets us.

1) Effectiveness of using the 30 Trees Columbia method for CBB sampling/spraying and how best to adapt the method to smaller farms. 2) When is CBB active? I have seen very little activity right now but there was a lot of activity before beans were full size and even when there were only flowers. Will that increase as the harvest season progresses (e.g. as total "tree-bound" cherry reduces)?

Other trapping methods or ways to reduce their reproduction.
Trapping with light source

Pursue the local fungi.
How can fungus be grown in coffee field without the hard labor of spraying.

Other ways of killing them and preventing them from entering.

Interrupt the breeding cycle

We have enough, after Luis A. It would be great to have "flying teams" in each area to help with gathering the stats, hanging, and tending traps as a group, and helping with the learning curve, as a cooperative effort among 5 or 6 neighbor hood farms. My farm is already divided into 6 equal plots. But some of the other stuff isn't yet clear.

Help GEM become and allowed product so we do not have to hide it's use. The commercial products are to costly and are not very affective.
effect on farmers around you that do nothing.

Are there weather (drought) related spikes in population and is susceptibility a stressed plant response.

Consult more with farmers to see what everyone is doing and getting information out to all the farmers on a regular basis like every 2 - 4 weeks to keep everyone informed as to what is happening. Right now it does not appear to be a lot going on.

Find out how many farmers don't to anything.

Get out of our way. Solutions have no need for bureaucrats.

Read, talk, ask