A Blood Mystery

Photo by Dan Maurer

Photo by Joan Maurer

A human dressed in white with a crane puppet head on one arm tends to juvenile whooping cranes.

Joan Maurer examines animal blood at the Zoo.

Photo by Richard Brodzeller

Joan Maurer wanted to solve a mystery. So she proposed a project: a pilot study on pre-pubescent birds learning from puppets to pilot the planet. Surely you've seen the pictures of these young whooping cranes following an ultralight aircraft to learn how to migrate. The problem: How can conservationists be sure these highly endangered birds are healthy enough for their first migration? The mystery involves a blood-clotting test. Ah, the plot thickens.

Not to be flippant, but this tale about a Zoological Society-funded study of problems in analyzing bird blood has all the elements of a mystery story. *The setting:* the International Crane Foundation (ICF) in Baraboo, Wis. *The detectives:* Joan Maurer, a veterinary technician at the Milwaukee County Zoo with a master's degree in biology, along with ICF veterinarian Dr. Barry Hartup and veterinary technician Cristin Kelley. *The time period:* Nine days in September 2007. *The mission:* Find out why ICF's blood-analysis results were not matching those of other crane-breeding institutions.

Why is this important? "There are only 500 whooping cranes left on the planet," says Maurer, who has a particular fondness for birds. In 1941, these cranes were nearly extinct. Organizations such as the ICF and the Zoo, and other members of the Whooping Crane Eastern Partnership, are helping to reintroduce a new flock of migratory cranes to the wild. To avoid extinction, the cranes need to breed and migrate more than 1,200 miles twice a year. ICF helps the cranes learn how to fly – using puppet "parents" and ultralight aircraft. How do you tell if the young cranes are healthy enough to migrate? Aha! Test their blood. If your blood tests are flawed, however… ah, there's the rub.

So Maurer goes undercover – literally. She, Dr. Hartup and others wear white, crane-like outfits and walk to a field laboratory (it's truly in a field). Experienced handlers capture the cranes, gently cover the cranes' heads so they're calm and can't see the workers, and collect blood samples.

Here's the scientific part: When blood is drawn – animal or human – it's put it into blood tubes containing an anticoagulant that keeps the sample from clotting. Without the anticoagulant, the blood eventually would clot and separate into serum and blood cell components. You couldn't test this clotted blood for, say, the number of white cells it contains. White cell counts help vets tell if an animal is ill. Maurer's hypothesis: ICF needed better blood-handling techniques or a different anti-clotting agent, or both. She tested two anticoagulants: heparin and EDTA. ICF had been using EDTA, "which is considered the anticoagulant of choice in most bird species," she says. She examined blood cells under the microscope to determine which anticoagulant preserved specimens the best. The answer: Heparin was better than EDTA in the juvenile cranes. So it looked like ICF should switch to heparin.

But that wasn't the only factor in this mystery. "When we collected blood samples in the field and immediately made blood smears, the humidity damaged the smears," says Maurer. "So we had only 10 high-quality samples for our comparison from a total of 27 birds." Concluded Dr. Hartup: "We think staff should use more controlled conditions for this type of testing." Because the results were based on only 10 birds, Maurer wants to return to ICF and "replicate what we found with at least another 10 juvenile whooping cranes. The goal of the whole study is to standardize the blood-handling technique for cranes worldwide," she says. Adds Dr. Hartup: "We hope to publish the study in a peer-reviewed journal."

Although Maurer says that her part in helping save the cranes "is just a drop in the bucket," her research shows how a minimal investment can bring significant results. The Zoological Society paid about $900 for her expenses, and the Zoo paid her salary as part of its professional development program. "The Zoo has a partnership with ICF to take cranes that can't be released," she says. The Zoo has one ICF whooping crane on exhibit. The Zoo also helps support field-conservation projects for endangered animals. For Maurer personally, the project was a challenge and a chance to support the crane foundation. "I love ICF. I'm impressed with their staff. And they have a successful program."

On Jan. 28, after a 97-day flight, 16 juvenile cranes – some of the same birds Maurer tested – completed their first migration to Florida from Wisconsin. They join 60 whooping cranes that have been reintroduced to the wild in eastern North America. Together with one wild flock of 236 whooping cranes, 149 captive birds, and 43 non-migratory wild cranes, they are helping their species come back from near extinction.

By Paula Brookmire