Hand-out and Questionnaire

for Valley Bees Meeting

Sunday 12 January

This information has been provided by people who were unable to attend our meeting, and wished to offer information.

We thank them for their words.

We hope there is some information offered here that can be of assistance.

Native bees remain one of the marvels of our natural eco-system, and we all remain committed and passionate about retaining the bee-balance in our ever changing environment. The variation and passion shown by the many people currently involved in the industry is inspiring and enriching, and we look forward to some great new information, understanding and designs to evolve.

Our sympathy goes out to those that have lost hives, and we wish you all well in the coming months.

Chris Fuller *provided the following information . . .*

As for protection of the hives from the heat, here are a few ideas. Draping hessian or a towel over the hive and into a bucket of water will produce a wicking type effect and produce a slightly cooler environment around the hive. It seems the critical number is around that 40 - 42 degrees C where the bees start to suffer severe heat stress. Unfortunately for those of us with numerous hives in many locations removal and cold storage of hives is just not feasible but if I only had a few hives and had the forecast of approaching days of these temps I would look at sealing hives with gauze or mesh etc, numbering the hives and stands from which they came, then ***getting them into the aircon until the heat has passed.***

Tim and I suggest keeping lost hives where the adults have died but nest structure is intact to use as splits when splitting healthy hives. Only keep hives that were definitely lost to heat and not any other pest. Take the brood out of the hives and discard it and split as normal using these heat lost halves as though they are empty halves. This will provide a lot of structure that the bees will then not have to collect.

Once we gather more details about the losses from last Saturday and see if there are any patterns to detect we might be able to make some suggestions on the way to best combat that sort of heat.

Once again, to those with only one or a few hives - keep a close look on the weather forecasts especially from websites such as the BOM. This will give you a accurate forecast of days potentially over those critical temperatures and a chance to seal them at night before the heat comes and bring them into the cool. The heat waves rarely last for more than a few days and the bees have a better chance of survival taped up and in the cool. One thing I have always tried to incorporate into my hives is an overhanging eave on the lid to cast shade down the sides of the hives in the middle of the day. Good luck!

Chris Fuller - www.nativebees.com.au

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Tim Heard *provided the following information . . .*

I am not sure how many hives I have lost. All the ones I have checked are OK including one I had in full sun for a trial. I have lost one at Belbowrie where it reached nearly 46 degrees. But that's the only one I know.

I was thinking about what people can do about the dead hives . . .

If the owner of a dead hive is confident that the hive has not yet been blown by natural enemies then he/she can use a dead hive to divide another live hive. First remove the dead brood, check for pests, leave the stored food in place. Then couple each half to a full hive that close to being ready to split. You then have saved the food reserves of the dead hive and recouped some of your loses. I have done this successfully many times before where I know the dead hive is clean.

Thanks for an offer of the questionaire responses. I would be very interested to receive a copy. Giorgio and I are doing some trials on heat and cold tolerance that are relevant and so we may be able to use these results as part of this study. Best wishes to all . . .

Tim Heard - www.sugarbag.net

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John Klumpp *provided the following information . . .*

Here is a message which encapsulates my thoughts. Like everybody else, I don't have all the answers and below is just my attempt to get some discussion and group input going :

G'day everyone. Well, maybe it's not such a good day after we all begin to take stock of the effects of last weekend's heatwave in some areas. A brief inspection of the 30 or so hives I have here at home seems to indicate that they are all OK (but Iíll come back to that in a moment). However, with the strong sea breeze we had here the shade temperature in my yard did not exceed 34 degrees so I donít regard that as a test of my latest hive design. Like many of us who have let a hobby get out of hand, I have had to outpost a large number of hives. The test will come when I inspect those; some of which are situated in very hot parts of Brisbane.

I'd like to say that the worst is over, but I'm not so sure ñ and I'm not just speculating on the possibility of further heatwaves, but rather ongoing repercussions from the one just passed. I've long held the view that many hive losses attributed to invasion by Syrphid flies, Phorid flies and Small Hive Beetles have had their origin in other causes. Many times this other cause is a slump or partial slump of the structure within the hive caused by heat, vibration or impact (or a combination of these factors). For hives with an observation panel and/or effective drainage the problem is often detected quite early, but nests without such provisions (including natural logs) can be suffering such effects without much external evidence until it is too late and the maggots have taken over. This can be many days or even weeks later, sometimes after the event or heatwave has more or less been forgotten. It pains me to say it, but I expect to hear reports of many more hive losses in the coming weeks.

Continued overleaf . . . .

. . . Continued from previous page, John Klumpp . . .

I'm probably a source of amusement for some when I post details of my artificially (and electronically controlled) heated and cooled hives. But these are just examples of me experimenting (read tinkering around) with low voltage devices, because I enjoy doing so. I fully acknowledge that so called 'passive' measures are far more practical. Perhaps it might be appropriate to look at some passive measures we can employ for the future.

Hive location: Arguably the paramount consideration, I prefer to position my hives in shade during both winter and summer. Moving so many hives each year so they get the sun in winter and the shade in summer is not practical for me. The bees may be slower to get going on winter mornings, but I can't recall losing any hives due to cold here at Victoria Point. Avoid reflected or radiated heat as well. For example a hive positioned under the eaves of a tin shed may be in the shade itself, but the metal sheeting may radiate considerable heat to it during the hottest part of the day. As far as I am concerned the direction the hive faces is of secondary importance. If the only shady spots I have available face south or west then that is where I put the hive.

Hive mounting: It is only in the past 5 years or so that I've really noticed how much a star picket with a hive mounted on it vibrates in strong winds and yet most of us (including me) use this method to secure our hives. The vibration is even worse if the hive is struck with a cricket ball or football during backyard sporting events or when bumped by a hip or shoulder while doing the mandatory mile hike behind the Victa every second summer weekend. Combine this vibration or impact with the warmth of even just a usual summer's day and it can be a problem for the bees. During a heatwave it is a recipe for disaster. I now say damn the ants and place all my new lightweight concrete hives directly onto the ground or on round concrete plinths to avoid any vibration. Ants are not really a problem for a well established hive in my opinion. Now before you jump on me and say that trees sway about in a strong breeze and that is where many natural hives are found, I will add that the swaying is much slower and gentle than the hive would experience on a star picket. If we must continue to use star pickets then I suggest we use the good, heavy Australian made ones ñ not the cheap skinny Asian ones they sell at places like Bunnings. Drive them well into the ground and position the hive low down to minimise vibration.

Insulation: is important and has been dealt with in detail on this site over the years. The primary insulation, by which I mean the nature and thickness of the material from which the hive has been made, should not be underrated. Thicker timbers and heavier materials often provide better insulation and greater thermal mass (slower to heat up and longer to cool down), but reduce portability options so this factor must necessarily be a compromise. Making Styrofoam jackets to go over a hive helps with insulation, but sometimes provides a home for spiders, ants and geckoes and may retain moisture around the hive which accelerates rotting of timber hives. On balance I use and recommend such jackets on square or rectangular hives, but they are not without their problems which is why I try to incorporate my insulation within the wall material itself.

Colour: Bob has demonstrated that colour can have a fairly significant effect on the temperature of hives with any degree of exposure to the sun. Even if your hive receives only a little direct sunlight during the day or some filtered sunlight consider painting it white or at least a very pale colour. I have even wrapped reflective foil, normally used in house ceilings, around some hives to deflect direct sunlight from nests that I could not place in full shade. There are some insulating paints on the market and while I have my doubts about the effectiveness of these products others swear by them so maybe they are worth considering.

Hive construction: Initially I thought the insides of my round plastic and lightweight concrete tubular hives was too smooth to provide sufficient anchorage for the bees' building material. I therefore include fixed or removable mesh or 'gutterguard' to provide a rougher surface, which the bees seem to appreciate. On timber hives I don't like the idea of painting the inside surfaces. In fact an undressed timber finish on the inside would be more like the surface the bees would find inside natural tree cavities. At least run some coarse sandpaper around the inside of a dressed pine timber hive to give the bees some sort of 'grip'. The inclusion of dividers or baffles or even mesh at the midline of the hive can also help to support the structure above and lessen the effects of a slump. Consider the option of providing an entrance at the top of the hive, as I now do, rather than following the tradition of putting it at the bottom. T. carbonaria and T. hockingsi tend to be influenced by the position of the entrance as to where they establish most of the brood. In my experience they often align it closer to the entrance.

Pollen is necessary for the raising of young and pollen stores are often positioned near the brood. The alignment of the brood may simply be influenced by returning foragers being in a hurry to dispose of their pollen load near the entrance, but there does seem to me to be a correlation. An upper entrance may influence the main brood mass being near the top of the hive which, in the case of a serious slump would see it ride down on top of the honey and pollen stores rather than being engulfed by them. In any case an upper entrance is likely to remain open to the bees during a major collapse whereas a lower entrance may be blocked. Denis Shepherd actually addressed this issue in the old video we were discussing recently.

Thank you, John Klumpp.

Russell Zabel *provided the following information . . .*

Hi all. I am a man of few words but I am happy to comment about the heat. I have now retired so I guess I can find the time to write a bit more often!

. . . We had a serious heat event (quite a while back), so we decided on thicker boxes (45mm). Many thought we were crazy and even now some still make adverse comments about the thickness. We had minimal losses recently that we know of but we have not visited all our sites as yet!. Most of you know where I live! Believe me, it was hot here. We have hives from Withcott to Bayside Brisbane. No losses with australis and hockingsi. So here is what I think!

Natural homes.

The carbonaria's natural home is a hollow mostly dead gum tree. It will have a100mm hollow (generally) that has been hollowed out by termites. There are many cracks and gallery marks up the inside of this hollow. The space is approx 600mm tall and the bees place a floor and roof at each end using hard cerumen called batumen. This seems to be made of a coarse blend of their building material. I suspect it is porous but keeps out all predators. The sides of the hollow are also sealed with a type of batumen. The colony is therefore isolated from most predators. The termite gallery marks up the side of the hive will allow air to still move vertically up the tree. Remember hot air rises, so the piping effect of the vertical tree takes away the hot air. I have found hives in dead tree in the middle of a treeless paddock. No protection at all. Remember the crow bar you left lying on the ground in the sun. How hot was it to pick up? Keep it standing and it is always quite cool. This is why the vertical tree is quite cool even in the full sun. John Klumpp's PVC boxes are similar to the natural log hives in many ways. Other homes are water meter boxes in suburban Brisbane. A unique different environment to the natural hollow tree! This is a different home with special feature. Mass insulation from the surrounding soil and a generally constant water temperature running throught the water pipes. The lid is at the top of the nest so hot air will rise out of the lid cracks/joint. Other homes that the bees have moved in voluntarily must be unique also.

Man made boxes.

The thin ply and pine boxes are fine for coastal regions so long as there is polystyrene insulation over them. No good for inland areas in both hot and cold events! We have found that the polystyrene actually holds the heat in as the hot air rises and gets trapped in the top! The only way polystyrene covers will work well, is if it is tight fitting and completely surrounds the box including underneath. These timber boxes tend to be well made and are tight fitting. There are no air gaps around the boxes at all. The entry hole is generally very small (8mm diameter) and the box has no other exit holes for air circulation. The lid is the same material as the rest of the box! These box are heat boxes that hold all the heat. I think this is why these boxes fail in extreme heat.

Our box design.

Yes we use 45mm thick cypress pine for the box carcase. Credit goes to Janine for this increase in thickness. The bottom board is 22 mm thick. The lid is a tropical lid with 2 layers of 22 mm cypress separated by a 22mm gap. The hives have a honey box on the top too. This is simply a third storey that has a ply baffle at the bottom of the honey box to isolate the brood from the honey stored above. We think the heat rises into this honey box and is further away from the brood below.

We use white paint! We mount them on a star picket for height. The entry hole is approx 22mm diameter. The bees size this down to suit. There are 2 drain/breather holes under the hive. The box layers are not tight fitting with each other. The boxes are each 95mm high but variations in the timber width means that there are gaps between the box parts. The tropical lid allows air to pass through the gap at the top. We keep our hives under shady trees so that they are in shade by 10am in summer. These boxes are not perfect and they are made via mass production of approx 500 at a time. I haven't the time to make them pretty and perfect.

I think I have said enough. I am certainly not looking for a debate about this topic. The above are simply observations. We have kept these bees for over 25 years. I have done 1000's of log transfers and 1000's of splits and made over 6000 empty boxes.

I hope we have it close to being right. Our bees are our business. We rely on these bees for part of our income.

My deepest sympathy to those who lost many hives. It is truly devastating. We will probably lose dozens too, but we can bounce back again as we have a large hive population spread throughout the region. The dead boxes can be scraped clean and used again for splitting next season. Let's hope that the rest of the summer and autumn months are more favourable to us and the bees. As I say to everyone I talk to - 'Native bees are the perfect pet.' Kindest regards . . .

Russell Zabel - www.zabel.com.au

Casey Pfluger *provided the following information . . .*

I was logging the temperature change/60sec in three bee box designs I have hives in during part of the heat wave using a high spec temperature datalogger (HOBO Brand) recommended by Bob Luttrell and purchased from a company with Brisbane offices called OneTemp. I will be collecting the temperature data in - 7 days time and would be happy to make it available to you.

The maximum temperature reached internally was at least - 39.9C which matched the external air temperature.

I have transported two of my hive designs to Gayndah QLD to relatives there who have noted the general lack of all bees including ANB species in the area in recent years compared to 5 years ago. The temperature in Gayndah in the recent heat wave reached - 44C and routinely shaded day temperatures in summer reach into the low to mid-40C range every day. Both of these hives are in shaded positions. Both of these hives have survived and flourished for 2+ years now including the recent heat wave conditions. This hive design incorporates a hive ìcoreî contained inside an internal insulated 1.25L soft drink bottle which I have then encased in a thick wooden box structure - see the youtube :

link : http://www.youtube.com/watch?v=drkEQQuBlqk

Brazilian Video that inspired my soft drink bottle experiments :
http://www.youtube.com/watch?v=9Bdu1YCPGms

All my hives were still active and foraging at the top temperature although there was a lot of ventilation fanning going on. It was audible from about 2m away from the hive entrances.

My strong impression is that it is the rate of temperature change rather than the high temperature itself that causes major problems as far as the hive brood and workers. If the rate of change in temperature is slowed then the bees can adapt their survival strategies and cope with the increasingly hot summer temperatures.

I also had some SHB maggots growing in some experimental liquid media I have been developing as a trap liquid for SHB, Phorid and Syrphid parasites. All of the maggot tubes survived apart from one where on a whim prior to the heat wave I had put a couple of tablets of No-Doze (High caffeine content) to see what would happen. The maggots in this tube are all dead. This may or may not be of significance for dealing with SHB larvae. Note: The maggots were fine in the caffeine-media prior to the heatwave but during the heatwave they died only in this media. This may be one advantage of increased temperatures if we can harness this process.

I am getting the impression that parasite attack during times of stress such as the recent heat wave is a major contributor to hive death. To kill a strong hive seems to require a combination of the following factors:

1. Damage to the external seals.

2. Imperfectly sealed hive containment.

3. Already present parasitic infection such as low level Phorid fly infestation.

4. Lack of bee numbers available at the entrance of the hive to prevent entrance of parasitic insect species.

5. Lack of insulation to slow the rate of temperature change over time. This can be via thin-walled hive boxes or choice of materials with a high rate of thermal conductivity such as metal or certain plastics.

6. Lack of internal hive support structures inside hive boxes. Especially surrounding the centre of the hive where the brood is usually situated. This results in slumping of hive structures which increases parasite access to sensitive portions of the hive and can also block the hive entrance preventing ventilation, cooling, removal of wastes and entry of foragers.

7. Lack of base support for the bottom of the hive. Wherever possible there needs to be a raised gridded section at the base of the hive box that has an open section available below this section so that if the hive structure does collapse it is then able to drain down into the empty section allowing the hive to recover.

8. Entrance design: If the entrance of the hive is too low on the box then this can increase the chance of hive death in cases of hive slump and also reduces the ability of the hive to vent heated air. The entrance of the hive should be placed at half way or higher up on the side of the box. Support structures should be placed to surround above and below the hive entrance area to ensure that this section is supported under hive slump conditions. Angling the entrance at either a rising or falling 45 degree angle may have an influence on hive resistance to slump.

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9. Lack of extra precautions during eduction, transfer or after splitting: Extra precuations must be made during vulnerable periods such as during eduction or after splitting or transfer:

a. Parasite traps need to be placed around the entrance of vulnerable hives to prevent opportunistic infection.

b. Hives placed too low to the ground are more vulnerable to parasitic attack. Hive should be raised above ground level.

c. Hive entrance should be extended away from the body of the hive using garden hose or other suitable tubing material. The extended entrance away from the hive body reduces the effectiveness of attacks by egg-laying parasites. There is some indication that SHB and Syrphid eggs are laid close by to the hive location where maggots hatch out and travel to the hive entrance. Perhaps drawn there by some of the same pheromones which have been shown to identify individual hives to hive members.

d. Has the use of fly-paper style traps placed around the sides and rear sections of a hive been explored as a parasite trapping mechanism? I have observed that Phorid and SHB will make their way all around the surfaces of a hive looking for an entrance site apart from the main hive entrance. A fake fine gap in hive integrity which instead contains a sticky ìhoney-trapî may prove very effective in preventing parasite attacks to the real hive entrance especially for the tiny SHB juveniles which try to enter any small gap in a hive and appear to be missed by hive defenders purely due to their extremely small size (2-3mm in length and 1-2mm width) and wood-shade camoflage colouration.

e. Hive entrance diameter should be reduced by use of shaped wax and/or aluminium foil to reduce ability of parasites to access hive.

f. If parasite load is observed to be high and phorid parasites observed inside a hive then an internal parasite trap should be placed inside the vulnerable hive to catch the parasites pursued by the hive members.

g. If SHB or Syrphid maggots are observed inside a hive then this is indicative of a major parasitic infection and a breakdown of the hive defences in general. At this point all efforts must be made to ensure that.... (lost text)...

h. If at all possible any opening of hives should be done outside the peak parasite attack times. In my experience in summer parasites are most active between 9am and 4pm. I have never seen phorid or syrphid parasites attacking hives after dark. Others may have more detailed information in this regard. Hives can be opened and worked on outside these hours without any significant damage to the brood as long as the air temperature is above 25C. Bees are able to find their core brood via pheromonal signals even in complete darkness and act automatically to protect the core brood. Bees outside the box of a hive transferred at night will happily overnight outside the new hive space and join their hive members the next day.

i. The only proviso preventing hive work being done outside the hottest periods of the day is when temperatures are below 25C such as during winter. Work during winter should be done once temperatures have reached 20C or above.

j. Work done during winter should only be done if hive parasites are not active as the lack of pollen and resin reserves during colder periods make hives especially vulnerable during winter. In my experience however, there is no observable parasite activity during winter in the Brisbane area at least.

I agree with Bob Luttrell re: the best way to prevent hive collapse is to incorporate internal supports made of either wood, fine bird mesh or plastic gutter guard (K-mart $2/10m). If internal structures are...(lost text)...

I am happy to provide bulk parasite trap liquid and traps to anyone who would like them but they will need to pick them up from my home location at Taringa, Brisbane or my workplace at RBWH Herston.

I think that this is a very good idea to link up as many people as possible in efforts to ensure the retention of the maximum diversity of Australian Native Bees.

Casey Pfluger - ANBees@yahoogroups.com

The extreme heat wave over the past weeks has impacted drastically on native stingless bees over a wide area. Many hives have been lost, and others have been weakened. Reports of major losses are still flowing in, with quite a number of keepers losing over half their hives. Operators in the native bee industry are very concerned.

Please, it's very important if you have lost any native hives, to answer and share these details.

QUESTIONNAIRE

1. How many native stingless hives did you have, in total, just before the recent heatwave?
a. Boxed hives.
b. Log hives.

2. What locality / region are your hives kept in?

3. Did you lose any of your hives over the past 10 days or so, due to the heat? How many?
Indicate if they were boxed or log hives that were lost.

About the hives that you have lost :

4. What species of bees were they? (Just indicate 'unknown' if you are uncertain)
a. Hockingsi
b. Carbonaria
c. Australis

5. Where were the hives kept?
a. In full shade
b. Half sun, half shade
c. Full sun
d. Other (please indicate)

6. Did the hives have any extra protection?
If yes :
a. Covered in slip-on styrene case
b. Styrene / styrofoam pieces packed around it / laid on top
c. Other (please indicate)

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Please, this is important:
7. What was the wall thickness of the hive/s?

8. We welcome any additional comments or observations from you, that are specific to your situation and your hives. This feedback is important.

9. Optional : If you have a few photos of the dead-out hives, please send them through. These would be much appreciated in the research.

10. Optional : Name / contact details (only if you wish to provide, but this would help).

This is vital information to the native bee industry. The results of the survey will be used in research, and will be of great assistance in ensuring less hive impact from the extreme heat in the future.

When emailing, please just simply send your response as typed text relating to the numbered questions.

Send your response either to -
Athol Craig, 18 Gallilee Road, Gympie 4571
Email : glenbo@live.com.au

or email direct to Dr. Giorgio Venturieri
Email : gventurieri@gmail.com
(Giorgio's mobile is 0405 678 348 if you need to relay a direct message).

Giorgio has been researching temperature tolerance of our native bees for the past year, and this real life situation adds to his report.

Valley Bees