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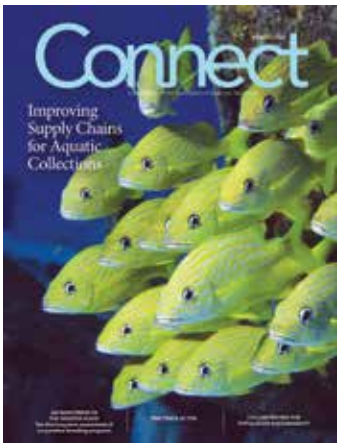
Blue Striped Grunt



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Grant

Government Grant Funds Research Project on Rhino Reproduction

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Greater one-horned rhino calf born at Denver Zoo, the result of AI using sperm from Omaha Zoo's greater one-horned rhino bull. Funding provided by IMLS grant.

A team led by scientists from Omaha's Henry Doorly Zoo and Aquarium in Omaha, Neb., SeaWorld Parks and Entertainment, South-East Zoo Alliance for Reproduction and Conservation, Taronga Conservation Society, the Denver Zoo in Denver, Colo., and ST Genetics was awarded a grant by the Institute of Museum and Library Services (IMLS) to carry out a project that will advance reproduction options for rhinos. The project aims to transform how insurance rhino populations are managed for genetic and demographic viability. The $445,065 will pay for the cost of important reproductive technologies that individual zoos would not be able to cover.

Managed breeding programs play an important role in conservation of threatened species. Rhinos have lengthy pregnancies and experience a long time between calves. These life history traits combined with unequal genetic representation of founders present roadblocks to achieving sustainable insurance rhino populations. That half of the rhino calves born in zoos are male presents another significant challenge because white and greater one-horned rhinos have been most successfully managed in large spaces as groups of many females with one male, yet zoos are typically limited in space.

While one male rhino has the potential to produce multiple calves in a year, one female rhino can produce only one calf every three years (given a ~16 month gestation). One way to ameliorate the incompatibility between limited space and the natural reproductive biology of rhinos is to manage for female-biased births. The ability to pre-select the sex of the calf would reduce the need for additional space required by males surplus to breeding programs, and for the first time, promote sex ratios of social groups that more closely mimic those occurring in the wild.

The management approach for pre-sexed births using sperm sex-sorting and artificial insemination (AI) is common in domestic livestock and some marine mammals in managed care. AI with frozen-thawed non-sorted sperm has been successful in white and greater one-horned rhinos and the methodology for preferentially selecting then cryopreserving "girl" sperm has now also been developed for rhinos. Thanks to funding from a prior IMLS grant and from key collaborators on this long-term program, X chromosome-enriched sperm samples have been cryopreserved from several males and the team is ready to begin AI trials with those samples. The grant will also support the expansion of males represented in cooperative genome resource banks with sex-sorted sperm.

A key goal of this work is to integrate an expanded reproductive toolset into rhino insurance population management. This approach will not replace natural breeding as this remains the most successful means of producing live calves.

The tools under development (e.g. hormone treatment to combat ovulation perturbations or asynchrony) will be used to enhance natural breeding efforts, particularly for those females who are under- or non-represented in the population and nearing the end of their reproductive window. Natural breeding is also important for rhinos to learn appropriate socio-sexual behaviors and cues associated with reproduction.

Ultimately, having a set of reproductive management options will permit population management teams, including species coordinators, veterinarians, reproductive specialists, and conservation geneticists, to integrate the most appropriate tool into each female's plan according to her life-history stage and management scenario. Coordinated planning will also guarantee that an adequate number of genetically diverse males exist for natural breeding. These approaches ladder up to a holistic strategy that addresses the needs of rhino populations in our care.