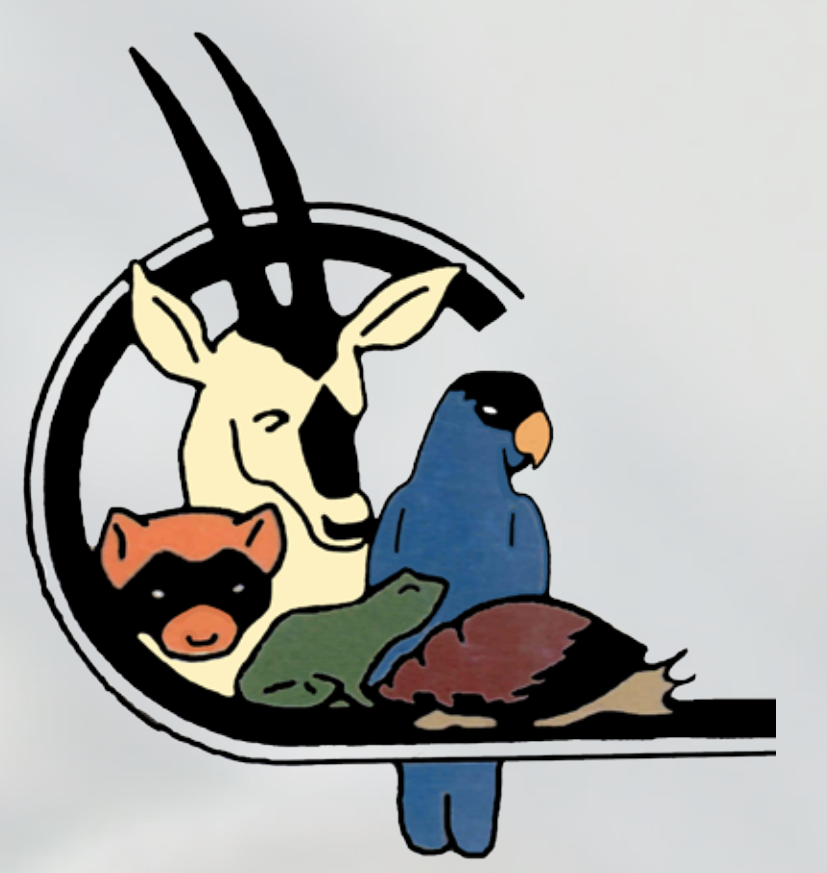




Captive breeding program of the Arabian leopard (*Panthera pardus nimr*) – an overview



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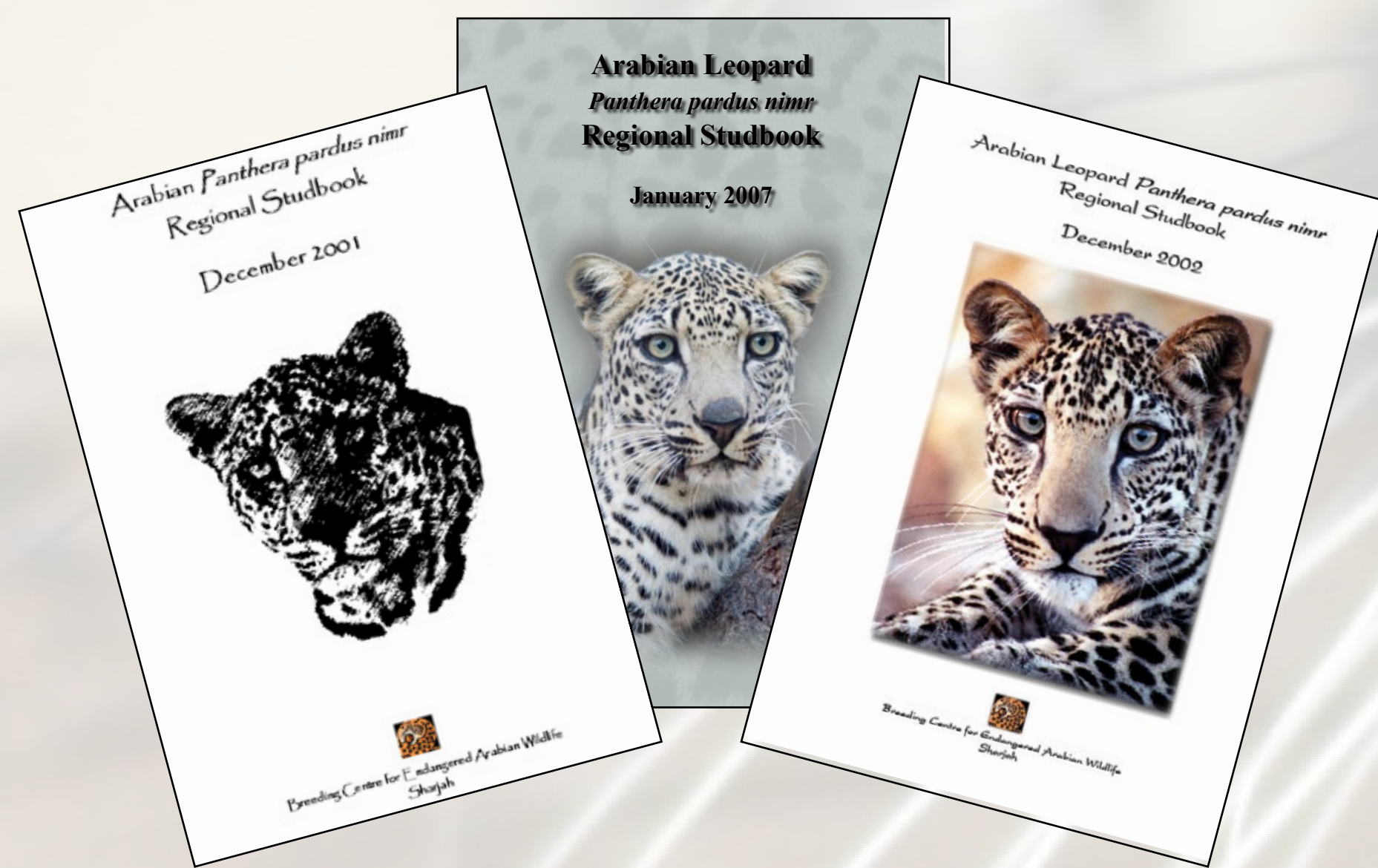
Role of Captive Breeding

As extinction rates accelerate, methods for preserving critically endangered species such as the Arabian leopard have to be initiated. Captive breeding can play a pivotal role in conserving endangered species by providing a healthy “safety net” population with which to buffer dwindling numbers in the wild, which for the Arabian leopard is critical in a rapidly decreasing and highly fragmented habitat. Experts believe that the Arabian leopard will not survive in the wild without reintroductions of animals from the captive breeding program.



Regional Program

The captive breeding program has been operating at a regional level since 1999, although the first Arabian leopards registered in the studbook were caught in 1985. The current population consists of 37 males and 34 females, 19 of which are wild caught. A large number do not actively contribute to the breeding program. There are nine institutions participating in the captive breeding program at present.



Genetic and Demographic Management

The Arabian leopard studbook provides a common goal for all institutes participating in the captive breeding program and encourages cooperation between institutes and countries. It provides recommendations on how best to manage the captive population to maximise total numbers in captivity, to maintain genetic diversity, and to eventually create or select founder populations for reintroduction. Dedicated software (PM2000) is used to analyse and manage the genetic and demographic composition.

The first step in analysing data, requires an evaluation of the age distribution of the population. A population pyramid (Fig 1) is a graphical illustration showing the distribution of various age groups in a population, and ideally forms the shape of a pyramid. There are a large number of females that are now 13 years old and will soon no longer be producing offspring. There are also more reproductive males than females, resulting in a potential slump in population growth.

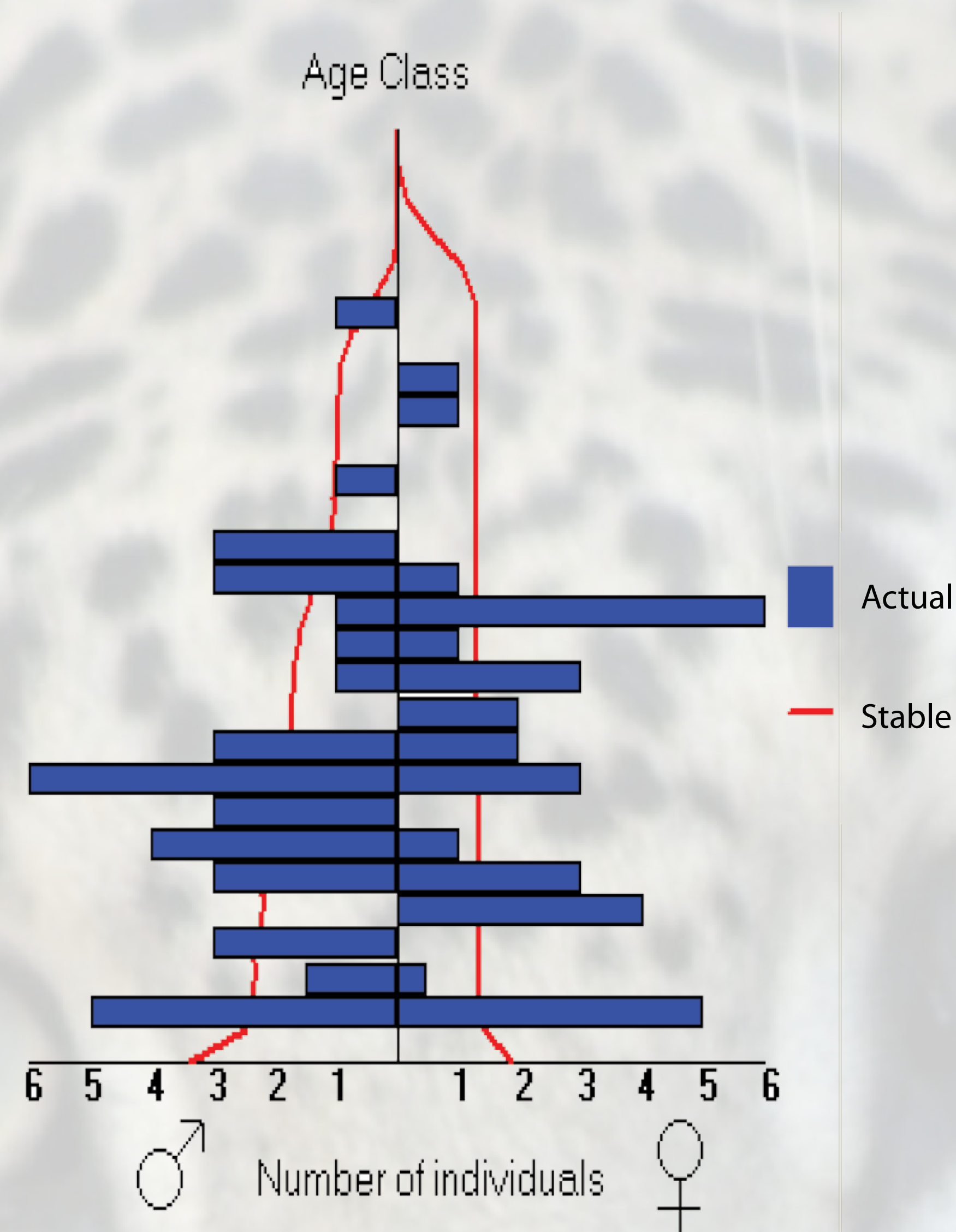


Figure 1: Age distribution of the Arabian leopard captive population.

Increasing Founder Representation

An uneven spread of descendents per founder (Fig 2) means the captive population does not represent the genetic make up of the wild population. Unrepresented founders should breed as a matter of urgency, and no founders should be prevented from breeding in this still small, young population.

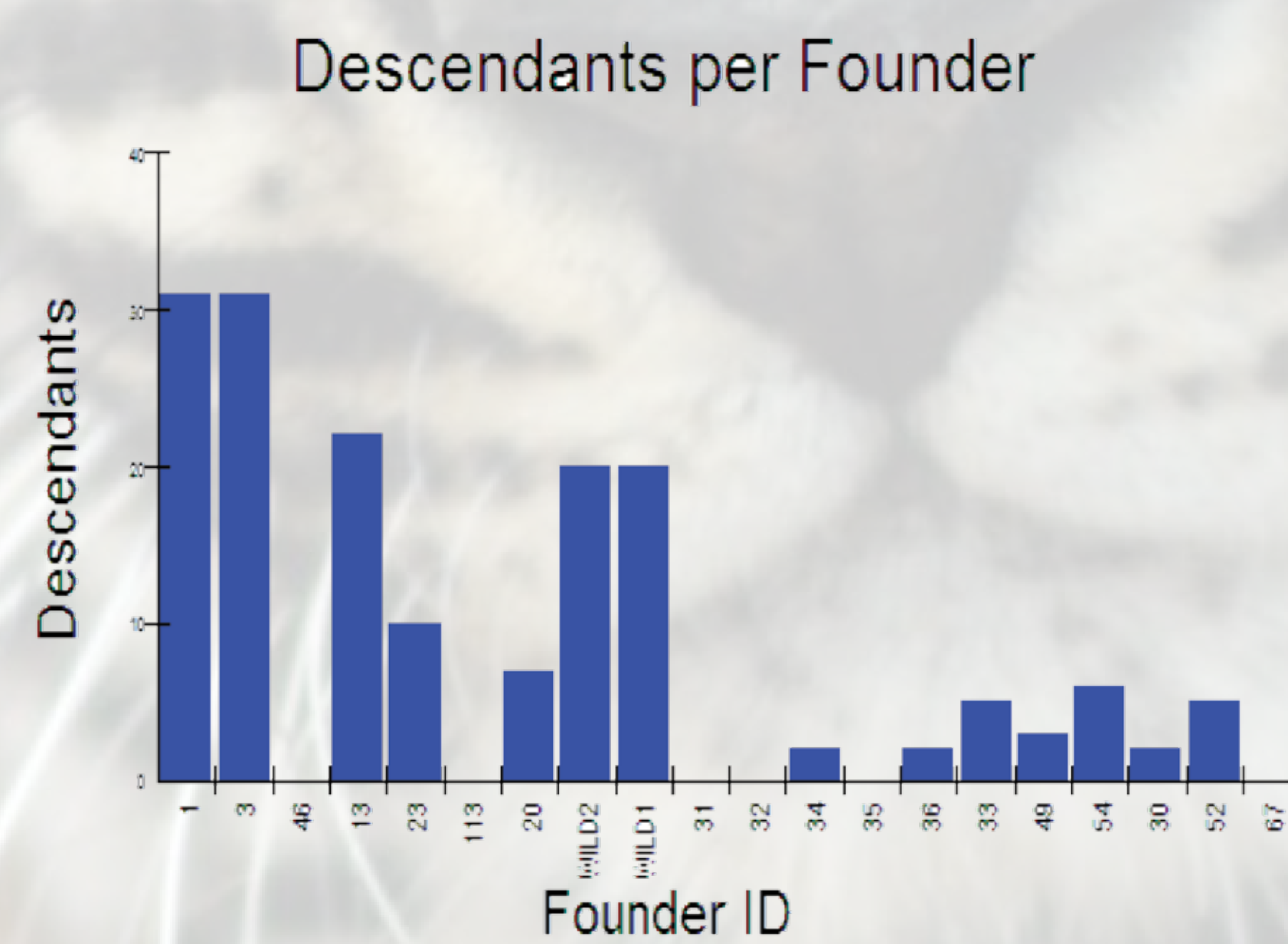


Figure 2: Number of offspring per wild caught leopard (founders).

Analysis using PM2000 shows that the population will lose genetic diversity rapidly (Fig 3) if the current trends within the captive breeding program do not improve.

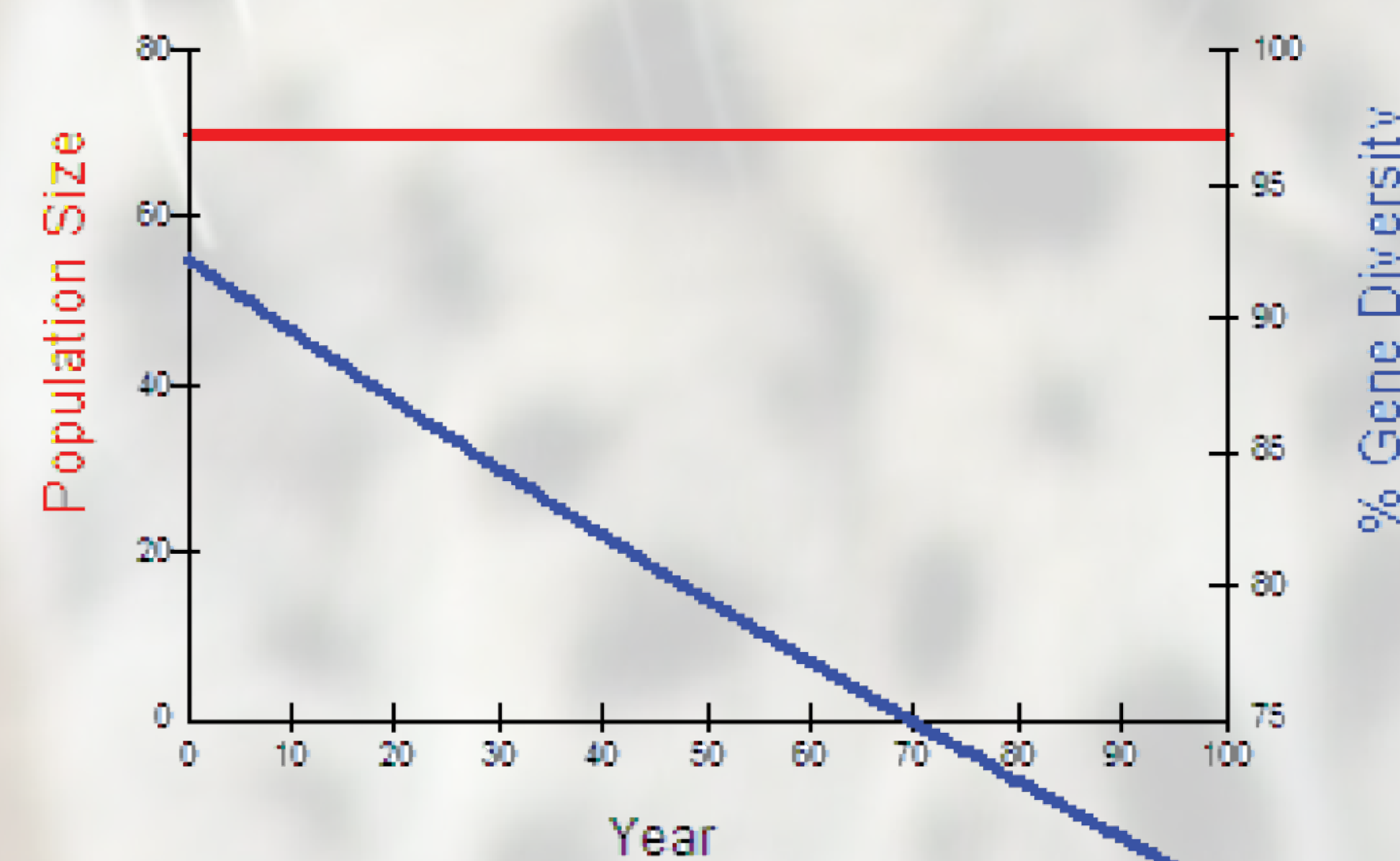


Figure 3: If current trends in the Arabian leopard captive populations continue, it will rapidly lose genetic diversity.

Maintaining Genetic Diversity

To retain 80% of the gene diversity of the wild population for 100 years with the current annual growth rate of 3.6%, the captive population needs to increase to 170 animals (Fig 4). Maintaining 80% of the diversity of the wild population means that the next generation can be expected to have an average level of inbreeding of 20%. If the average level of inbreeding in the population was 25%, this would mean that average relatedness would be equivalent to brother and sister, which can be expected to have consequences for genetic fitness. Maintaining more gene diversity would be better.

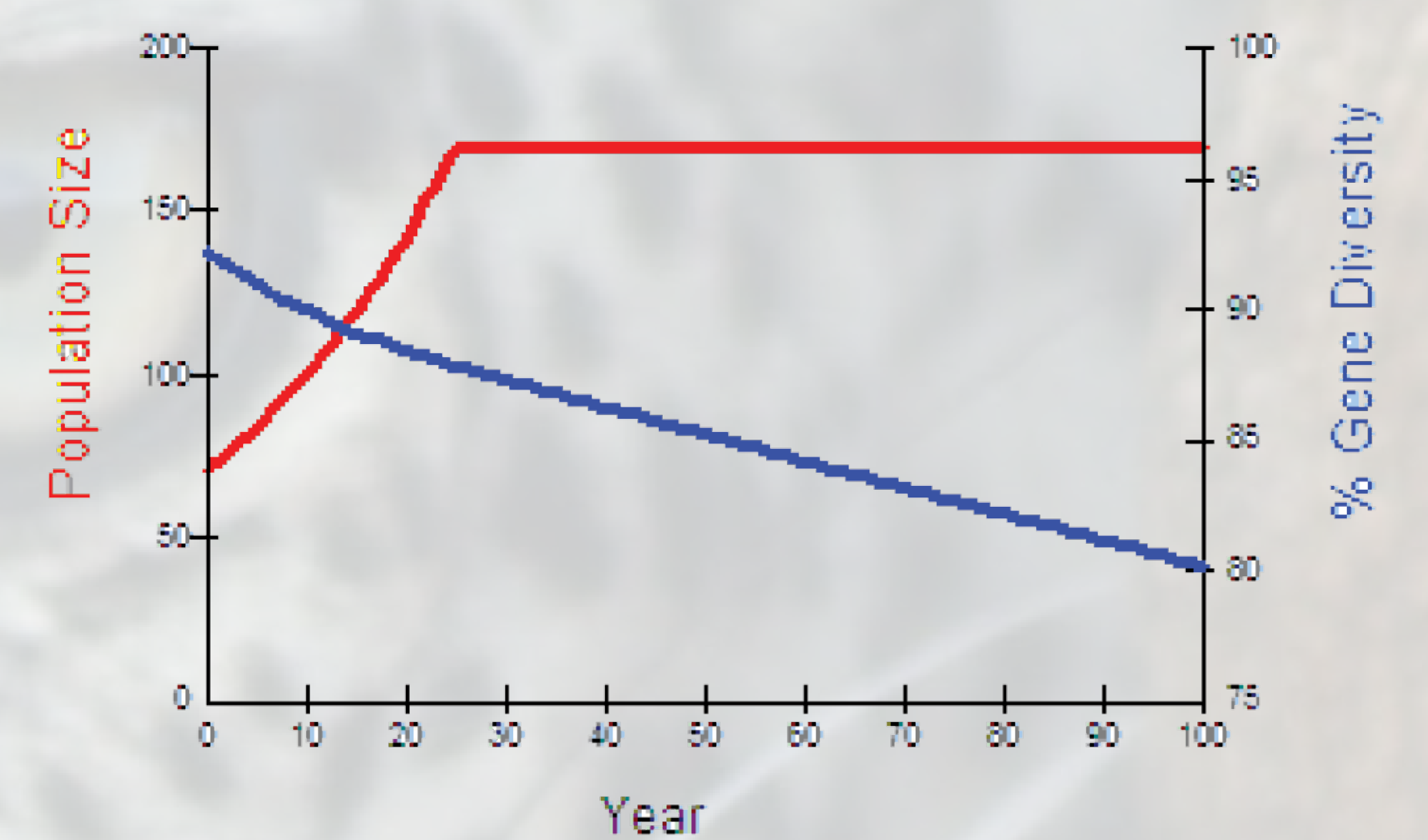


Figure 4: To retain 80% genetic diversity within the captive population, the number of captive leopards must increase to ≥ 170 .

To maintain the maximum achievable gene diversity of 86% for the Arabian leopard captive breeding program; the annual population growth rate needs to increase to 10%, the 6 unrepresented founders (Fig. 2) must breed, and the population increase to 300 (Fig 5).

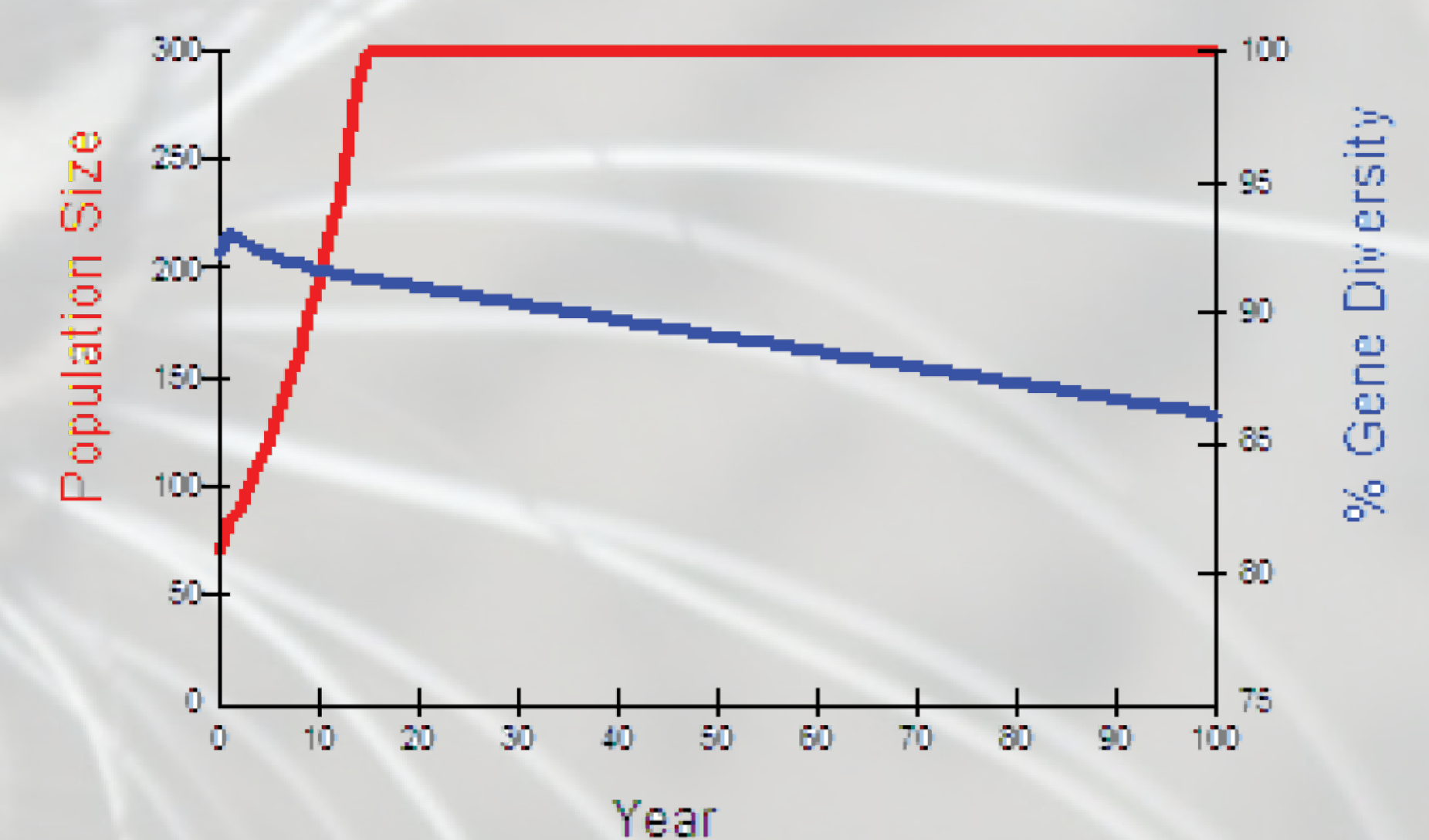


Figure 5: To reach the maximum achievable genetic diversity of 86%, the number of leopards in captivity must increase to 300, with a growth rate of 10% and all unrepresented founders must breed.

International and Regional Cooperation

The Arabian leopard captive breeding program focuses on maintaining a genetically sound population that closely resembles the wild population. Cooperation between institutes holding Arabian leopards is essential to ensure representation of all the wild-caught animals. Additional institutes must be included in the captive breeding program in order to further expand the growth potential of the population.