Review Report on the PhD dissertation submitted to Adam Mickiewicz University in Poznań

Candidate's Name: FILIP J. WOJCIECHOWSKI, MSc

Dissertation Title: THE PHILIPPINE TARSIER (*TARSIUS* [*CARLITO*] *SYRICHTA*): ACTIVITY PATTERNS, SOCIAL BEHAVIOUR AND POPULATION ENDANGERMENT RISK IN BILAR, BOHOL

Dissertation Supervisor: Prof. UAM KATARZYNA A. KASZYCKA, PhD, DSc

Assistant Supervisor: RN Dr. MILADA ŘEHÁKOVÁ, PhD

Reviewer: Dr. Katarzyna Nowak, PhD

DISSERTATION EVALUATION

This publication-based dissertation—consisting of three published articles about the Philippine tarsier (Near Threatened on the IUCN Red List)—ranks as very good, and holds original and scientific merit. It contributes to new knowledge in primatology, captive animal welfare, and use of local knowledge to inform wildlife population status and conservation decisions. The methodology is scientifically sound and the PhD candidate—Mr. Filip J. Wojciechowski—has demonstrated a solid understanding of the research area.

Wojciechowski has chosen a challenging study species: cryptic, small, nocturnal and inhabiting dense forest-covered slopes (Wojciechowski et al. 2019). As emphasized in Wojciechowski et al. 2020, this species' social behavior is scarcely known. Despite its cryptic nature, it is a species of perceived importance economically and culturally, as well as the target of the illegal wildlife (pet) trade (Wojciechowski et al. 2021). These factors in combination add to the urgency of careful research and timely conservation.

Mr. Wojciechowski's research results are clearly presented in each of the three papers with sound analyses and evaluation of the broader implications of the work. These broader implications include social (local community perspectives and citizen participation as well as tourism aspects) and ecological (natural history, ecology and conservation of this little-known primate).

As lead author on the three published papers, the candidate's contribution is clear and, to my best knowledge, he has appropriately acknowledged others' contributions. I would encourage consideration of inclusion as coauthors of additional in-country collaborators who are/were key to this research in the future (per this recent call to expand scientific authorship to recognize diverse contributions in conservation science research: https://besjournals.onlinelibrary.wiley.com/doi/10.1002/2688-8319.12060).

Mr. Wojciechowski's body of work so far is commendable and I have confidence that he will continue to conduct first-rate research that contributes to wildlife conservation and welfare

including in primate habitat countries. The candidate's contribution to the research is sufficient to warrant awarding him with a PhD.

My following comments and questions delve into additional detail and are organized under the headings of each of Mr. Wojciechowski's and colleagues' respective three papers.

Thank you for the opportunity to review this high-quality, interesting and timely work.

Sincerely,

Dr. Katarzyna Nowak
Faculty of Agricultural, Life and Environmental Sciences, University of Alberta, Canada

2019
Activity Patterns of Captive Philippine Tarsiers (*Tarsiur syrichta*): Differences Related to Sex and Social Context
Folia Primatologica

Comments and Questions:

It strikes me as surprising and peculiar that a species that does so poorly in captivity would be the target of the pet trade. I assume that this species and that tarsiers as a group do not do well as pets? If *T. syrichta* is kept as a pet in-country / *in situ*, I wonder if there might be any possibility in the future to speak with pet owners (perhaps on the condition that their identity be kept anonymous?) in order to garner more information?

In Table 1, the description of "Social" includes interaction with another animal of the opposite sex. I wonder why this is limited to just the opposite sex; what about the other males that were recorded beyond the enclosure / observed to approach within the vicinity of the enclosure? Were there interactions between the captive and wild males/individuals?

It appears that pairing is energetically expensive and increases stress. Presumably, therefore, it is important to get it right in captivity with respect to the amount of together versus solitary time. This seems to be a major finding of the research that is perhaps understated.

Another important finding is that you observed more scanning in smaller spaces which possibly informs "minimum viable enclosure size".

Can you explain/make a case for captive breeding? Is it for reintroduction purposes (and if so, are habitat conservation efforts sufficient?) or solely for species conservation through the maintenance of captive populations (without emphasis on habitat)?

Is it possible that some species simply cannot and therefore should not be maintained in captivity as they resist captive conditions which can never satisfy their needs?

Did you observe any stereotypic behaviors associated with the captive conditions?

In the final two sentences of this paper, the authors write that, "It is crucial to ascertain the extent to which results obtained in this study may differ from those in the wild and under different captive conditions. Evaluation of activity budgets in such a spectrum may help in practical considerations for housing *T. syrichta* in captivity." My question is: where you say "crucial", you do not clarify crucial to/for what? In terms of housing in captivity, the assumption here is that this is desirable.

2020
Social Behavior of a Reproducing Pair of the Philippine Tarsier (*Tarsiur syrichta*) in Captivity
Journal of Applied Animal Welfare Science

Comments and Questions:

In the figure that appears under the abstract, it would have been useful to further label 2015 as "unfamiliar" (although this is assumed / assumed the two never interacted in the wild) and 2016 as "familiar" (assuming that one year is sufficient for familiarity with each other) not only in the caption but in the figure legend itself.

Can the candidate comment on other mammalian species that were assumed to be solitary or largely solitary by the scientific community but then revealed to be social? (e.g., black rhinos come to mind). It is fascinating how hunters you spoke with do report sociality/pairing in the wild which suggests that science is catching up to local knowledge.

Can the candidate suggest an alternative to the old-fashioned "lower primates" / "higher primates" dichotomy?

Survival chances in captivity and during transport are low. In addition, you describe how of 37 births in captivity, 20 were still births or died on the same day. Do you think there is a case to be made to not wild-source / wild-catch tarsiers for any purposes (including research) given their high sensitivity? I acknowledge that this is a re-phrasing of a question I already asked above, but given the practical, conservation and ethical ramifications, I am restating it here.

It would have been good to include a sentence or two about whether this species shows sexual dimorphism and potential consequences of yes/no.

The second infant that was born to the pair is described as "surviving". How long did this second infant survive/suckle/etc.? Did you also manage to record systematic observations of mother-infant interactions?

If the enclosure had been larger, do you expect that the maximum distance between the two (male-female) would have increased? Is it known how proximate individuals of pairs tend to be in the wild? I appreciate your recognition (expressed in the first paragraph of the discussion) that the pair were "forced" to be in close proximity to each other given their captive conditions. (There is a quote attributed, I believe, to Konrad Lorenz, that when studying animals in captivity, one learns more about captivity than about the animals).

Interesting finding about the female being most vocal during estrus.

Where you say that male Philippine tarsiers may exhibit increased sexual interest toward a new, unfamiliar female, might the flip side of this be equally true: that a female is more receptive to interest from a new male?

Might allogrooming also contribute to stress reduction?

You write that there was not any clear-cut evidence of female dominance. Who had primary access to food? Did the female receive more grooming from the male than the male from the female? I am suggesting that there may be proxies for female dominance that were observable.

Interesting that there appear to be extra-pair copulations by females / polyandry (?) (where you cite Gursky, 2007 in the section on "copulatory behaviors").

Re: sleeping trees, it would have been good to know how many trees and of how many and which genera and species.

In the section on husbandry and welfare implications, where you describe separation in housing, were the individuals of the pair still adjacent? Or proximate enough to hear each other's vocalizations even when housed apart?

In the final sentence in "Conclusions" you suggest that the results be taken into account to improve husbandry practices for the Philippine tarsier if "we are to successfully breed this threatened species in captivity". What do you suppose are the husbandry protocols for mother-infants and then juveniles? Is there a plan to reintroduce juveniles to the wild (at dispersal time) requiring a period of training them for life in the wild (as is done with golden lion tamarin reintroduction programs)?

2021
Utilizing local community knowledge of the Philippine tarsier in assessing the Bilar population endangerment risk, and implications for conservation
Journal for Nature Conservation

Comments and Questions:

Certainly the involvement of local people / knowledge holders / scientists / authorities / conservationists is desirable and I am very happy to see this paper which advances the field of primatology through the use and inclusion of local community knowledge. It also helps with decolonization, moving away from "parachute research", and moving towards more effective and inclusive conservation. I think that Poland is well-positioned to help pave the way here given its history and understanding of occupation (if not colonization) and not repeat the mistakes of western researchers working in the "global south" in extractive or exploitative ways.

This said, I would have made some word changes in the abstract of this paper, for example instead of "Investigating the local people's perception of the primate species in question, as well as the impressions of and experiences with conservation measures in their neighbourhood, it is

important in order to devise an appropriate conservation strategy", opted for "Understanding local peoples' perceptions of primate species, as well as their impressions of and experiences with conservation measures in their community, is important for devising inclusive and effective conservation strategies."

Instead of "incorporation in decision-making processes" opt for "participation in decision-making processes." Rather than "manage the resources they have been surrounded by for generations" opt for "steward the nature they have been dependent on for generations". Suggest reading the book "Red Alert!" by Daniel R. Wildcat and/or tuning into the "Reconciling Ways of Knowing" seminars which help western-trained scientists like us think more about language: https://www.waysofknowingforum.ca/ and (loaded) words such as "resources", "land use planning" (versus the Indigenous-preferred "land relationship planning"), "management" (versus "stewardship"), and so on. Of course there may be similar resources more appropriate to SE Asia.

Do you think there are differences in peoples' perceptions and extent of / level of local knowledge of diurnal versus nocturnal species? May be an interesting line of further research.

Are there other species (primate or other) that are considered to be "flagships"?

Is tourism domestic too? (in my experience in Tanzania, domestic tourism was underinvested in despite calls from Tanzanians to boost it: https://www.ajol.info/index.php/ejesm/article/view/73349/62278 and also: https://www.tandfonline.com/doi/abs/10.1080/14724049.2019.1689987?journalCode=reco20 I wonder if this is also the case in The Philippines and if you might play a future role in helping foster domestic tourism, even night safaris?)

60 percent of the 214 mammal species are endemic (such high endemism!); how many of these are primates?

In the body of the paper, you mention others' names but you do not include the name of the "local research assistant (born and living locally in Subayon)". Is this because the person preferred to remain unnamed in the text? If not, then might you include the person's name and/or include them as a co-author in the future (not just in acknowledgements)?

Important finding about younger generations knowing more about tarsiers than older; might the younger be message multipliers? Is there any evidence that they are / that they bring natural history / conservation information home to their parents and elders from school?

I am pleased to see that e.g., time on-the-land as source of knowledge was not mutually exclusive with e.g., learning from others in your analysis.

With respect to reasons for capture, did you get a sense for the relative role of foreign demand for pets compared with capture for in-country tourist centers/facilities? The CITES Trade Database seems to have very little data (which I took the liberty to download and can send as a CSV file to Mr. Wojciechowski in the case he has not explored it).

Re: charcoal consumption; Zanzibar red colobus monkeys consume it presumably as a way to deal with tannins in their diets that include exotic species such as Indian almond leaves (https://doi.org/10.1023/A:1026341207045 so may not be out of realm of possibility?

Is there any chance for Indigenous Protected and Conserved Areas (IPCAs) in the Philippines?

You say that people do not associate these primates with any health benefits; but presumably pet ownership may confer some form of mental health benefits?

Do Philippine schools use social media in learning/classroom? I wonder what role social media specifically is playing in learning about (and trade in) tarsiers?

Conclusion

The research led by Mr. Wojciechowski is thorough and impressive. It is because of this that my above comments and questions have arisen / been stimulated.

I commend this PhD candidate and recommend that his PhD be conferred following a successful defense.

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I, hereby, declare that the reviewed PhD dissertation by **Filip J. Wojciechowski** meets the criteria pursuant to art. 13.1 of Act of 14 March 2003 on Academic Degrees and Academic Title and Title in the Arts (O.J. no 65 item 595 as amended) and request that the Research Discipline Council of Biological Sciences of Adam Mickiewicz University in Poznan accepts **Filip J. Wojciechowski** for further stages of doctoral proceedings.

Katarzyna Nowak

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Date Reviewer's signature