

Prevalence of chromosome anomalies in a deer farm with fertility decline in Malaysia

ABSTRACT

Background: A number of factors are known to reduce fertility rate in animals and one of the important categories of such factors is chromosome anomalies. They can occur with or without causing phenotypic abnormalities on animals; in some cases, they may directly affect meiosis, gametogenesis and the viability of conceptus. In many instances, balanced structural rearrangements can be transmitted to offspring, affecting fertility in subsequent generations.

Aim: This work investigated the occurrence of chromosome aberrations in *Rusa timorensis*, *Rusa unicolor* and *Axis axis* raised in a nucleus deer farm in Malaysia with a history of declining fertility of unknown origin.

Materials & methods: Blood samples were collected from 60 animals through venipuncture, cultured for 72 h and arrested at metaphase. SmartType® and Ideokar® software were used to karyotype the chromosomes.

Results: We found 15 out of the 60 animals screened from both sexes harbor some form of chromosome aberration. Chromosomal aberrations exist at the rate of 25% and may not be unconnected with the observed reduced fertility on the farm. Further investigations should be carried out, especially on the offspring of the studied animals to transmission of these aberrations. The animals that are confirmed to transmit the chromosomal aberrations should be culled to arrest the propagation of their abnormalities.

Lay abstract: Some genetic problems affect fecundity in animals; they affect reproduction thereby reducing farm output. There are reports regarding these types of problems, which links them to causing enormous economic losses in different types of animal farms. In this work, we collected blood samples from a deer farm where different breeds are kept together and fertility decline has been reported previously to check if these types of genetic problems are present on the farm. Our investigation revealed that 25% of the animals investigated, both males and female, carry a type of genetic problem that was previously reported to be associated with fertility issues. We recommend a more extensive investigation to get to the bottom of the problem, to proffer appropriate solution and to avoid economic losses on the farm.

Keyword: Chromosomal aberrations; Cytogenetics; Deer; Fertility decline; Karyotyping