BOTSTIBER INSTITUTE
FOR WILDLIFE FERTILITY CONTROL

FACT SHEET

NATIVE PZP

ZonaStat-H/ZonaStat-D

Brand name: ZonaStat (ZonaStat-H/ZonaStat-D)

Regulatory Status: Registered by the U.S. Environmental Protection Agency (EPA) for use in wild equids and cervids; registered for use in 16 U.S. states

Common name: Native Porcine Zona Pellucida (PZP)

Producer: Science and Conservation Center
2100 S. Shiloh Road,
Billings, Montana 59106

General Description

Immunocontraceptive vaccines, such as Native Porcine Zona Pellucida (or PZP), activate the immune system to block a crucial aspect of reproduction. "Porcine" refers to the sourcing of the vaccine from pigs eggs. "Zona Pellucida" is a non-cellular membrane that consists of several glycoproteins (proteins + some carbohydrates attached) that surrounds all mammalian eggs.

The Native PZP vaccine contains the PZP glycoproteins and an adjuvant to boost the immune system. When this vaccine is injected into the muscle of the target female animal, it stimulates the immune system to produce antibodies against the vaccine. Sperm must attach to the Zona Pellucida before an egg can be fertilized. The antibodies to PZP attach to the sperm receptors on the eggs' Zona Pellucida and distort the shape of the receptors, thereby blocking sperm attachment and fertilization during breeding.[i ii] Native PZP does not directly affect any other body processes.

Efficacy

The effectiveness and longevity of the vaccine depends upon the species, the individual animal and its response to the vaccine.[iii] For most species, Native PZP requires annual boosters to maintain its effectiveness, although longevity of effectiveness may increase after three consecutive years of treatment. Annual treatment of wild horses and white-tailed deer with Native PZP typically reduces pregnancy rates by 80-90% .[iv v vi]

Health and Safety

A large body of research compiled over 30 years shows that Native PZP can be administered safely with very few side effects. Behavioral side effects are minor and are associated with the failure of the treated animal to become pregnant. If administered to a pregnant animal, Native PZP will not harm the animal or her developing offspring. The vaccine is not passed on to the developing fetus and the treated animal will give birth normally. In deer, the only known side effect of Native PZP treatment is extension of the mating season; there is no evidence that this causes any harm.

Research and field observations have indicated that a small percentage of treated individuals may experience localized reactions at the injection site in the form of inflammation, or formation of a granuloma or abscess. These temporary reactions heal on their own without intervention. Because Native PZP relieves treated animals of the biological demands of breeding and caring for offspring, treated animals generally benefit over time from increased body condition and improved overall health.

If eaten, Native PZP is broken down like any other protein and does not accumulate in the animal's tissue or pass through the food chain. Native PZP must be injected to be effective.

Applications

More research must be completed to determine where, to what extent and how fast Native PZP can reduce wildlife populations. At this writing, Native PZP has reduced wild horse populations at Assateague Island National Seashore in Maryland[vii] and Rachel Carson National Estuarine Research Reserve in North Carolina, white-tailed deer populations at Fire Island National Seashore, New York,[viii] and the National Institute of Standards and Technology, Maryland,[ix] and American bison populations on Santa Catalina Island, California.[x] Native PZP vaccinations are also stabilizing populations of African elephants at provincial parks and private wildlife preserves in South Africa.[xi]

Tests on captive animals of nearly 100 species in approximately 100 zoos and aquaria worldwide indicate that Native PZP works very well on a wide variety of hoofstock, including antelope, deer, wild cattle, sheep, zebra and

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giraffes as well as bears and sea lions.[xii] Native PZP has also been given to free-roaming Tule elk at Point Reyes National Seashore, Calif.,[xiii] and water buffalo on the island of Guam.

Authorizations

ZonaStat-H is federally registered with the Environmental Protection Agency (EPA) and the Humane Society of the United States (HSUS) is the registrant. Only ZonaStat-H is currently available for management applications. All other PZP uses are considered experimental. For ZonaStat-H to be used for management it must also be registered with the state and approved for use by the state's department of agriculture and/or natural resource agency. ZonaStat-H is currently registered for use in wild equids in the following states: Arizona, Colorado, Hawaii, Idaho, Louisiana, Maryland, Montana, Nevada, New Mexico, North Carolina, Oregon, South Dakota, Utah, Virginia, Washington, and Wyoming. ZonaStat-H is produced and distributed by The Science and Conservation Center (SCC) in Billings, Montana.

Additional Information

For information on ZonaStat-H and its use in managing reproduction in captive animal and wildlife populations, visit SCC's website at www.sccpzp.org.

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[iv] Rutberg, R.T., Naugle R.E. Population-level effects of immunocontraception in white-tailed deer (Odocoileus virginianus) (2008). Wildlife Research 35:494–501.

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[vii] Kirkpatrick JF, Turner A. (2008) Achieving population goals in long-lived species (Equus caballus) with fertility control. Wildl. Res. 35:513-519.

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[x] Duncan, C.L., King, J.L., Kirkpatrick, J.F. 2013. Romance without responsibilities: the use of the immunocontraceptive porcine zona pellucida to manage free-ranging bison (Bison bison) on Catalina Island, California, USA. .J Zoo Wildl Med. Dec;44(4 Suppl):S123-31.

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[xii] Frank, K.M., R.O. Lyda, and J.F. Kirkpatrick (2005). Immunocontraception of captive exotic species. IV. Species differences in response to the porcine zona pellucida vaccine and the timing of booster inoculations. Zoo Biology 24:349-358.
