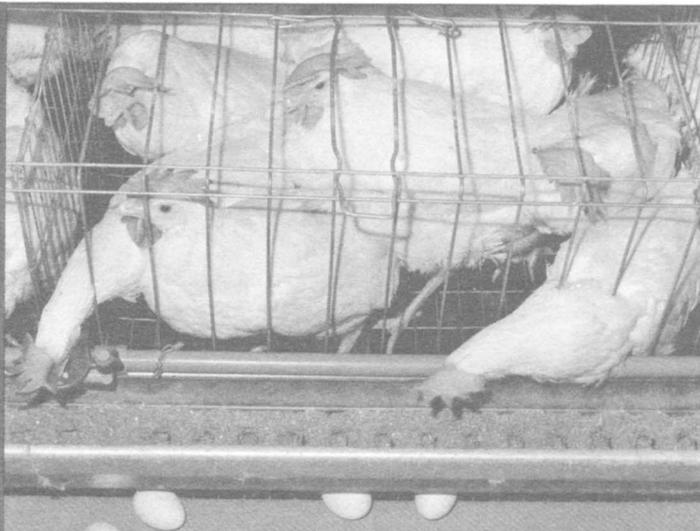


# Avian Sciences Research Update



Published as a special supplement to California Agriculture. Technical coordinator: F. Howard Kratzer, Chairman, Department of Avian Sciences, University of California, Davis. Special Editor: Gary A. Beall, Communications Specialist, Animal Science, University of California, Davis. Photos by Jack Kelly Clark (unless otherwise indicated). All authors are in the Department of Avian Sciences, unless otherwise indicated.

California is the top-ranking state in the United States in egg production and is second only to Minnesota in the production of turkeys. In addition, many turkey breeders are located in California and supply basic stock to the rest of the country and the world. Meat-bird production is increasing in importance in the state.

Over the years, many of the discoveries in the University of California's Department of Avian Sciences have had immediate application to industry problems. These have covered a range of disciplines, from feeding to breeding to insemination techniques. Many of the principles developed in these discoveries have been important for the production of other animal species as well.

In recent years, we have responded to a need for research related to the consumer in areas such as meat quality, cholesterol in eggs, off-flavors, the effect of gossypol on eggs, residue problems in food, and toxicants (aflatoxins).

The development of methods to protect the environment has also been a concern of the department. Work is underway studying: the dangers of oil pollution on sea birds which may be affected by oil spills; desirable ways of disposing of poultry manure; wild species and problems of reproduction in a number of endangered species of raptors; and the environmental and recreation aspects of game-bird production.

In studying the basic biology of avian species, we are developing information which can have a variety of uses. In some cases, the information can be directly applied to the poultry industry. In other cases, the information may have important biomedical applications: many nutritional discoveries have been made over the years with poultry as experimental animals; studies with mutant strains of chickens—particularly those that develop scoliosis or muscular dystrophy—have had important biomedical applications; and studies of avian species have led to important discoveries in the area of immuno-genetics.

The following pages provide a brief look at some of our major research thrusts. Although not inclusive, they offer a good cross-section of our effort to serve California's poultry industry and the concerns of the general public.

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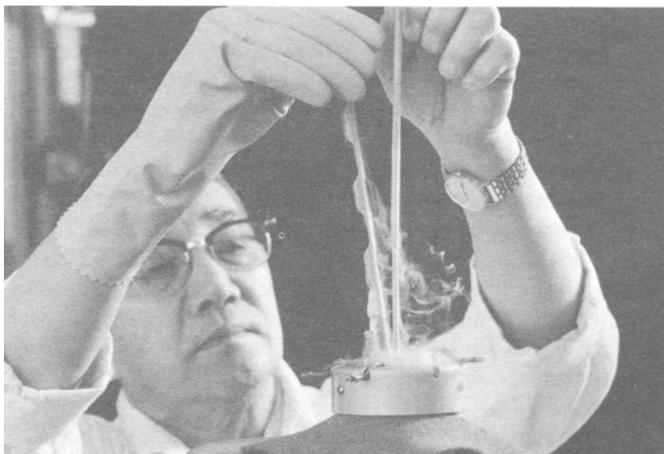
## Reproduction

Artificial insemination is an essential technique for the production of commercial turkey hatching eggs because the birds are no longer capable of natural mating.

We introduced this technique to the industry in the early 1950s and have since learned much about the reproductive physiology of turkey hens that has led to improved insemination techniques.

We discovered two major sperm storage sites in the hen's oviduct. The most important site lies at the junction of the vagina and the shell gland, designated as the utero-vaginal region. The other is at the top of the oviduct at the junction of the infundibulum and the magnum. It is now known that after an egg is laid, the sperm are released from the lower storage site and travel up the oviduct to the upper storage site into the funnel region where they fertilize the ovum as it is ovulated.

We also found that the storage tubules, or sperm-host glands, in the uterovaginal region consist of a single layer of columnar cells arranged in the form of a blind-ended tube. A more extensive study of this sperm-host region revealed that



Freezing turkey semen in liquid nitrogen.