Tortoise Shell-ter Project

***Browse preference study***

Obj: To study browse preference in 4 species of tortoises from 2 different geographical regions; and how different browse species (originating from Southeast Asia) influence activity budgets of tortoises.

Aim: To introduce and increase browse consumption in tortoises – substitute cut hay mixed into daily diet with naturalistic diet.

|  |  |
| --- | --- |
| Animals involved | Region |
| Burmese Star Tortoise *(Geochelone platynota)* | Southeast Asia |
| Indian Star Tortoise *(Geochelone elegans)* | Southern Asia |
| Leopard Tortoise *(Stigmochelys pardalis)* | Southern Africa |
| Ploughshare Tortoise *(Astrochelys yniphora)* | Southern Africa |

Materials required:

* 5 browse species from WNC, including meadow hay.

Table 1. Combination and pairing for the five proposed browse species.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Browse A (Hay) | Browse B | Browse C | Browse D | Browse E |
| Browse A (Hay) |  | AB | AC | AD | AE |
| Browse B |  |  | BC | BD | BE |
| Browse C |  |  |  | CD | CE |
| Browse D |  |  |  |  | DE |
| Browse E |  |  |  |  |  |

Total number of pairings: 10

Table 2. Newly proposed weekly schedule for sampling browse preference for each tortoise species. *Browses A-E are still pending confirmation from PH.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Week** | **Mon** | **Tue** | **Wed** | **Thu** | **Fri** |
| **1** | BE | BE | BE | BE | BE |
| **2** | DE | DE | DE | DE | DE |
| **3** | AE | AE | AE | AE | AE |
| **4** | AB | AB | AB | AB | AB |
| **5** | CE | CE | CE | CE | CE |
| **6** | AD | AD | AD | AD | AD |
| **7** | AC | AC | AC | AC | AC |
| **8** | BC | BC | BC | BC | BC |
| **9** | CD | CD | CD | CD | CD |
| **10** | BD | BD | BD | BD | BD |

DJ Proposed methods:

* One observation session per day (Observation hours: 9 am to 11 am)
* 4 tortoise species to be sampled within each session
* Randomization of offered browse species across 10 weeks provided in Table 2 above.
* Each subject (i.e., tortoise species) to be observed for 20 mins per browse combination (e.g., AC, DC etc)
  + Order of studied subjects are randomized within a day (i.e., account for time of day)
  + 4 \* 20 min = 80 min per day
    - Total time taken: +/- 2 h (including prep work)
    - Each subject is observed for 800 min (after 10 weeks)
  + Normal diet to be provided after lunch/ after observations
  + For e.g., Week 1, Monday - Friday
    - All species to be given browse combination BE (as shown in Table 2)
  + So, each subject samples one browse species about 20 times, and is subjected to each pair-wise browse combinations 4 times.
* Data collection:
  + Food preference (AM; 0900 – 1100 h):
    - Focal sampling (i.e., only sample interested, active individuals)
    - Frequency of bite counts on targeted browse species
      * E.g., 250 and 120 bites of browse A and B (respectively) per 20 min observation (Table 3)
    - Collect data corresponding to Table 3.
  + Activity budget (PM; 1330 –1600 h):
    - Ethogram reading – 1-min intervals for 30 mins
    - Ethogram shown in Table 5

Table 3: Example of collected dataset

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Bites** | **Browse** | **Day** | **Species** | **Individual** | **Sex** | **Weekly weight** | **Temperature** | **Time** |
| 250 | A | Monday | Indian Star | Sam | Male | 500 | 35 | 930 |
| 100 | B | Monday | Indian Star | Roy | Male | 200 | 35 | 930 |

Table 4. Example of randomization of exhibits per week in order (Morning preference data collection and afternoon activity budget)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Day/Order** | **TS2** | **TS5** | **TS6** | **TS7** |
| **Monday** | 1 | 4 | 2 | 3 |
| **Tuesday** | 3 | 1 | 2 | 4 |
| **Wednesday** | 4 | 3 | 2 | 1 |
| **Thursday** | 3 | 4 | 2 | 1 |
| **Friday** | 3 | 4 | 1 | 2 |

Same order will be used per day for AM and PM observations.

Table 5. Ethogram

|  |  |
| --- | --- |
| **Behaviors** | **Group** |
| Sleeping | Non-active |
| Resting | Non-active |
| Walking | Active |
| Walking to browse | Active |
| Smelling browse | Active |
| Eating Browse (Hanging leaves) | Active |
| Eating Browse (Planted grass) | Active |
| Eating Browse (Exhibit) | Active |
| Drinking/Soaking | Active |
| Defecating | Active |
| Courtship | Active |
| Mating | Active |
| Aggressive Interaction | Active |
| Non-aggressive Interaction | Active |
| Others | N/A |

Discussion:

* Rank browse according to consumption per bundle pairs

Future project

* Can we do parasite load study based on browse?
  + Send fecal for weekly check?
  + See if browse affect parasite load

Workflow for intern

* Husbandry begins at 8.30am for TS’s intern
* Browse bundles would have been prepared the day before (i.e Prepared on Sunday for Monday’s data collection) and soaked in water tub to ensure freshness

|  |  |
| --- | --- |
| Time | Details |
| 0900 | Place browse bundles in exhibit and start 20-min observation |
| 0920 | Clear browse and take photo of fecal |
| 0930 | Repeat for second exhibit |
| 0950 | Clear browse and take photo of fecal |
|  |  |
| 1100 | Help TS keeper with husbandry |
| 1200 | Lunch break |
| 1300 | Feed normal diet for tortoises |
| 1300-1430 | Prepare browse bundles/OTOT |
| 1430 | Clear food trough |
| 1500 | Start 30-min observation for activity budget for first exhibit |
| 1530 | Repeat for second exhibit |
| 1600 | Repeat for third exhibit |
| 1630 | Repeat for fourth exhibit |
| 1700 | End of day |