

## Spring Active Dung Beetle Nurseries



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*Bubas bubalus*

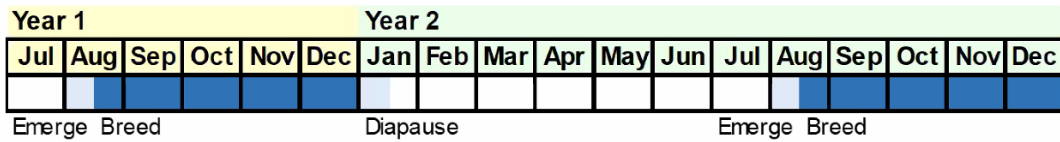


# *Onthophagus vacca*

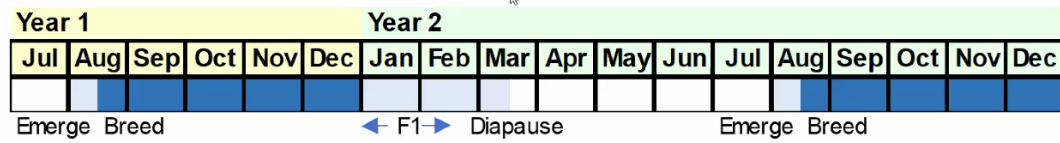


## Life Cycles

### *B. bubalus*



### *O. vacca*



## Nursery types



SZ/LZ nursery

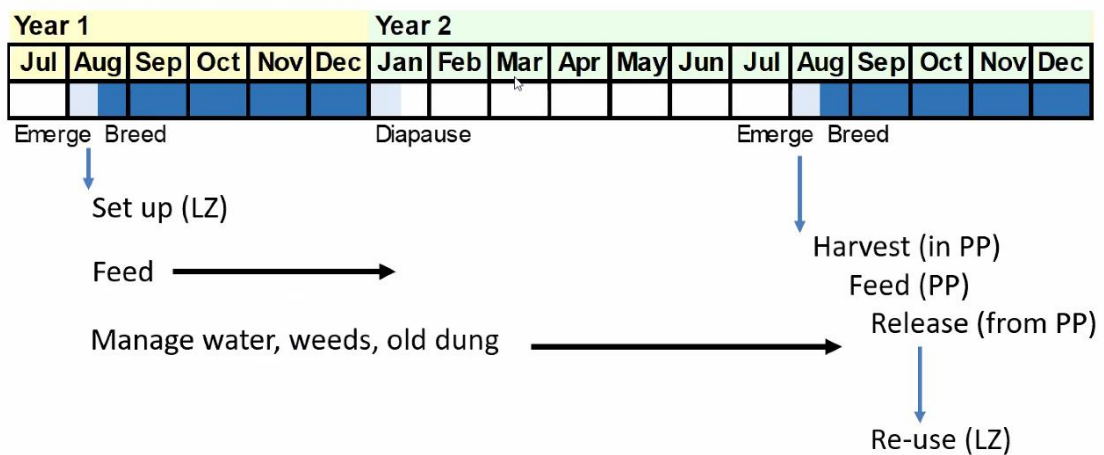


PP tent



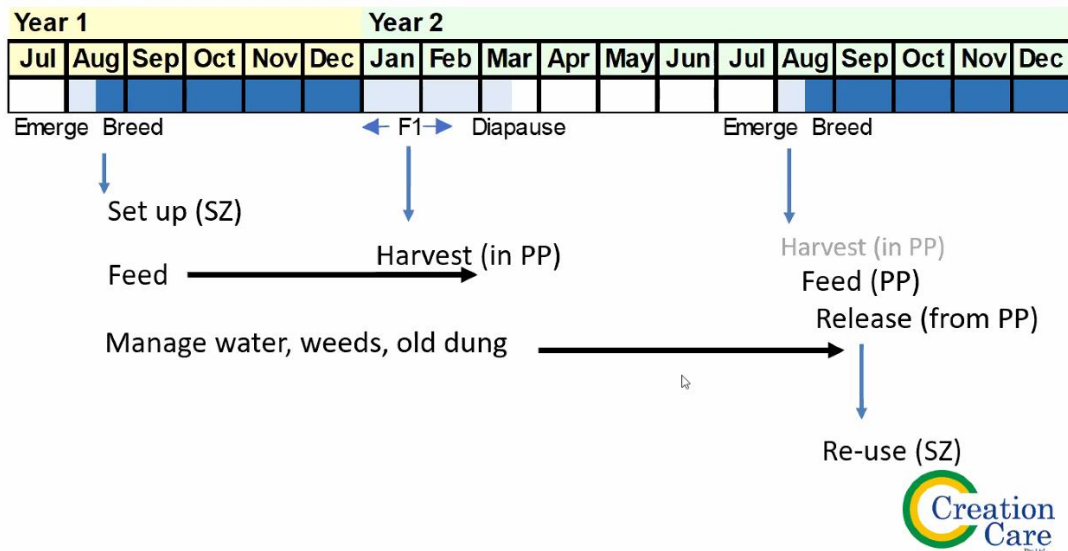
## Management timeline

### *B. bubalus*



# Management timeline

*O. vacca*



## Nursery procedures



SZ/LZ nursery



PP tent

1. Location of nurseries (SZ/LZ and PP tent)
2. Managing nurseries (SZ/LZ and PP tent)
3. Feeding breeding nurseries (SZ/LZ)
4. Harvesting nurseries (into PP tent)
5. Releasing beetles (PP tent)
6. Results



# 1. Location

- Central to stock rotation paddocks, or cells, to maximise breeding when beetles released – especially important for PP tent.
- Away from tree root zones, to minimise moisture loss during summer.
- No shade from the north
- North facing slope best
- Shelter from cold southerly winds.
- Fenced off, so stock can not interfere with nurseries
- Away from flood zones, frost hollows, rocky ground.
- “Typical best pasture”



Bucket of dung

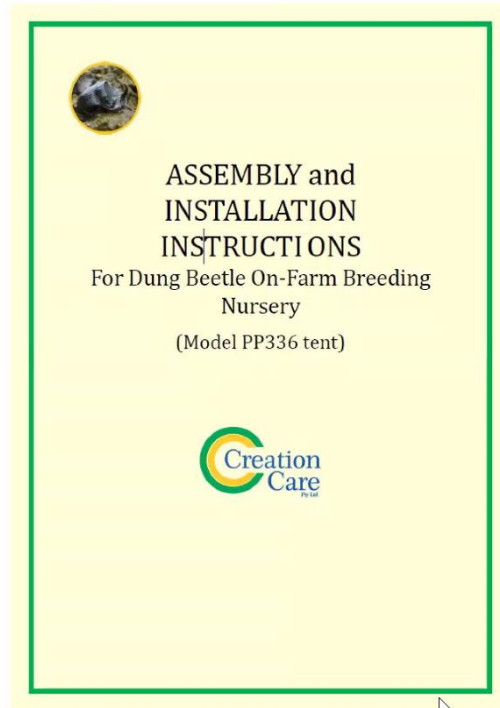
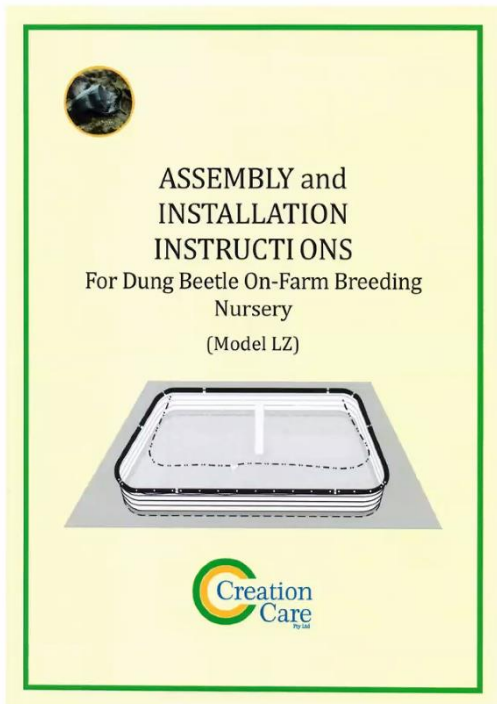


## Victor Harbour 550 mm/yr



### Survival location





Layout



Trench



10 cm



Pins



Tamp  
soil



Finished

## 2. Management



Weed control (zips clear, observations, humidity)

- brush-cutting
- hand-weeding edges of PP tent
- Spray is OK: recommended for kikuya/couch, no dye

Old dung removal

- mites and dampness
- Stand it up at side of nursery to dry out and ensure all beetles exit it

Timing

- Do maintenance (and feeding) outside beetle activity times:
  - 11 am to 3pm for *O. vacca*
  - late afternoon to early morning for *B. bubalus*



## 3. Feeding - dung

- Collect fresh drench free dung (from dairy easiest) and store in a bucket/tub with 2-3 mm holes in the lid to vent gases.
- Store buckets/tubs of dung in the shade; approx. 2 weeks OK
- Using 1.0 or 1.5 kg/L saucepan or measuring jug, place scoops of dung evenly spaced inside the nursery:
  - 5 scoops x 1.0 L for 100 vacca in SZ
  - 7 scoops x 1.5 kg/L for 100 bubalus in LZ, (or 10 scoops x 1.0 kg)





## Feeding - release Beetles

- Beetles will arrive in a container with Coir Peat.
- Gently remove handfuls of Coir Peat with beetles and place them directly next to dung scoops.
- Repeat this next to all dung scoops keeping an even amount of beetles per dung scoop.



## Feeding - frequency and amount

- Feeding beetles should be every 5 to 7 days - depending on activity level.
- The amount of scoops to place each time is dependant on the amount dung that has been consumed from the starting scoops.
- If 2 or 3 dung pads have been consumed (overall) then replace with 2 or 3 fresh scoops of dung directly "adjacent" to consumed dung pads.
- At every inspection for feeding put at least one (small) scoop of dung in so that the fresh smell of dung is in the nursery.
- General rule no less than a "smell scoop" and no more than 5-7 scoops, every 5-7 days.
  - 5 total scoops x 1 L for vacca,
  - 7 total scoops x 1.5 L for bubalus



You are viewing Greg Dalton's screen View Options





## Feeding

### - according to season

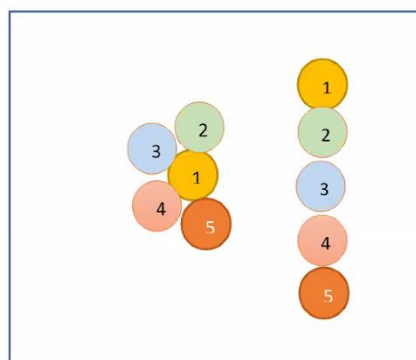
- During hotter months dung will not last as long, drying out quicker, this becomes waste and must be removed and replaced with fresh scoops of dung.
- Stand up unused dung on its edge at the side of the nursery to allow any beetles to escape, before throwing out the dried pad at the next feeding event.
- There must always be some fresh dung inside the nursery during active periods.
  - *B. bubalus* active from early August through to January on Fleurieu Peninsula, SA
  - *O. vacca* active from mid August to February on Fleurieu Peninsula, SA



## Feeding

### - tips

- Do “adjacent feeding” to maximise the use of the nursery space
- OK to feed over the same ground a second time, look for spots of unworked soil
- Don’t panic if you are a day late with feeding and all the dung is gone



## Feeding F1 *O. Vacca* in Jan-Feb

80 beetles/kg dung (120 beetle/1.5kg)

Approx. 2-3 weeks after last beetles put in = shredding stops

Will not be soil casts



Lots of tunnels, beetles obvious in dung & shallow in soil



Stages of shredding



## 4. Harvesting

When to start

Summer harvest

Vacca F1 Dec/Jan when shredding starts



Spring harvest

Feed SZ/LZ from early August onwards (in SA)

- 2 x 0.5 L dung stations per SZ/LZ, every 4-5 days
- Look for activity = soil casts and tunnels under dung



- When its obvious there are more than two or three beetles active then start trapping





# Harvesting - what You Need

- Plastic trapping tray supplied with SZ/LZ
- 3-4mm sieve for vacca
- 6-8 mm sieve for bubalus



# Harvesting - what you need

- Coarse sand as this does not clump and is easiest sand to sieve.
- Secure sealed plastic tub with ventilation to temporarily hold the beetles

Note: Any sand or soil will work just the effort to separate it from beetles will take longer.





## Harvesting - set up trap

- Remove any old dung crusts from SZ/LZ nursery
- Dig out soil in the middle of SZ/LZ in the shape of the tray
- Place tray in hole making sure that soil is level with top of tray as beetles often walk into the trap
- Fill with coarse sand or soil, damp not wet
- Place approximately 0.5 L of fresh drench free dung on top of sand
- Assess trap every 3-5 days, or daily if numbers are high

Note: Any remaining fresh dung that's in the enclosure should be placed onto the trap to maximise attraction to the trap. Or, wash out the dung to ensure no beetles are discarded with it.



## Harvesting - emptying the trap

- Remove dung from trap and leave it in enclosure (disposable gloves recommended)
- Remove dung in low activity times to maximise amount of beetles in the sand and not in the dung

Note: If you must harvest while activity is high then use a watering-can to water the surface of the entire enclosure to slow the beetles down.





## Harvesting - emptying the trap

- Place sand from the tray into the sieve then place the tray back into the soil insert in the SZ/LZ
- Sieve sand over tray so that sand is sieved back into the tray, to minimise waste
- If you don't have a sieve, carefully sift through the sand by hand and pick out the beetles. This works fine with the large bubalus beetles, but it is easy to miss the small vacca beetles.

Note: If sand/soil becomes too wet (from dung or rain) then refill the trap with dryer sand/soil.



## Harvesting - emptying the trap

- If sand or soil is hard to sieve use a watering can (or hose) to wash the sand/soil through, this also helps slow down beetle activity and their potential to fly away.
- Once sand/soil has been separated you can easily pick out beetles, count them and place them in the plastic tub.
- Any other species of beetle found in the sieve are to be removed and discarded
- Place any sand/soil/debris from sieve back into enclosure just in case there is any missed beetles in it.





## Harvesting – picking out the beetles



### Harvesting - rest the trap

- You may have to top-up the sand in the trap
- Make sure to put any removed dung from the trap back onto the trap as well as fresh dung for the smell factor.
- When the dung on the trap builds up, or there is lots of dry dung on the trap – it is time to wash out all the trap dung to look for beetles, then start with a fresh 0.5 L of dung on the trap.
- Ensure the soil level is at the top of trap





## Harvesting - check the sides of the nursery

- For vacca, excavate the sides of nursery as majority of beetles that are not trapped are usually within 100mm from the inside edge and at 200mm deep.
- For bubalus, check for tunnels near the sides of the nursery and dig to find the beetles.

Note: This is not always necessary but if there is competition from other beetles or not enough fresh dung in trap then beetles will be found around the inside edge, mainly in the corners.



## Harvesting – handling the beetles

- Place harvested beetles into secure plastic tub
- Keep beetles in plastic tub in the shade at all time during harvesting activities
- Beetles should not remain in the plastic tub for longer than 30 minutes unless there is a medium in the container such as cool soil or coir peat.



## Harvesting - release into PP tent

- Evenly distribute scoops of dung throughout PP tent
  - 1L dung for every 50-60 vacca (Jan), 30-40 (Spring)
  - 1.5L dung for every 25-30 bubalus (Spring)
- Release harvested beetles onto dung in PP tent.
- Feed ad lib in PP tent
  - Vacca in Jan: till activity stops, 2 -3 weeks
  - Bubalus in spring: until all soil fully worked, then open PP tent
- Use drench free dung which has been collected and stored in a full bucket for 3-4 days, with 2-3 mm holes in the bucket lid, to vent gases.



## 5. Releasing beetles



SZ nursery



PP tent



Releasing

Vacca	100 beetles	x 10 =	1,000 beetles	x 10 =	10,000 broods survive
	Sep 2021		Jan - Feb 2022		Oct - Dec 2022
Bubalus	Sep 2021		Sep 2022		Oct - Dec 2022
	100 beetles	x 6? =	600 beetles	x 6? =	3,600 broods survive
					<b>Aim for minimum 800 - 1,000 surviving broods</b>



## PP tent steps

Beetles into PP  
- Vacca in Jan  
- Bubalus in Sep-Oct



Spring: Feed till all soil worked = full of broods;  
2-4 weeks ~ number.



Cattle contained around PP tent  
(fence, cells, hay)



Open tent to allow beetles to escape



Close tent when all beetles gone (~ 1 week)



Following spring

- open tent for another release
- or, harvest beetles and relocate



## 6. Results

800-1,000 minimum target

Year 1: Spring		Year 2: Spring		Year 2: Release
Start number	Increase Ratio	PP tent number	Increase Ratio	Surviviing broods in soil
100	4	400	4	1,600
100	6	600	6	3,600
100	8	800	8	6,400
100	10	1000	10	10,000
100	12	1200	12	14,400



# Results

## Greater than 400 beetles in PP tent

- May have to open PP tent early (1-2 weeks)

## Below 400 beetles in PP tent

- If PP soil is not fully worked in Spring 2021, leave till 2022, feed and release in Spring 2022 – adds another couple weeks work in Spring 2022
- Accept as unsuitable:
  1. Site
  2. Season
  3. Other factor



## Spring Active Dung Beetle Nurseries



Book: Dung Down Under by Bernard Doube & Tim Marshall