

Commentary on Costa et al.: “Influence of Ambient Temperature and Confinement on the Chemical Immobilization of Fallow Deer (*Dama dama*)”

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We have serious concerns regarding the recently published study by Costa et al. (2017). The reproducibility of an experiment is a fundamental tenet of science. The methods should be described in such detail that competent peers can reproduce the experiment.

In the Costa paper there is no information about dart placement or needle length. Dart placement is probably the main determinant of induction time (Caulkett and Arnemo 2015). A study in reindeer (Arnemo et al. 2011) showed that the mean induction time after suboptimal hits was twice as long as after optimal hits. Also, in fallow deer the needle length was found to influence induction time (Bergvall et al. 2015).

Dart impact may cause tissue trauma with subsequent hemorrhage and reduced absorption of drugs. Dart trauma results from dispersion of kinetic energy ($\frac{1}{2}mv^2$) upon impact (Kreeger and Arnemo 2012). Velocity (v) depends on the power setting of the dart gun and the darting distance and is the major factor that will cause trauma. The other important factor is the mass (m) of the dart, including the actual drug volume. The authors provide no information about any of these factors. We calculated that the average drug volumes (36 kg animal) in Groups A and B were 2.16 mL and 4.14 mL, respectively. The Dan-Inject remote drug delivery system comes with an 11-mm barrel for 3-mL darts and a 13-mm barrel for 5 mL darts. The 5-mL darts are long and heavy and have poor ballistic properties, making them very inaccurate for distances >20 m.

The study was carried out in “winter” (Group A) and “spring” (Group B), but there is no information about dates or time of the

day for the experiments. The ambient temperature, a key variable in the study, is reported being on “average” 12 C in winter and 22 C in spring. This is not a huge difference per se. There is no information about other factors that may be more important for the animals’ thermoregulatory response, e.g., sunshine, wind speed, precipitation, and snow-covered ground.

The authors used a certain amount of xylazine (X) and tiletamine-zolazepam (TZ) in winter, but they gave no reference for the chosen dose. After five unsuccessful immobilizations with the winter dose in spring, they increased the doses (by 100% for X and 50% for TZ) because the animals “were not immobilized,” without any further discussion. There is no discussion of several other factors that also may influence drug effects, such as quality of induction, degree of muscle relaxation, body condition, reproductive status, and seasonal metabolic rate.

The conclusion made by the authors that “the only factors that could influence the outcome of the present study were the ambient temperature and confinement stress in the pen” is not supported by the data presented. As written, this study is not reproducible, and because of the many uncontrolled variables, the conclusion is invalid. We urge the authors to address the deficiencies pointed out.

LITERATURE CITED

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