



## Vet Sleuths Save Lives

A new team of detectives has helped save horses by uncovering a poisonous weed problem in their pasture, helped zookeepers save wallabies by tracking down a rare nutritional deficiency and discovered that zinc in new pennies can kill puppies.

By identifying the bacterial culprit, the sleuths helped a Phoenix-area horse breeder end a string of deaths of high-priced foals. By pinpointing an unexpected nutritional problem, they helped put pep and productivity back into a commercial dairy herd in central Arizona. They are on the lookout for contagious diseases in pets and livestock anywhere in the state.

The detectives are seven University of Arizona faculty scientists and their assistants appointed to the Arizona Veterinary Diagnostic Laboratory, with headquarters in Tucson and a branch in Mesa. The new lab started work last year, after funds to create it were approved by the Arizona Legislature in 1982.

The UA veterinary team helped the Reid Park Zoo deal with a parasite problem affecting the zoo's addax antelope. (Photo by Allan Fertig.)

About \$300,000 in advanced equipment, plus the addition of new personnel, have greatly expanded the amount of diagnostic service that the university can provide for animal owners and veterinarians, said Dr. Raymond Reed, a UA veterinary pathologist since 1952.

"We have always helped however we could, but now our capacities are much greater," said Reed.

Last year, the lab handled about 150 specimens a month. "This year, our case load has essentially doubled," said Dr. Gavin Meerdink, who came to Arizona from Michigan in 1983 to head the lab. He expects the case load to top 10,000 specimens per year as more Arizonans learn of the facility. "We kept kind of quiet until January because we wanted to get the tests and equipment working smoothly," he said.

The specimens may either be dead animals or samples such as tissue, blood serum or milk from living animals. Tests on dead animals help identify ways to protect other animals.

### 'A Lot of Expertise'

Dr. Mark Ashby, a veterinarian at Oracle, said that the people at the Veterinary Diagnostic Laboratory are helpful to him in his private practice. "They have a lot of expertise in many areas, more than any one practitioner can have," he said. "They help us when we have a tough diagnostic problem."

Dr. Carlos Reggiardo, the lab's veterinary microbiologist, has the equipment and expertise to find, grow and identify bacteria or viruses from infected specimens. Dr. Jim Shively, veterinary pathologist, uses both light and electron microscopes to identify tissue abnormalities, infectious microbes and parasites.

Meerdink, a toxicologist, spots any evidence of harmful chemicals and works with chemist Dana Perry to identify the toxins even at levels in the parts-per-billion range. Reed and diagnostician Dr. Ted Noon round out the faculty of the Tucson lab, and pathologist Dr. Ed Bicknell heads a branch lab at the university's Mesa Agricultural Center.

Ashby said that Meerdink helped him identify the problem that killed one horse in Catalina this year. "He figured out that it had been eating burweed, which is toxic," said Ashby. "Without someone there in toxicology, we probably wouldn't have figured that out."

In this case, the diagnosis may have saved the lives of other horses that were moved out of the problem pasture, said Ashby.

The lab gets many of its cases from veterinarians, but accepts specimens for testing from the public as well. Fees are set for the various tests available.

"We can work most efficiently with practicing veterinarians," said Meerdink. "The practitioner is familiar with the animal's environment and history, and can best determine the direction for a thorough investigation."

He added, "We leave treatment recommendations to the practitioners."



The UA Veterinary Diagnostic Laboratory used its electron microscope in ruling out an apparent virus infection of the giant anteaters at Reid Park Zoo in Tucson. (Photo by Allan Fertig.)



Left: Microbiologist Dr. Carlos Reggiardo examines a sample of infected tissue at the campus laboratory.

Center: Dr. Edward Bicknell heads the Mesa branch of the UA Veterinary Diagnostic Laboratory. (Photos by Allan Fertig.)

Right: Marlene Stahl works on the growth and identification of bacteria and viruses.

We specialize in diagnosing the problem and the practitioner specializes in maintaining the animal's health."

### Protecting Livestock

About half of the lab's specimens have been from commercial livestock, and that fraction is growing.

Bicknell worked with a dairy in the Phoenix area last winter where several calves had died. "It looked like some kind of virus problem, since the animals were not responding to treatment," he said. He sent tissue samples to the Tucson lab via the university's daily courier.

"The tests came out negative for viruses, but they did find bacteria," said Bicknell. Knowing which bacterium was the problem and which antibiotics control it best, the dairyman stepped up treatment and stopped the disease from killing more calves.

For the horse breeder who had lost four valuable foals, Reggiardo identified the infectious cause as a type of salmonella bacterium and determined that it was new on the owner's farm. He identified which mares had been exposed to the bacteria and worked with the breeder and the breeder's veterinarian to stop the problem.

The lab keeps on an alert status for contagious livestock diseases, such as foot-and-mouth disease and hog cholera, that may enter Arizona from other states or Mexico, said Meerdink.

The lab helps Dr. Karl Pugh of St. Johns and other veterinarians around the state who check swine for pseudorabies before the animals can be entered in county fairs.

It also compiles information on the frequencies of specific problems in order to help set veterinary research priorities. The scientists have been surprised by the frequency of cattle reproductive problems linked to infection by chlamydia bacteria. "That has been a common diagnosis by us in calf abortions," said Reggiardo.

### Penny-Poisoned Pet

Most lab specimens that are not from livestock come from pets. Dr. Joe Yearous, veterinarian of the Rincon Small Animal Clinic in Tucson, said that the new lab "helps with a big percent of my problem cases. . . . I consider it a very valuable asset to my practice." He said that the lab's use of an electron microscope allows it to make specific

diagnoses of parvo virus, an important health problem among dogs.

Detailed analysis of one puzzling death this summer led to lab's discovery that new pennies can pose a zinc-poisoning threat to small dogs. Stomach acids can eat through the copper coating over the zinc core of pennies minted since 1982, Meerdink explained. Dissolved zinc is absorbed into the blood and concentrated by the liver. The liver of the small dog in which penny poisoning was documented had about six times the normal concentration of zinc.

"A mentally square adult dog is not likely to eat a penny, but it is something a puppy might do," said Meerdink.

The most exotic specimens for the lab are from zoos and the Arizona Game and Fish Department. The animals tested have ranged from a rare, thumb-size dove to a rhinoceros and a black bear.

### Wallabies and Macaques

In wallabies from Tucson's Reid Park Zoo, the lab identified a muscle-degeneration disease linked to deficiencies of selenium and vitamin E in the diet. Some animals had died and others were weak.

"It had become a detective case to figure out what was happening," said zoo curator Mike Flint. "It can get extremely tricky when you're dealing with a scale of two to four parts-per-million in the diet, and you're seeing such serious effects."

He said, "We found out that the animals were avoiding the alfalfa pellets in their diet that contained the selenium they needed." After the problem was diagnosed, solving it was easy with changes in the diet.

A Celebes macaque that had had recurring problems with anemic diarrhea since arriving in Tucson seven years ago was having trouble coping with the stress of a pregnancy this year. Reggiardo figured out which micro-organisms in the monkey's stomach were responsible and helped the zoo staff develop a way to monitor the problem and treat flare-ups early.

The lab has also helped the zoo recently with parasite problems in birds and antelope and with sores on a giant anteater.

"We have a tremendous relationship with the university people," said Flint. "They make our job a lot easier."

Meerdink said, "Diversity is really the hallmark of this lab. We get a little of everything, and we have to be thorough. We want to be sure about everything we say. The university is a place people come for facts."



The UA veterinarians helped the Reid Park Zoo in Tucson keep this Celebes macaque mother healthy during her pregnancy. (Photo by Allan Fertig.)