

Sensory enrichment for the common marmoset (*Callithrix jacchus*)

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Abstract

Common marmosets (*Callithrix jacchus*) are New World primates that are found within the coastal rainforests of North East (NE) Brazil. They are a multisensory species, relying on all their senses to survive. It is the duty of all animal carers to fulfil the 5 needs of captive animals,¹ one of which being the need to express natural behaviours. Apart from the environmental enrichment that is placed in a primate's home cage, the majority of enrichment ideas used usually involve hiding foods and sweet treats encouraging the sense of taste to keep the animals engaged for longer. Within the marmoset breeding colony, at the Defence Science and Technology Laboratory (Dstl), a form of enrichment that would encourage the primates to use sense of smell was trialled. To do this the hammock within the marmoset's home cage was soaked in other scents to encourage a use of the sense of smell. This poster describes the trial designed to assess 2 different scents on one of the breeding families.

Hypothesis

The marmosets would smell the hammocks more frequently with different scents more compared to the scentless hammock.

The marmosets would prefer the scent of oregano compared to cinnamon as cinnamon has a sharper scent than oregano.

The hammock scent would reduce the time spent by the marmosets in the hammock owing to the scent being unfamiliar, the hammock scent would also affect the playing, relaxing and grooming activities whilst in the hammock.

Trialling ideas

When it came to looking for a scent it was decided to use something that is similar to that which a marmoset might come across in the wild but also easy to get hold of here in the UK. Looking into the natural habitat of the common marmoset (NE Brazil) there are a number of different herbs and spices that grow there. The end decision was to use oregano (*Origanum vulgare*) and cinnamon (genus *Cinnamomum*) allowing the comparison of a herb and a spice.



Figure 1.
Top: Cinnamon Hammock. Bottom: Plain Hammock.

The next stage was to find a way to present the scent to the family group in the home cage. To ensure that the marmosets were interested in a scent, not a novel item, a piece of regularly used cage furniture was assessed. The object had to be easily replicated, cleaned and placed back into the cage. The items of choice were wooden perches or tea towel hammock.

After trialling a couple of methods of getting the scent to attach to the wooden perch, such as soaking the perch in a bucket of scented water or applying a paste of the desired scent to the perch, it was realised that using wooden perches was not feasible. Tea towel hammocks were chosen as the better option.

Method

One breeding family was chosen to record during the whole scent hammock trial. This family consisted of 6 individuals. Dam and sire, 2 juveniles 6+ months and 2 infants under 6 months. Each day before filming, the camera was placed on top of the family cage to allow the marmosets to acclimatise to the camera. This then ensured focus was on the enrichment given and not the camera.

Over the space of a week, the family group were given the three types of hammock, one at a time, and recorded for an hour between 1100-1200. All the essential husbandry duties were completed in the room for the day before any recording took place and access was restricted to the room to prevent any other distractions. This was repeated for three consecutive weeks.

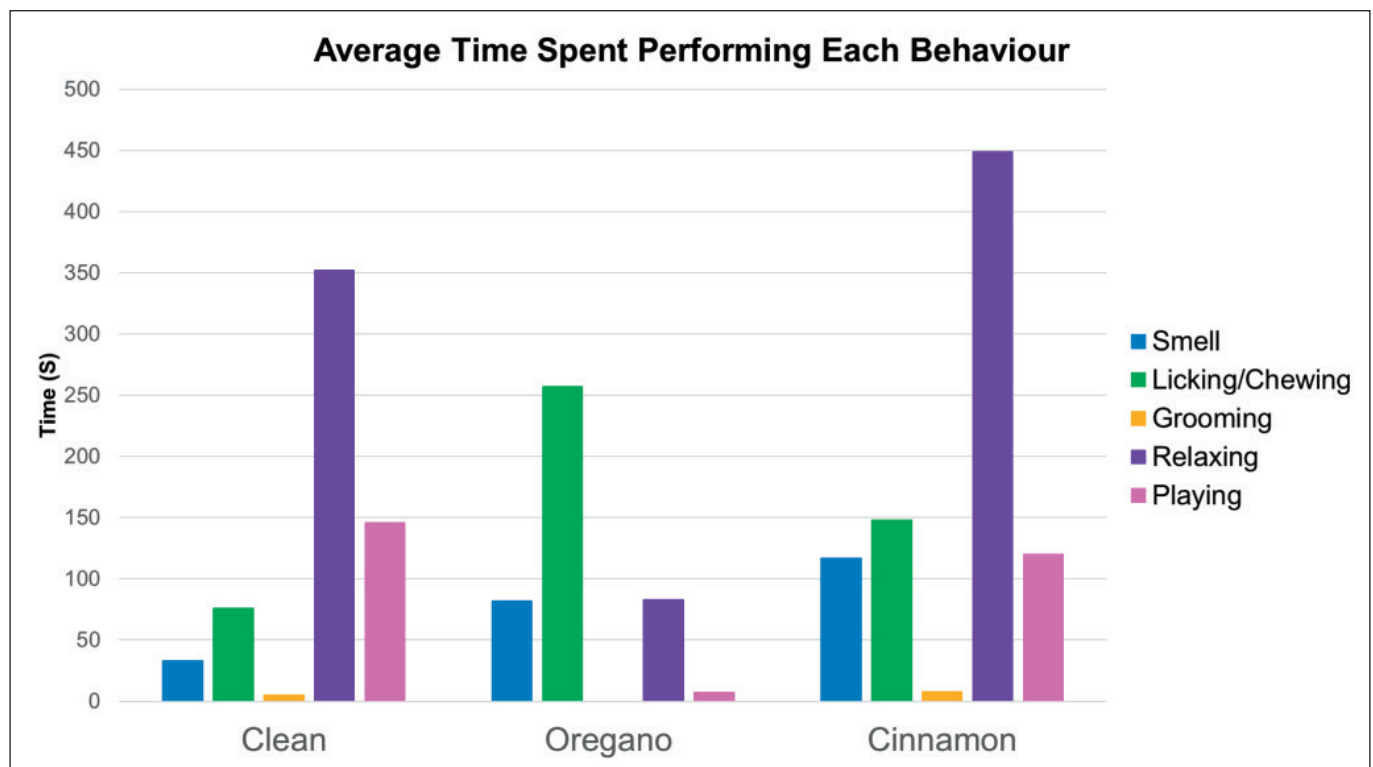
The two scented hammocks were created by soaking each in a mixture of the chosen scent (either cinnamon or oregano) and water for an hour before being hung up to dry overnight. The following day they were ready to be placed in the cage for monitoring.

Once all the footage was recorded it was then analysed to see how many times specific behaviours were noticed. These behaviours were:

- Smelling, seeing how many instances of smelling the hammock were recorded.
- Licking/chewing, either chewing the hammock material itself or the individual spices/herbs.
- Grooming, the marmosets sitting on the hammock grooming one another.
- Relaxing, The marmosets either sitting or lying on the hammock for a certain period of time without getting off the hammock or performing other behaviours.
- Playing, The marmosets chasing or play fighting with one another on the hammock.

Results/Discussion

On average the marmoset family spent 117 seconds (1 minutes 57 seconds) smelling the cinnamon hammock. This is 35 seconds more than the average time spent smelling the oregano hammock. However the hammock that had the least time spent smelling was the plain hammock which had only an average of 33 seconds. This shows the first statement of the hypothesis, the



marmosets would smell the hammocks with different infused scents more, compared to plain hammocks was proved correct.

The second part of the hypothesis had to be rejected as the data shows the opposite of what was predicted. Overall the family group spent more time on the cinnamon hammock, a total average of 842 seconds (14 minutes) compared to a total average of 429 seconds (7 minutes) on the oregano hammock.

The data collected shows time spent playing, relaxing and grooming was reduced on the oregano hammock, a total average of 90 seconds (1 minute 30 seconds), compared to the plain hammock, a total average of 503 seconds (8 minutes 23 seconds). However the longest time spent playing, grooming and relaxing was the cinnamon hammock, a total average of 577 seconds (9 minutes 37 seconds) This was surprising as this scent was the strongest scent. This meant the final statement of the hypothesis 'with the other behaviours that will be monitored the marmosets would be more inclined to play, relax and groom on the hammock with no extra scent as it is more familiar to the family group' was rejected.

Conclusion

In conclusion the trial was a success in showing that the use of scented enrichment works to stimulate the marmosets and keep them occupied. This is the first time within the colony's history that scents were used to stimulate our marmosets in other ways than by taste and even though attempts were made to lick/chew the scented hammocks, whether it was picking at each individual oregano herb/grain of cinnamon on the hammock, the marmosets still spent more time smelling the material compared to licking/chewing it. Cinnamon was the favoured scent of the two scented hammocks in all areas apart from licking/chewing which is most likely down to the ease of picking at individual pieces of oregano compared to grains of cinnamon.

Since this trial was completed we have now implemented the use of scent hammocks into our enrichment rotation. With the success of this trial there are also plans in place for further investigations into other scents as well as looking into other senses and how we can encourage marmosets to use other senses, such as sound and touch.

Acknowledgements

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References

- ¹ <https://wikipedia/wiki/fivefreedoms>
- ² **WWF** (2021). 'Ten products and ingredients that come from tropical rainforests' [online] Available at <https://www.wwf.org.uk/updates/ten-products-and-ingredients-come-tropical-forests> (Accessed 16/12/2021).
- ³ **Scielo** (2013). 'Photodegradation of essential oil from marjoram' [online]. Available at http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0370-59432013000200001 (Accessed 16/12/2021).