

## **Darkling beetles, Eastern lubbers, Fiery searchers & Longhorn cactus beetles** **(*Eleodes armata*, *Romalea guttata*, *Calosoma scrutator* & *Moneilema gigas*)**

### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

\***Lightly** mist grasses and mist cactus on occasion

\*Sweep all feces from the tops of the rocks with the small broom and dustpan (use a ladder if necessary to reach). Occasionally (1x a week or so) the rocks should get a good scrubbing with a wet scrubby sponge to remove stuck on feces but NEVER use soap or any other chemicals in the exhibit!

\*Using a wet paper towel, wipe the back and side walls (get a ladder if necessary) to remove any grasshopper feces that you can see. Be sure to also wipe the feces smears from the front window and window ledge as well.

\*Remove any extremely wilted greens **daily** and replace with fresh greens if necessary

\*If the Fluker's is empty or dried out please add more or replace; the same goes for the Beetle jelly. Remove any feces you see on the jelly or Fluker's for aesthetic reasons.

\***On an Herbivore feeding day:** replace **ALL** greens and produce with the appropriate diets for each species



Darkling Beetle diet

\*When making the diet to the left, be sure to THINLY slice the sweet potato; the insects need a thin edge so that they can get their mouthparts around it. Place this dish on a rock up high.



Eastern Lubber diet

\*For the Eastern lubbers put out 5 to 6 pieces of romaine or red leaf lettuce on top of the rocks; they can occasionally be given a piece of kale, collard greens, cucumber or apple as enrichment.



Cactus longhorn diet

\*The cactus pad should be cut in half; if the population in this exhibit is greater than 25 beetles, additional cactus pads may be given. Place the cactus pad lower down in the exhibit, on the rocks near the live cactus

\***On a Group B Carnivore day:** put out the correct diet for the **Fiery searchers** (see diet chart)



## **Milkweed leaf beetles (*Labidomera* sp.)**

### **Daily exhibit care:**

\*Check lid for any adult beetles when opening it! Pull off any beetles on the lid and place them down into the enclosure

\*Check for any deceased animals and remove them from exhibit; because there are SO MANY milkweed beetles, an individual death does not need to be recorded on TRACKS. Write the death on the Bug Daily notes table; periodic census count updates will be done as needed.

- **SPECIAL NOTE!** The monarch larvae and adults are NON-ACCESSIONED so do not record on TRACKS if you find a dead caterpillar or butterfly

\*Lightly mist browse and water/mist exhibit plants; the substrate in this enclosure should always be moist

- If there is a butterfly chrysalis on exhibit DO NOT directly mist the chrysalis

\*Wipe any mist or condensation from exhibit glass with microfiber towel. Wipe away any feces that is on the glass. If there are eggs or beetle larvae on the glass, try to clean around them and don't disturb them. If any eggs do get onto the towel be sure to remove them and replace them OR place them in the insect trash so that you do not transfer them to another exhibit by accident.

\*Remove any yellow leaves or wilted browse and replenish with fresh browse OR do a full browse change if necessary. **Fully change browse for this exhibit 4-6x/week;** record on exhibit card when full change is done (see below for instructions)



\*Remove any dropped leaves from the bottom of the exhibit so that it looks tidy

### **How to replenish/change browse:**

1. Remove browse one piece at a time, checking carefully for adults and juveniles on each piece.
2. Place any adult insects that you find back in the exhibit. If you find any larvae on a piece of browse you may place that browse back into the exhibit with the larvae in place if it is not too wilted or you may gently remove the larvae and place it onto fresh browse.
3. As you remove the browse, double check to be sure you have removed all larvae and adults and place it into the insect trash for freezing (since there will likely be eggs on much of the browse)

4. Once all the bad browse is removed, replenish with fresh browse (if doing a partial change) OR remove the browse cup, rinse and fill with fresh water and then fully replenish with fresh browse.

- The picture to the left illustrates an appropriate amount of browse for the milkweed beetles

### **Asian forest scorpions (*Heterometrus longimanus*):**

#### **\*This is a venomous species\***

#### **Daily exhibit care:**

\*Check lid for any scorpions before opening it! Use tongs to remove any scorpions on the lid and place them back into the enclosure.

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

\*Heavily mist the back wall of the exhibit (not necessary if automatic mister line is open); the substrate in this enclosure should always be moist

\*Wipe any mist or condensation from exhibit glass with microfiber towel being VERY CAREFUL not to place your hands too close to any scorpions when doing so.

**\*On a Group B Carnivore day:** feed out the correct number of crickets per scorpion (see diet chart).

\*If you see any crickets left in the enclosure on a non-feeding day, remove them if you can do so safely. (ie. If you don't have to reach under a scorpion to get them!)

## **Giant desert centipede (*Scolopendra heros*):**

**\*This is a venomous species\***

### **Daily exhibit care:**

\*Check lid and back wall for the centipede before opening it! If you do need to move the centipede off of the lid or reposition it in the enclosure be sure to put on gloves. Use tongs to move the centipede (grasp it GENTLY in the middle) from the lid if necessary. Be prepared when grabbing the centipede with the tongs as it is **FAST** and will try to bite at the tongs when it is restrained.

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

\*Heavily mist the back wall of the exhibit for approximately 10 seconds; the substrate does not need to be completely moist

\*Wipe any mist or condensation from exhibit glass with microfiber towel being VERY CAREFUL not to place your hands too close to the centipede when doing so.

\***On a Group C Carnivore day:** feed out the correct number of crickets to the centipede (see diet chart).

\*If you see any crickets left in the enclosure on a non-feeding day, remove them if you can do so safely. (ie. If you don't have to reach under the centipede to get them!)

\*Try to make sure the centipede is visible in this exhibit; you will probably have to GENTLY grasp the centipede in the middle using the tongs and place it close to the public glass for viewing. It helps to place it where it feels sheltered by the log pieces on exhibit. If the centipede is very agitated and keeps running around after a few times moving it, do not stress it out any further. Allow it to settle and attempt to move it again later; DO NOT attempt a later move once Bug House is open to public.



- Example of good centipede placement for public viewing



## **Gooty sapphire tarantula (*Poecilotheria metallica*):**

### **\*This is a venomous species\***

#### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

\*Be sure you know where the spider is before opening the lid to her enclosure! She is generally in the front corner in the webbed area she has built and usually will remain still as long as you don't disturb her. If she is on the lid of the tank DO NOT open the lid as she is VERY FAST and cannot be grabbed with tongs like the centipede.

- It is a good idea to have a cup nearby *just in case* the tarantula attempts to escape as this is the safest way to recapture her (put the cup over her and then slide a piece of paper underneath and put her back in the enclosure). However, you shouldn't have to resort to this. If she starts to move around the exhibit just close the lid and wait until she settles into a spot before finishing servicing the exhibit.

\*Water the exhibit plants and mist lightly in the exhibit but DO NOT directly mist the spider, as you don't want to upset her and have her run out the top of the enclosure. (Not necessary if automatic mister line is open.); the substrate in this enclosure should always be moist

\*Wipe any mist or condensation from exhibit glass with microfiber towel being VERY CAREFUL not to place your hands too close to the tarantula when doing so.

\***On a Group A Carnivore day**: feed out the correct number of crickets to the tarantula (see diet chart).

\*If you see any crickets left in the enclosure on a non-feeding day, remove them if you can do so safely. (ie. If you don't have to reach under the tarantula to get them!)

\***Molting behavior**: If you notice that the spider is laying on its back this is a good indication that it is going to molt or in the process of molting. You should remove ALL crickets from the exhibit at this time as the tarantula is very vulnerable during this process. Mist the enclosure a little more heavily than usual but be sure the mister is on the lightest mister setting. While the spider is molting you should cover the front of the exhibit and put up a sign informing the public that the spider is not on display. Write on the spider's card the date of the molt and DO NOT offer any food for 1 week while the spider's exoskeleton is hardening. Be sure to let a supervisor know that the spider is molting and not available for public viewing.

## **Green lynx spider (*Peucitia viridans*) & Vinegaroons (*Mastigoproctus giganteus*):**

### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

\*Mist the grasses lightly and mist the moss in the 'burrow' area for the vinegaroons; the substrate should be moist but not drenched.

\*Wipe any mist or condensation from exhibit glass with microfiber towel

\***On a Group B Carnivore day**: feed out the correct number of appropriately sized crickets to the spiders and vinegaroons (see diet chart).

\*If you see any crickets left in the enclosure on a non-feeding day, remove them if you can catch them without destroying the spider's webs.

\*If any of the spiders have molted, remove the molts (for aesthetic reasons) but try not to disturb the spiders' webs as much as possible.

## **Two-striped walkingsticks (*Anisomorpha buprestoides*):**

### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit. Write the death on the Bug Daily notes table & on TRACKS & change the count on the exhibit card.

\*Lightly mist browse and water/mist exhibit plants; the substrate in this enclosure should always be moist.

\*Wipe any mist or condensation from exhibit glass with microfiber towel.

\*If any juveniles are found on exhibit, remove them and place them in the nursery tank in IRR. Be sure to record the event on the Bugs Daily Notes table & change the count on the nursery exhibit card.

\*Remove any yellow leaves or wilted browse and replenish with fresh browse OR do a full browse change if necessary. **Fully change browse for this exhibit every 5-7 days**; record on exhibit card when full change is done (see below for instructions)

\*Remove any dropped leaves from the bottom of the exhibit so that it looks tidy



### **How to replenish/change browse:**

1. Remove browse one piece at a time, checking carefully for adults and juveniles on each piece.

2. Place any adult insects that you find back in the exhibit. If you find any larvae on a piece of browse you may place that browse back into the exhibit with the larvae in place if it is not too wilted or you may gently remove the larvae and place it onto fresh browse.

3. As you remove the browse, double check to be sure you have removed all larvae and adults and place it into the insect trash for freezing (since there will likely be eggs on much of the browse).

4. Once all the bad browse is removed, replenish with fresh browse (if doing a partial change) OR remove the browse cup, rinse and fill with fresh water and then fully replenish with fresh browse.

- The picture to the left illustrates an appropriate amount of browse for the walking sticks. Note that there is one large branch of red-tip to act as a 'space filler' for the exhibit. The walking sticks primarily feed on the rose.





## **New Guinea stick insect (*Eurycantha calcarata*):**

### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit. Write the death on the Bug Daily notes table & on TRACKS & change the count on the exhibit card.

\*Lightly mist browse and water/mist exhibit plants; the substrate in this enclosure should always be moist

\*Wipe any mist or condensation from exhibit glass with microfiber towel.

\*If any juveniles are found on exhibit, remove them and place them in the nursery tank in IRR. Be sure to record the event on the Bugs Daily Notes table & change the count on the nursery exhibit card.

\*Remove any yellow leaves or wilted browse and replenish with fresh browse OR do a full browse change if necessary. **Fully change browse for this exhibit every 3-5 days**; record on exhibit card when full change is done (see below for instructions)

\*Remove any dropped leaves from the bottom of the exhibit so that it looks tidy



### **How to replenish/change browse:**

1. Remove browse one piece at a time, checking carefully for adults and juveniles on each piece.

2. Place any adult insects that you find back in the exhibit. If you find any larvae on a piece of browse you may place that browse back into the exhibit with the larvae in place if it is not too wilted or you may gently remove the larvae and place it onto fresh browse.

3. As you remove the browse, double check to be sure you have removed all larvae and adults and place it into the insect trash for freezing (since there will likely be eggs on much of the browse).

4. Once all the bad browse is removed, replenish with fresh browse (if doing a partial change) OR remove the browse cup, rinse and fill with fresh water and then fully replenish with fresh browse.

- The picture to the left illustrates an appropriate amount of browse for the walking sticks.



**\*Caution!\***

The males of these insects have a large thorny protrusion on their rear legs; if handled improperly they can pinch very hard and potentially puncture skin.

## **Blue death feigning beetles (*Asbolus verrucosus*) & Velvet ants (*Dasymutilla occidentalis*):**

### **\*Velvet ants are a venomous species\***

#### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card.

-Remember that the Blue death feigning beetles are **very good** at faking death. DO NOT remove a beetle as 'deceased' unless you are absolutely sure it is dead. They are very stiff when they are faking death and sort of floppy when they are really dead. If you are unsure if a beetle is dead, replace it in the exhibit somewhere that guests will not see it (behind the log). If it is still in the same place the next day it is reasonable to presume it is dead.

\*Before opening the lid of the enclosure, make sure there are no velvet ants at the top or on the lid. Keep an eye out for ants when servicing the enclosure as velvet ants are a type of wasp and **can sting**. People with bee allergies should be especially careful around the velvet ants.

\*These are both arid species and do not require any misting. (\*Note- The blue color of the Blue death feigning beetles is due to a waxy coating which helps them hold in moisture; they will turn black if they get wet).

#### **\*On an **Herbivore** feeding day :**

- Remove their old diet and replace with a fresh diet.
- Slice 4-5 grapes in half and place them in a clean petri dish for feeding.
- On occasion a slice of cucumber, sweet potato, zucchini, orange or apple may be given in place of 2 of the grapes



## **Harlequin flower beetles (*Gymnetis caseyi*):**

### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

\*Lightly mist browse and water/mist exhibit plants ; the substrate in this enclosure should always be moist.

\*Wipe any mist or condensation from exhibit glass with microfiber towel

\*Occasionally search the substrate for grubs, if any are found, move them to the larvae bucket in the IRR and note on the Bugs Daily Notes table.

### **\*On an Herbivore feeding day :**

- Remove the old diet, making sure to take out the old banana peels as well, and replace with fresh banana.
- They should receive  $\frac{1}{4}$  to  $\frac{1}{3}$  of a banana, sliced in half, as shown in the photo to the right.
- Orange or apple slices may occasionally be substituted for the banana for variety.



\*All beetles may have access to beetle jelly; it is not a dietary requirement but if their jelly is empty remove the old container and replace with a new one if desired.

## **Goliath birdeating tarantula (*Theraphosa blondi* &/or *Theraphosa stirmi*):**

### **\*This is a venomous species\***

#### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

\*Be sure you know where the spider is before opening the lid to her enclosure! She is generally under her log hide and usually will remain still as long as you don't disturb her. If she is on the lid of the tank DO NOT open the lid as she is VERY FAST and cannot be grabbed with tongs like the centipede.

- It is a good idea to have a cup nearby *just in case* the tarantula attempts to escape as this is the safest way to recapture her (put the cup over her and then slide a piece of paper underneath and put her back in the enclosure). However, you shouldn't have to resort to this. If she starts to move around the exhibit just close the lid and wait until she settles into a spot before finishing servicing the exhibit.

\*Water the exhibit plants and mist lightly in the exhibit but DO NOT directly mist the spider, as you don't want to upset her and have her run out the top of the enclosure. (Not necessary if automatic mister line is open.) The substrate in this enclosure should always be moist.

\*Wipe any mist or condensation from exhibit glass with microfiber towel being VERY CAREFUL not to place your hands too close to the tarantula when doing so.

\***On a Group C Carnivore day:** feed out the correct number of crickets to the tarantula (see diet chart).

\*If you see any crickets left in the enclosure on a non-feeding day, remove them if you can do so safely. (ie. If you don't have to reach under the tarantula to get them!)

\***Molting behavior:** If you notice that the spider is laying on its back this is a good indication that it is going to molt or in the process of molting. You should remove ALL crickets from the exhibit at this time as the tarantula is very vulnerable during this process. Mist the enclosure a little more heavily than usual but be sure the mister is on the lightest mister setting. While the spider is molting you should cover the front of the exhibit and put up a sign informing the public that the spider is not on display. Write on the spider's card the date of the molt and DO NOT offer any food for 1 week while the spider's exoskeleton is hardening. Be sure to let a supervisor know that the spider is molting and not available for public viewing.



## **Sri Lanka praying mantis (*Heirodula membranacea*):**

### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

\*Water/mist exhibit plants. The substrate for this exhibit should always be moist.

\*Wipe any mist or condensation from exhibit glass with microfiber towel.

\*The mantis frequently perches on the underside of the exhibit lid. If the mantis is not visible to guests, gently coax it onto your hand and place it lower down on the branch where guests can see it.

\*Remove any uneaten crickets that you find in the enclosure as we do not want crickets laying eggs in the substrate.

### **\*On an **Assassin/Mantid** feeding day:**

- Offer the mantis one large cricket by tongs.
- The mantis should grab the cricket and take it.
- If the mantis is housed alone you may leave the cricket in the enclosure even if the mantis does not take it from the tongs but be sure to remove the crickets the next day.



Praying mantis enjoying a cricket

\*If the mantis lays an egg case on exhibit ask a Primary Keeper if that mantis has been mated. If so, the egg case should be removed within 1-3 days and placed into a separate container in IRR for rearing purposes. We do not want any egg cases hatching on exhibit!

## **Golden stag beetles (*Odontolabis femoralis*):**

### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

\*Water/mist exhibit plants.

\*Wipe any mist or condensation from exhibit glass with microfiber towel; the substrate in this enclosure should always be moist.

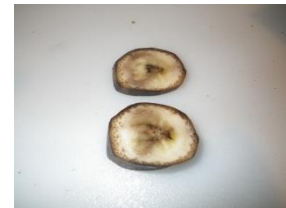
**\*If the beetles are on top of a piece of old banana and you need to remove it be sure to grasp the males on the back behind their heads to avoid being bitten!**

\*Try to make sure at least one beetle is visible to the public. CAREFULLY unbury the beetles from the moss and use the tongs to move them out into view. It helps to place a banana slice towards the front of the exhibit to make the beetles more visible to the public.

### **\*On an Herbivore feeding day:**

- Remove the old diet from the exhibit, being sure to remove the old banana peels as well. .
- Sometimes the beetles will bury their banana so check really well for old food!
- Replace with a small slice of banana between ¼ and ½ inch thick.
- Feed out 1 ½ -2 banana slices per beetle.
- Small slices of orange may occasionally be substituted for the banana for variety.

\*All beetles may have access to beetle jelly; it is not a dietary requirement but if their jelly is empty remove the old container and replace with a new one if desired.



## **Peruvian jumping sticks (*Stiphra sp.*):**

### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily notes table & on TRACKS & change the count on the exhibit card

\*Exercise **caution** when you have the door open as these stick insects are actually a type of grasshopper and **can jump several inches!**

\*Lightly mist browse and water/mist exhibit plants; avoid making soil too soggy, but be sure the substrate is always moist.

\*Wipe any mist or condensation from exhibit glass with microfiber towel.

\*If any juveniles are found on exhibit, remove them and place them in the nursery tank in IRR. Be sure to record the event on the Bugs Daily Notes table & change the count on the nursery exhibit card.

\*Remove wilted browse and replenish with fresh browse (see diet sheet for appropriate browse types) OR do a full browse change if necessary. **Fully change browse for this exhibit every 5-7 days;** record on exhibit card when full change is done (see below for instructions)

\*Remove any dropped leaves & feces that you can reach.

### **How to replenish/change browse:**

**\*\*Whenever you do a full browse change try to remove as much feces and dropped leaves from the exhibit as possible while you have the browse cup out of the way\*\***

1. Whenever you remove browse from the exhibit you should place it in the Green Rubbermaid container labeled 'for Browse change.' Once you have removed the desired amount of browse from the enclosure tightly close the lid on the browse change container.

2. Once all the bad browse is removed; either replenish with fresh browse (if doing a partial change) OR remove the browse cup, rinse and fill with fresh water and then fully replenish with fresh browse. (make sure browse water cup is not visible to public; cover with log or wood piece)



\*The picture to the left illustrates an appropriate amount of browse for the jumping sticks

3. Go back to the Green Rubbermaid and reopen it. Carefully check each, individual piece for animals. Place any adult insects that you find back in the exhibit. If you find any juveniles place them into the juvenile enclosure in BOH & be sure to record on the Bug Daily notes that you moved juveniles and how many you found. Re-cover the browse in the container once you have checked it and come back to it later.

4. When you have time, discard the browse you pulled out of the exhibit in the insect trash. When you discard the browse, use the clippers to snip it into 2-3 inch segments. This will help to take up less space in our biowaste containers. As you snip the browse, check **CAREFULLY** for any juvenile or adult insects that you may have missed the first time and replace them to the appropriate enclosure if any are found.



Adult male jumping stick





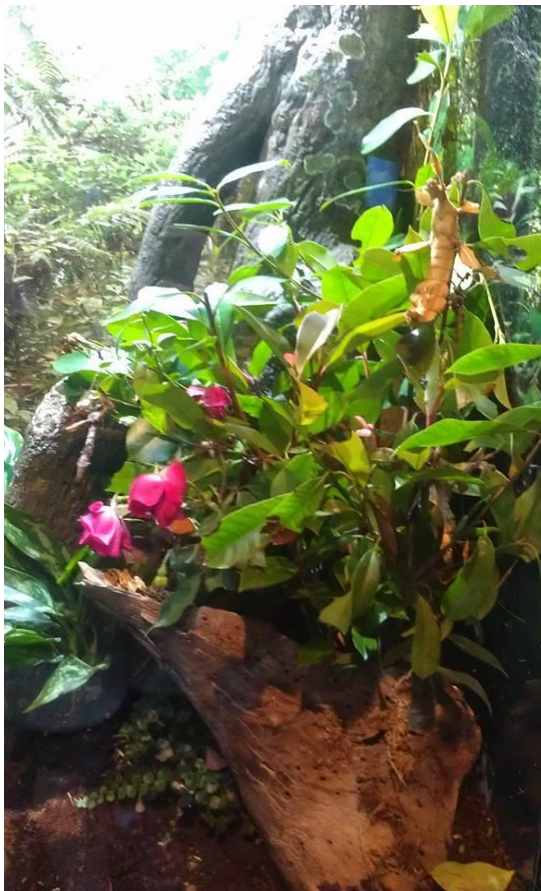
Adult female jumping stick

### **Australian Prickly Sticks (*Extatosoma tiaratum*):**

#### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily notes table & on TRACKS & change the count on the exhibit card

\*Lightly mist browse and water/mist exhibit plants; avoid making soil too soggy but be sure the soil is always moist



\*Wipe any mist or condensation from exhibit glass with microfiber towel

\*Remove wilted browse and replenish with fresh browse (see diet sheet for appropriate browse types) OR do a full browse change if necessary. **Fully change browse for this exhibit every 5-7 days;** record on exhibit card when full change is done (see below for instructions)

\*Remove any dropped leaves and feces that you can reach; when removing feces be sure to check for eggs and place any eggs in the appropriate container in the BOH (see below for photo of feces vs eggs)

**How to replenish/change browse:** **\*\*Whenever you do a full browse change try to remove as much feces and**



**dropped leaves from the exhibit as possible while you have the browse cup out of the way\*\***

1. Whenever you remove browse from the exhibit you should place it in the Green Rubbermaid container labeled 'for Browse change.' Once you have removed the desired amount of browse from the enclosure tightly close the lid on the browse change container.
2. Once all the bad browse is removed; either replenish with fresh browse (if doing a partial change) OR remove the browse cup, rinse and fill with fresh water and then fully replenish with fresh browse. (make sure browse water cup is not visible to public; cover with log or wood piece)

\*The picture to the left illustrates an appropriate amount of browse for the walking sticks

3. Go back to the Green Rubbermaid and reopen it. Carefully check each, individual piece for animals. Place any adult insects that you find back in the exhibit. If you find any juveniles place them into the juvenile enclosure in BOH & be sure to record on the Bug Daily notes that you moved juveniles and how many you found. Re-cover the browse in the container once you have checked it and come back to it later.
4. When you have time, discard the browse you pulled out of the exhibit in the insect trash. When you discard the browse, use the clippers to snip it into 2-3 inch segments. This will help to take up less space in our biowaste containers. As you snip the browse, check **CAREFULLY** for any juvenile or adult insects that you may have missed the first time and replace them to the appropriate enclosure if any are found.



In the photo above the longer, bumpy pieces on the left are frass/feces and may be discarded in the insect trash; the smooth, round pieces on the right are eggs and should be placed in the container labeled 'Australian prickly stick eggs' in the BOH.

\*If any juveniles emerge from in the egg cup; place them in the juvenile enclosure in BOH.

\*If any juveniles are found on exhibit, move them to the nursery tank in BOH & note on Bug daily notes.

\*These insects can be easily sexed as they reach adult size; if a juvenile is large enough to join the adult enclosure it should also be large enough to sex. Move the individual to the exhibit by doing a 'Registrar request' and list it as sexed; use the photos below for guidance.



Unsexed juvenile; should be in nursery



Adult male on left (can fly); adult female on right

## **Flamboyant flower beetles (*Eudicella*) & Rainbow stag beetles (*Phalacrognathus muelleri*):**

### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

\*Lightly mist browse and water/mist exhibit plants; the substrate in this enclosure should always be moist.

\*Wipe any mist or condensation from exhibit glass with microfiber towel

### **\*On an Herbivore feeding day :**

- Remove the old diet, making sure to take out the old banana peels as well, and replace with fresh banana.
- They should receive  $\frac{1}{4}$  to  $\frac{1}{3}$  of a banana, sliced in half, as shown in the photo to the right.
- Apple slices or orange slices may occasionally be substituted for the banana for variety.

\*All beetles may have access to beetle jelly; it is not a dietary requirement but if their jelly is empty remove the old container and replace with a new one if desired.



## Arizona giant water bugs & Sunburst diving beetles:

### \*Giant water bugs are a mildly venomous species\*

#### Daily exhibit care:

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

\*Check the water change chart (on the fridge in IRR) to determine if a water change or water quality test is needed for the day.

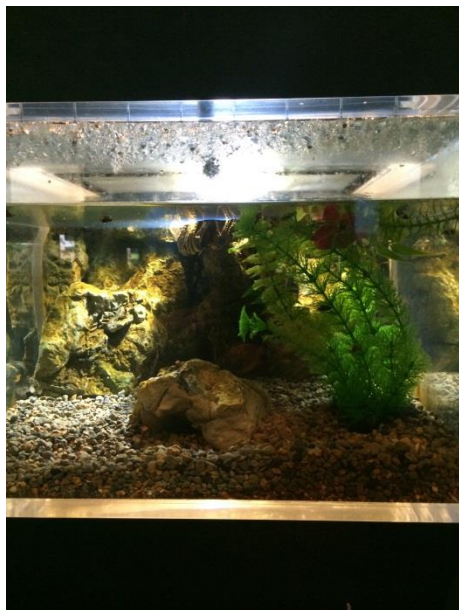
- Twice a month the water quality in this exhibit should be tested. If this is on the aquatic task schedule for the day please follow the instructions on the test sheet & record the results in the Bug Binder

\*If no water change is necessary, use a small net to remove the old food (pieces of mealworms and crickets) from yesterday. Be sure to move the rock that blocks the intake for the filter and clean off the intake as lots of the old food debris winds up stuck to the intake. Replace the rock in front of the filter once you are done cleaning the intake.

- Replace any water that was taken out with RO water ONLY.
- Replace the rocks and plants that were disturbed during servicing.

\***Every day** : Once you have removed the old food be sure to feed out the appropriate amount of crickets and/or mealworms per bug or beetle (see diet chart). If it is a water change day, do not feed out until after you have completed the water change.

#### How to do a water change:



1. Scrub the rockwork and sides of the tank with an algae scraper or scrubbing sponge to remove excess algal growth.
2. Get the gravel vacuum from the shelf where the off exhibit aquatic insects are housed & an empty bucket.
3. Use the small gravel vacuum to remove 30-50% of the water from the exhibit (depending on how dirty the water is). Be sure to gravel vacuum all throughout the exhibit in order to get the feces and old food debris hidden in the gravel. Pay special attention to getting the old food out from under the rocks & from behind the rock that hides the intake.
4. Fill a clean bucket with **RO water** and refill the exhibit to its previous level.
5. Once you have added the fresh water be sure to smooth out the gravel so that it covers the bottom of the exhibit, replant a few of the plants in the gravel and replace the rock to hide the intake.

## **Frog beetles (*Sagra buqueti*):**

### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

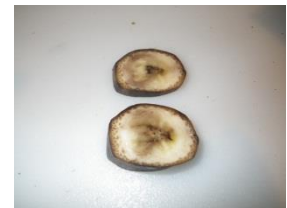
\*Water/mist exhibit plants; the substrate for this enclosure should always be moist.

\*Wipe any mist or condensation from exhibit glass with microfiber towel.

\*Try to make sure at least one beetle is visible to the public. CAREFULLY remove the beetles from the top of the exhibit and place them on the branches in public view. It helps to place a banana slice towards the front of the exhibit to make the beetles more visible to the public.

### **\*On an Herbivore feeding day:**

- Remove the old diet from the exhibit, being sure to remove any bits of fruit that may have fallen off of the petri dish, the old banana peels and/or orange rinds as well.
- The beetles should be given a small petri dish with a variety of mixed fruit/vegetables and slices of apple, sweet potato and grapes.
- Place a small slice or two of banana (or occasionally orange) on the climbing sticks or on the ground in the exhibit



\*All beetles may have access to beetle jelly; it is not a dietary requirement but if their jelly is empty remove the old container and replace with a new one if desired.



### **Browse:**

- These beetles utilize kudzu for breeding
- Be sure to provide some leaves in the exhibit and change out every 3-5 days as needed



## **Redspotted & Whitespotted longhorn beetles (*Batocera sp.*):**

### **Daily exhibit care:**

**\*\*Caution: these beetles can bite hard!\*\***

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

\*Water/mist exhibit plants; the substrate for this enclosure should always be moist.

\*Wipe any mist or condensation from exhibit glass with microfiber towel.

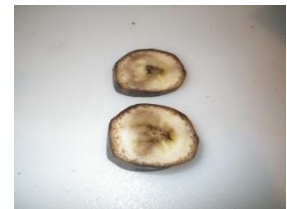
**\*If the beetles are on top of a piece of old banana and you need to remove it be sure grasp the beetles on the back, behind the head to avoid being bitten!**

\*Try to make sure at least one beetle is visible to the public. CAREFULLY remove the beetles from the higher areas of the exhibit. Their legs can grasp objects very tightly so exercise caution so that you do not pull any of their legs off! It helps to place a banana slice towards the front of the exhibit to make the beetles more visible to the public.

### **\*On an Herbivore feeding day:**

- Remove the old diet from the exhibit, being sure to remove the old banana peels as well. .
- Sometimes the beetles will bury their banana so check really well for old food!
- Replace with a small slice of banana between  $\frac{1}{4}$  and  $\frac{1}{2}$  inch thick.
- Feed out 1  $\frac{1}{2}$  -2 banana slices per beetle.
- Small slices of orange may occasionally be substituted for the banana for variety.

\*All beetles may have access to beetle jelly; it is not a dietary requirement but if their jelly is empty remove the old container and replace with a new one if desired.



## **Giant African millipedes (*Archispirostreptus gigas*):**

### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

\*Water/mist exhibit plants; the substrate for this enclosure should always be moist.

\*Wipe any mist or condensation from exhibit glass with microfiber towel.

\*If you attempt to dig out any of the millipedes to make them more visible be sure to use extreme **CAUTION** and dig with your **HANDS** only. There may be millipedes that have molted and digging tools can very easily damage them before their exoskeletons have hardened.

### **\*On an Herbivore feeding day:**

- Remove the old diet from the exhibit, being sure to remove any pieces of fruit that may have fallen off of the petri dish.
- Replace with a freshly made 'salad' on a clean petri dish.
- The diet should consist of a small bed of greens, a pinch of fruit mix, a small slice of various fruit or vegetable and a slice or two of cucumber. Top the salad with a pinch of **oyster shells**. When selecting the fruit or vegetable for the day it should be based on what is available and how much produce is in the fridge. Sweet potato, grapes, or apple are all good options.
- In order to encourage visibility of the millipedes you may also place one or two whole leaves of lettuce or collard greens in the exhibit for them to feed on.



Millipede enjoying a leaf of kale

## **Domino roaches (*Therea petiveriana*):**

### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

\*Water/mist exhibit plants; the substrate in this enclosure should always be moist.

\*Wipe any mist or condensation from exhibit glass with microfiber towel.

### **\*On an Herbivore feeding day:**

- Remove the old diet from the exhibit, being sure to remove any pieces of fruit that may have fallen off of the petri dish.
- Replace with a freshly made 'salad' on a clean petri dish.
- The diet should consist of a small bed of greens, a pinch of fruit mix, and a thin slice of fruit or vegetable. Top the salad with a pinch of fish flakes. When selecting the fruit or vegetable for the day it should be based on what is available and how much produce is in the fridge. Sweet potato, grapes, orange, apple or cucumber are all good options.
- Occasional enrichment food items for the roaches include hard boiled egg, strawberries, melons or other fruits when they are delivered as rotational produce.



Roach 'salad' diet

## Madagascar hissing cockroaches (*Gromphadorhina portentosa*):

**\*\*Caution: there are very often juveniles on the underside of the tank lid!!\*\***

### Daily exhibit care:

\*Check for any deceased animals and remove them from the exhibit. \*\*\*The exact number of roaches in this exhibit is very difficult to determine; if a Madagascar hissing cockroach dies you **DO NOT** need to record the death in TRACKS; we do still need to make a note of it in the Bug Binder on the Bug Daily notes table notes table \*\*\* A census count should be done periodically & numbers should be updated on TRACKS at that time.

\*Water/mist exhibit plants.

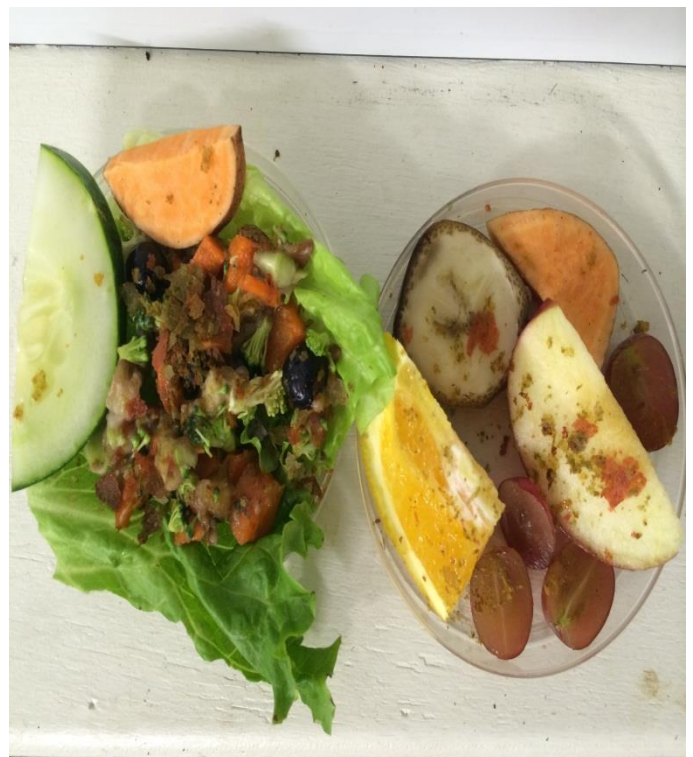
\*Wipe any mist or condensation from exhibit glass with microfiber towel.

\*These insects are VERY PROLIFIC so be sure to check any dishes or other objects that you remove from the exhibit for juvenile roaches.

\*These roaches should be culled occasionally to prevent overpopulation of the exhibit.

### \*On an Herbivore feeding day:

- Remove the old diets from the exhibit, being sure to remove any pieces of fruit that may have fallen off of the petri dish.
- Replace with 2 freshly made 'salads' on clean petri dishes. .
- The 'mixed salad' diet should consist of a small bed of greens, a pinch of fruit mix, and a thin slice of fruit or vegetable. Top the salad with a pinch of fish flakes. When selecting the fruit or vegetable for the day it should be based on what is available and how much produce is in the fridge. Sweet potato, grapes, orange, apple or cucumber are all good options.
- These roaches can also consume larger chunks of produce. So a salad with big chunks of apple, orange, lettuce, halved grapes or sweet potato may be given.
- Again because there are so many roaches in this exhibit you should give 2 petri dishes of food daily. Either 2 'mixed salads,' 2 of the 'larger chunk' salads or one of each is acceptable.



Examples of mixed salad vs larger chunk salad

## **Giant katydid (*Macrolyristes corporalis*):**

### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily Notes table & on TRACKS & change the count on the exhibit card

\*Water/mist exhibit plants & the substrate; the substrate for this enclosure should always be moist.

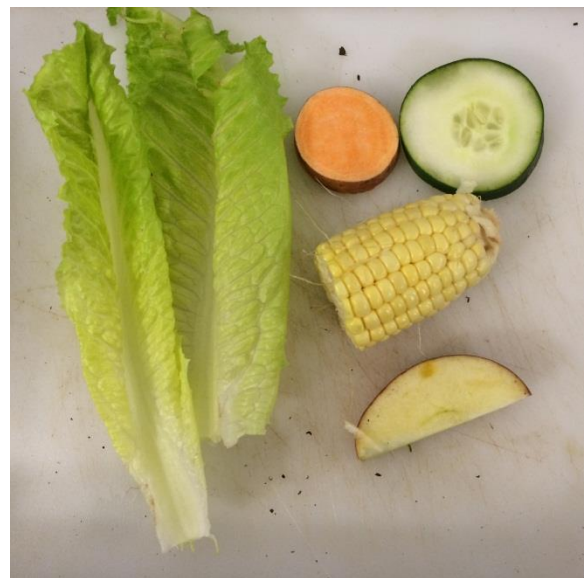
\*Wipe any mist or condensation from exhibit glass with microfiber towel.

\*Try to make sure that the katydid is visible to the public. If the katydid is hidden, gently scoop it up from underneath using both hands. The katydid is less likely to scream if you scoop it up versus grabbing it.

\*If you find any juvenile katydids in the exhibit be sure to remove them and place them in the nursery tank.

### **\*On an **Herbivore** feeding day:**

- Remove the old diet from the exhibit, being sure to remove any pieces of fruit or greens that are on the ground or placed around the exhibit.
- Replace the diet with a few fresh pieces of greens, a small chunk of corn and few large chunks of vegetables or fruit. In addition to the corn and greens the katydid may be given sweet potato, apple, cucumber or orange. Check the availability of produce in the fridge to determine what to feed out for the day.



Various produce chunks for the katydid



## **Jungle nymphs (*Heteropteryx dilatata*) & Phasmids (*Phobaeticus serratipes*) :**

### **Daily exhibit care:**

\*Check for any deceased animals and remove them from exhibit; be sure to record the death on both the Bug Daily notes table & on TRACKS & change the count on the exhibit card

\*Lightly mist browse and water/mist exhibit plants; avoid making soil too soggy but be sure the substrate is always moist.

\*Wipe any mist or condensation from exhibit glass with microfiber towel

\*Remove wilted browse and replenish with fresh browse (see diet sheet for appropriate browse types) OR do a full browse change if necessary. **Fully change browse for this exhibit every 5-7 days;** record on exhibit card when full change is done (see below for instructions)

\*Remove any dropped leaves and feces that you can reach; when removing feces be sure to check for eggs and place any eggs in the appropriate container in the BOH (see below for photo of feces vs eggs)

**How to replenish/change browse: \*\*Whenever you do a full browse change try to remove as much feces and dropped leaves from the exhibit as possible while you have the browse cup out of the way\*\***



1. Whenever you remove browse from the exhibit you should place it in the Green Rubbermaid container labeled 'for Browse change.' Once you have removed the desired amount of browse from the enclosure tightly close the lid on the browse change container.

2. Once all the bad browse is removed; either replenish with fresh browse (if doing a partial change) OR remove the browse cup, rinse and fill with fresh water and then fully replenish with fresh browse. (make sure browse water cup is not visible to public; cover with log or wood piece)

\*The picture to the left illustrates an appropriate amount of browse for the jungle nymphs & phasmids

3. Go back to the Green Rubbermaid and reopen it. Carefully check each, individual piece for animals. Place any adult insects that you find back in the exhibit. If you find any juveniles place them into the juvenile enclosure in BOH & be sure to record on the Bug Daily notes that you moved juveniles and how many you found. Re-cover the browse in

the container once you have checked it and come back to it later.

4. When you have time, discard the browse you pulled out of the exhibit in the insect trash. When you discard the browse, use the clippers to snip it into 2-3 inch segments. This will help to take up less space in our biowaste containers. As you snip the browse, check **CAREFULLY** for any juvenile or adult insects that you may have missed the first time and replace them to the appropriate enclosure if any are found.



In the photo above the longer, bumpy piece on the left is frass/feces and may be discarded in the insect trash; the smooth, round pieces on the right are eggs and should be placed in the container labeled 'Jungle nymph eggs' in the BOH.

\*If any juveniles emerge from in the egg cup; place them in the juvenile enclosure in BOH.

\*If any juveniles are found on exhibit, move them to the nursery tank in BOH & note on Bug daily notes.

\*These insects can be easily sexed as they reach adult size; if a juvenile is large enough to join the adult enclosure it should also be large enough to sex. Move the individual to the exhibit by doing a 'Registrar request' and list it as sexed; use the photos on the next page for guidance.





Unsexed hatching; should be in nursery



Unsexed juvenile; should be in nursery



Adult female on the left; adult male on the right (can fly)



Giant phasmid (walkingstick)

Be extra careful when checking browse to make sure you don't snip a phasmid with pruning shears or throw them in the trash by accident! Any juvenile phasmids should also be moved to a nursery tank if found on exhibit!