**Supplementary material 1**

**The below subsections follow the order of *Vortex* entry screens:**

***Species description***

For inbreeding depression we used default values. *Vortex* includes the ability to model the detrimental effects of inbreeding through reduced first-year survival of inbred individuals. Inbreeding is thought to have major effects on reproduction and survival, especially in small populations. The median value estimated from analysis of studbook data for 40 captive mammal populations was 3.14 lethal equivalents (LE) (Ralls et al., 1988). Wild populations that live in potentially more challenging environments are more vulnerable to inbreeding than captive populations. Crnokrak and Roff (1999) examined 157 datasets for wild populations of 34 taxa and found that 90% showed evidence of inbreeding depression, with average effects being significantly higher (7x) in the wild than observed in captivity. O’Grady et al. (2006) found an average overall effect of 12.29 LE over the life history of wild mammal and bird populations, with 6.29 LE of this impacting the production and survival of offspring to age one year. Based on these studies, the impact of inbreeding was modeled as 6.29 LE on juvenile mortality, with 50% of the effect of inbreeding due to recessive lethal alleles.

***Reproductive system***

In the Knott et al. (2013) study, fecal samples were serially collected from a multiparous female and six females reaching sexual maturity at < 4 years of age. The youngest pregnant female in this study was 1.8 years of age and this female did not exhibit clear ovarian cycling prior to breeding. According to the international studbook the average age at first reproduction in captivity is 4 years (N= 168), with a median of 3 years and 2 months. However, data from captivity (Knott et al., 2013; Schappert, 2019) may be biased and heavily influenced by human care and pairing of individuals for mating.

***Lifespan***

There are no long-term studies of individual giant anteaters in the wild to report on these parameters. Furthermore, data from captivity is unrealistic as animals under human care tend to live longer. The oldest male to have reproduced in captivity was 26 years, while the oldest female was 24 years (Schappert, 2019). These data enable us to set longevity and the maximum age of reproduction at the same age. Based on best guess, maximum age of reproduction/lifespan was set at 15 years; however, mortality rates after 10 years were increased each year by 5% in the model such that very few individuals actually reached maximum age (see mortality rate parameters). This parameter was also included in the sensitivity analysis.

***Sex ratio at birth***

The Anteaters & Highways project captured 50% males and 50% females in the wild (n=44). There is no *a priori* evidence to suggest a skewed sex ratio at birth in the wild. Additionally, Schappert (2019) reports the number of animals born in captivity from the International Studbook since 1980 (excluding unknown sex) as 319 males (46.9%) and 361 females (53.1%). Examining the sex ratio of giant anteaters born in captivity during 10-year periods (table below), it appears that sex ratios are biased due to stochasticity. We therefore selected an equal sex ratio of 1:1 to perform the baseline.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | EAZA (Europe) | | N | AZA (North America) | | N |
|  | Male | Female | Male | Female |
| Jan 1990 – Jan 2000 | 43% | 57% | 28 | 35% | 65% | 63 |
| Jan 2000 – Jan 2010 | 49% | 51% | 105 | 44% | 56% | 89 |
| Jan 2010 – 1 Jan 2019 | 41% | 59% | 136 | 65% | 35% | 48 |

***Density-dependent reproduction***

We did not consider density dependence in our model; however, we agree that it could be considered where especially at low densities animals may have lower reproduction due to difficulty of meeting with one another (Allee effect). For instance, this could be a factor in the Campos Gerais of Paraná State, Brazil, where density is low (0.11 ind/km²) in a remnant of Cerrado biome relict (Braga, 2010).

***Mortality rates***

Adult mortality estimates were based on results of the Anteaters & Highways project, which is based on a Cerrado study site. The project monitored 44 animals for approximately 12850 days. A total of seven animals died during the study. Four animals were killed by vehicle collisions. One animal that died appeared to be very old when captured with white fur on its nuzzle, maintained a very small home range and died a few months into the study. Another animal died of unknown causes within its territory. Finally, one animal left its home range after the land was completely tilled by the landowner. This adult female dispersed for 25km before then dying. We therefore considered that we had three non-road related deaths during the time of the study. Although one of the deaths appears to be due to human activity, we consider that all animals in our study site were subject to human activity and therefore used the death of three adults was to calculate adult mortality rates in our study area. Calculation of deaths was as follows:

|  |  |  |
| --- | --- | --- |
| #days | 12850 |  |
| #deaths/day | 0.000233463 | =3/12850 |
| daily survival | 0.999766537 | 1- (3/12850) |
| annual survival | 0.918306601 | (1- (3/12850))^12 |
| annual mortality | 0.081693399 | 1-(((1- (3/12850))^12) |

**References**

Braga, F.G., 2010. Ecologia e Comportamento de Tamanduá-bandeira *Myrmecophaga tridactyla* Linnaeus, 1758 no município de Jaguariaíva, Paraná. (PhD dissertation), Universidade Federal do Paraná, Curitiba, Brasil.

Crnokrak, P., Roff, D.A., 1999. Inbreeding depression in the wild. Heredity, 83: 260-270.

Knott, K.K., Roberts, B.M., Maly, M.A., Vance, C.K., DeBeachaump, J., Majors, J., Riger, P., DeCaluwe, H., Kouba, A.J., 2013. Fecal estrogen, progestagen and glucocorticoid metabolites during the estrous cycle and pregnancy in the giant anteater (Myrmecophaga tridactyla): evidence for delayed implantation. Reprod. Biol. Endocrinol., 11:83-96. http://doi.org/10.1186/1477-7827-11-83.

O’Grady, J.J., et al., 2006. Realistic levels of inbreeding depression strongly affect extinction risk in wild populations. Biol. Conserv., 133: 42-51. https://doi.org/10.1016/j.biocon.2006.05.016

Ralls, K., Ballou, J.D., Templeton, A.R., 1988. Estimates of lethal equivalents and the cost of inbreeding in mammals. Conserv. Biol., 2: 185–93. https://doi.org/10.1111/j.1523-1739.1988.tb00169.x

Schappert, I. 2019. International studbook for Giant Anteater *Myrmecophaga tridactyla*. Zoo Dortmund. Unpublished studbook database.