

Pygmy hippo (*Choeropsis liberiensis*)

[illegible]

Duration	Duration of efficacy has not been well established. As a guide: 4.7 mg implants will suppress for a minimum of 6 months; 9.4mg will be effective for a minimum of 12months	Lupron® is available in various formulations lasting from 1 to 6 months, but because the release of hormone from the depot formulation varies by individual, actual duration of efficacy can vary considerably.	Unknown for most of species. Improvac® induces an immune response that generates short-lived antibodies in the domestic pig (antibody production starts to decline ~7-8 weeks following second injection). Suppresses oestrus for a full season in mares after the first booster.	The duration of this product can last 2.5 to 3 years.	Dose dependant: 45-90 days in general. However, effects could last ~12 years in some individuals.	No more than one dose each day. Regumate® must be given daily to maintain suppression of oestrus.	No more than 10-12mg each day. Chlormadinone must be given daily to maintain suppression of oestrus.	Species -dependant: most species 1 year	Permanent
Reversibility	Deslorelin is designed to be fully reversible however there are no current cases of reversal in this species. Removal of implant may hasten time to reversal.	Lupron® is designed to be fully reversible however there are no current cases of reversal in boidae.	Improvac is not designed to be reversible, although reversibility has been demonstrated in some wild animal species. We have one record of reversal in common hippos however, the date of offspring birth was not provided so time to conception could not be calculated.	Implanon is designed to be fully reversible however we do not have any records of reversal in this species.	Designed to be fully reversible but individual variations can occur. We have several records of reversal in common hippos, with time to conception ranging between 1 month and 7 years following the estimated expiry of the product. Further research in the subject is necessary.	It should be reversible after cessation of treatment. Signs of oestrus in equids have been observed 5 days after the end of treatment but will vary depending on the individual. We have one record of reversal in a common hippo in which the female conceived approximately 3 months following the cessation of treatment.	Chlormadinone should in theory be reversible, however this has not been researched in this species. We have one record of a reversal in a common hippo, in which the female conceived almost immediately following the end of treatment that had lasted 6 months.	Species differences on reversibility. Reversibility differs between species; however the longer P2P is given the longer it takes for a female to become fertile again. Treatment for over 5 years has been associated with ovarian failure in some cases. The possibility of ovarian damage makes this method unsuitable for animals highly valuable to captive breeding programmes or where reversibility is important. It is therefore suggested that an individual is on P2P for no longer than 3 years if you want the female to breed. We have one record of an common hippo conceiving approximately 4 years after the cessation of treatment.	-
Effects on Behaviour	Data deficient	Data deficient	Similar to surgical castration but short-acting (duration of antibody effect). No oestrus behaviour in mares.	Data deficient	Effects on behaviour have not been studied; there may be individual variation in response. Medroxyprogesterone acetate [not all progestins are androgenic; so important to clarify] binds readily to androgen receptors and is antiestrogenic; females may experience male-like qualities (increased aggression, development of male secondary sex characteristics, etc.) Further research in the subject is necessary.	Regu-mate® can be used to alleviate temperament changes and aggression.	Effects on behaviour have not been studied; there may be individual variation in response.	Since usually the vaccine doesn't suppress oestrus cycles it has almost no effects on social behaviour, and no undesirable behavioural effects have been registered in free-ranging elephants treated for up to 9 years. In some species the failure to conceive can result in longer than usual breeding season and in some cases this can result in aggression and social disruption.	-
Effects on sexual physical characteristics	Similar to gonadectomy. GnRH agonists may cause the suppression of physical secondary sexual characteristics.	GnRH agonists may cause the suppression of physical secondary sexual characteristics.	Similar to surgical castration but short-acting (duration of antibody effect).		Because Medroxyprogesterone acetate binds readily to androgen receptors and is antiestrogenic, females may experience male-like qualities (increased aggression, development of male secondary sex characteristics, etc.)	Data deficient	Data deficient	Data deficient	-
Males	Data deficient. Not Recommended as GnRH agonists are seemingly not effective in male ungulates	Data deficient. Not Recommended as GnRH agonists are seemingly not effective in male ungulates		Not recommended	Not recommended	Not recommended	Not recommended	Not recommended	
Dose	-	-	Two injections of 400ug are given 35 days apart and boosters are usually administered every 3-6 months, although duration can vary between species.	-	-	-	-	-	-
Latency to effectiveness:	-	-	Latency to effectiveness can be up to 6 weeks so separation of the sexes is recommended if possible.	-	-	-	-	-	Depending on species and individual, perhaps as long as 2 months or more
Use in prepubertals or juveniles:	-	-	Data deficient	-	-	-	-	-	Data deficient
Use in seasonal breeders:	NA	NA	NA	NA	NA	NA	NA	NA	NA
Duration and Reversability	-	-	Unknown for most species. Improvac® induces an immune response that generates short-lived antibodies in the domestic pig (antibody production starts to decline ~7-8 weeks following second injection). This lasts ~ 5 to 9 months in bull elephants when used for the control of musth. Improvac is designed to be fully reversible; there are currently no reversals on the database however, studies have shown reversibility in equids within a two year period.	-	-	-	-	-	The procedure should not be used in males likely to be recommended for subsequent breeding as reversal is unlikely
Effects on Behaviour	-	-	Similar to surgical castration but short-acting (duration of antibody effect). Decrease male aggression due to down regulation of testosterone synthesis. Can prevent, terminate or reduce aggression/musth behaviour in bull elephants.	-	-	-	-	-	Vasectomy will not affect androgen-dependent behaviours
Effects on sexual physical characteristics	-	-	Similar to surgical castration but short-acting (duration of antibody effect).	-	-	-	-	-	-
General:									
Side effects	In general weight gain as would be seen with ovariectomy or castration. Increased appetite will result in weight gain, especially in females. Males may lose muscle and overall weight if not replaced by fat. Males may become the size (weight) of females. Some dichromatic species may change colour. The EAZA RMG recommends always reading the manufacturer's data sheet	In general weight gain as would be seen with ovariectomy or castration. Increased appetite will result in weight gain, especially in females. Males may lose muscle and overall weight if not replaced by fat. Males may become the size (weight) of females. Some dichromatic species may change colour. The EAZA RMG recommends always reading the manufacturer's data sheet	Swelling at the vaccination site may be observed- need to inject deep intramuscular in elephants and horses. In some cases, fever and lameness are seen. The EAZA RMG recommends always reading the manufacturer's data sheet.		Possible deleterious effects on the endometrium following prolonged use. Progestins are likely to cause weight gain in all species. In the human literature, Depo-Provera® has been linked to mood changes. Because it binds readily to androgen receptors and is anti-estrogenic, females may experience masculinisation (increased aggression, development of male secondary sex characteristics, in dichromatic species, aspects of male colouration, etc.). The EAZA RMG recommends always reading the manufacturer's data sheet	Progestagens likely cause weight gain in all species. Possible deleterious effects on uterine and mammary tissues vary greatly by species. Can cause endometritis in domestic horses and cystic follicles in suids at low doses. The EAZA RMG recommends always reading the manufacturers' data sheet.	Progestagens likely cause weight gain in all species. Possible deleterious effects on uterine and mammary tissues vary greatly by species. Can cause endometritis in domestic horses and cystic follicles in suids at low doses. The EAZA RMG recommends always reading the manufacturers' data sheet.	Treatment for over 5 years has been associated with ovarian failure in some species (species differences). Significant ovarian disruption has been noted in dogs, rabbits, mice and domestic sheep. Oophoritis unknown if transient or permanent. In some species the failure to conceive can result in longer than usual breeding season (aggression and social disruption)	-

Warnings	Causes initial gonadal stimulation. Duration may be reduced if implant is broken. Do not cut the implant. If implant is not completely removed at the end of treatment, residual circulating levels of deslorelin may affect time to reversal. Should not be used in conjunction with Depo-Provera.	Causes initial gonadal stimulation	It should be handled with extreme care to avoid handler accidents. The EAZA RMG recommends always reading the manufacturer's data sheet	Interaction with other drugs are known to occur and may influence protection against pregnancy. In some diabetic animals progesterone has led to an increased insulin requirement, it is advised that the product be used with caution in diabetic animals and that urine glucose levels are carefully monitored before and after dosing. The EAZA RMG recommends always reading the manufacturer's data sheet.	This product is contraindicated for use in females with a previous or current history of uterine inflammation. The EAZA RMG recommends always reading the manufacturer's data sheet	This product is contraindicated for use in females with a previous or current history of uterine inflammation. The EAZA RMG recommends always reading the manufacturer's data sheet	The only adjunct used with PZP is Freund's Modified adjuvant, which DOES NOT CAUSE TB+ TEST RESULTS, and injection site reactions are less than 0.05%. Following the initial treatments, boosters are required, using only Freund's incomplete adjuvant.	The procedure should always be carried out under sterile conditions, with potential for infection of the surgical wound.
Reporting Requirements: In order to increase our knowledge of the efficacy of contraception methods in hippopotamidae it is recommended that all individuals on contraception be reported to the EAZA RMG								
References: 1) Asa, C.S. & Porton, L.J. (eds.) (2005) Wildlife Contraception: Issues, Methods, and Applications. The Johns Hopkins University press: Baltimore. 2) Flacke, G.L., Schwarzenberger, F., Penfold, L.M., Walker, S.L., Martin, G.B., Millar, R.P., Paris, M.C.J. (2017). Characterizing the reproductive biology of the female pygmy hippopotamus (<i>Choeropsis liberiensis</i>) through non-invasive endocrine monitoring. <i>Theriogenology</i> . 102:126-138. doi: 10.1016/j.theriogenology.2017.07.017.								
Disclaimer: The EAZA RMG endeavours to provide correct and current information on contraception from various sources. As these are prescription only medicines it is the responsibility of the veterinarian to determine the dosage and best treatment for an individual								