

# CREW PROGRESS REPORT

Lindner Center for Conservation and Research of Endangered Wildlife



Photos by Brian Jorg

## CREW's New Approach Offers Hope for Oaks

The “old oak tree” is not just a line from a song. Oaks (*Quercus* spp.) are iconic trees in many communities and keystone species in ecosystems around the world. Of the 500 species of oaks worldwide, at least 20% are threatened and in need of conservation. However, *ex situ* (off-site) conservation of oaks is complicated because their seeds cannot survive the conditions of conventional seed banks. As an alternative, CREW has recently tested the method of shoot tip cryopreservation with several oak species. CREW's Plant Lab has now initiated cultures of 10 oak species, including the common live oak (*Q. virginiana*), the endangered Hinckley's and Arkansas oaks (*Q. hinckleyi*, *Q. arkansana*), and the economically important cork oak (*Q. suber*), to provide tissues for banking in CREW's CryoBioBank. Oaks are difficult to work with because they are slow growing and produce phenolic compounds that can inhibit growth, but CREW is working to improve growth conditions to make working with oak species easier.

These cultures provide the tiny, 1 mm long tips (which include the stem cells) for cryopreservation. The tips are frozen in liquid nitrogen (LN) using a procedure known as “droplet vitrification.” With this method we have seen an average of 46% and up to 90% recovery with live oak shoot tips after exposure to LN and some survival with cork oak and the endangered Hinckley's oak! We have also learned that recovering tips under alternating temperature conditions (26°C day:15°C night) can improve growth after freezing, compared with a constant 26°C. These are significant breakthroughs, since shoot tip cryopreservation should be widely applicable to many oaks species. To test its effectiveness across species, the CREW Plant Lab is continuing to increase the number of oaks it has in its tissue culture collection and to test droplet vitrification with each, with the goal of providing a broadly applicable conservation tool for this critical group worldwide. (*CREW is grateful to the Cincinnati Wild Flower Preservation Society for their support of this research.*)



“Using Science to Learn,  
Applying Knowledge to Save,  
A Future for Wildlife”

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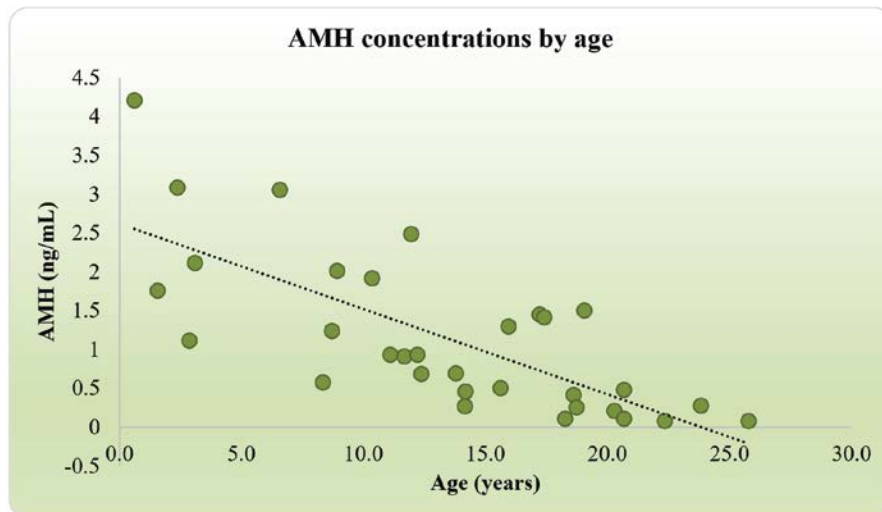


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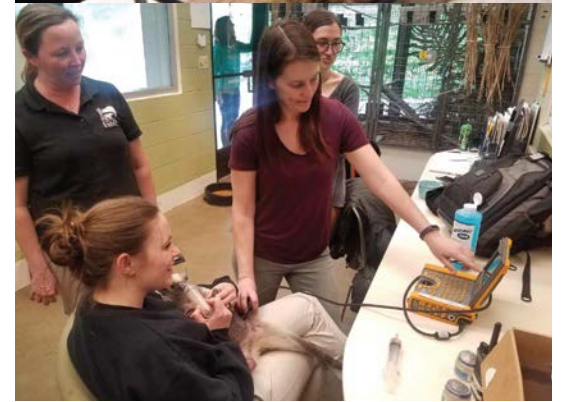


## New Fronts on a Fertility Test for Polar Bears

Despite the reputation for having the world's largest polar bear poop bank, scientists at CREW are delving into some less smelly studies. Until recently, collecting blood from polar bears was considered an invasive procedure, as it commonly required anesthesia; however, advances in animal training techniques are now permitting animal care staff to collect serum samples from polar bears voluntarily and regularly. The ability to analyze serum, from which a more diverse panel of hormones can be detected, opens new doors for monitoring reproductive health in this species. One serum hormone of particular interest to CREW scientists is anti-Müllerian hormone (AMH), which is produced by the ovary and is used to assess fertility in other species, including humans. Scientists at CREW successfully validated an assay to measure AMH in polar bear serum and then quantified the hormone in banked blood samples. Preliminary results indicate that AMH concentrations decline with age, reaching their lowest concentrations around the time female bears turn 20. While it's unlikely that AMH will serve as a pregnancy test, it holds promise for assessing which individuals have the best chance of producing cubs and consequently can be used to prioritize breeding recommendations, which is important given the shortage of males in the population. Additionally, a more thorough understanding of AMH may be beneficial in monitoring wild bears, whose fertility may be impacted by environmental pollutants. *(This study was supported, in part, by the Charlotte R. Schmidlapp Fund).*



## Team Tamandua



The tamandua, also known as the lesser anteater, is an insectivorous and arboreal mammal native to Central and South America. Little is known about the reproductive biology of this species, and pregnancy length can range from 130-190 days. In 2018, CREW scientists began using ultrasonography to monitor fetal development in the Cincinnati Zoo's pregnant female tamandua, 'Isla'. Fetal skull size (length and width), total size, and heart rate were recorded weekly. The pup, 'Mani' (Spanish for 'peanut') was born in early 2019. Under a recommendation from the tamandua Species Survival Plan (SSP), Isla became pregnant again in late 2019. CREW scientists performed ultrasound exams throughout this second pregnancy and using the data collected during Isla's first pregnancy (specifically skull width), were able to predict date of birth within one week of the actual event. Weekly exams of fetal development allowed staff to monitor fetal health and growth and to narrow down the window of possible birth dates from two months to one week, aiding the animal care staff's timely preparations for the pup's arrival.