Japanese Quail Used as Research Fowl

By R. D. Hendershott and B. L. Reid

The Poultry Science Department of The University of Arizona has established a colony of *Coturnix Coturnix Japonica,* or Japanese quail, now housed at the University's Poultry Research Center. The original hatching eggs were obtained from the University of California at Davis through the courtesy of Dr. W. O. Wilson, head of the Poultry Science Department there.

As early as the 12th century, the Coturnix quail were domesticated in Japan and developed as song birds. By 1910, Coturnix quail were being used for meat and egg production in Japan. During World War II, the varieties of song quail disappeared entirely and the domesticated quail virtually disappeared because their feed sources were incorporated into the war effort.

Eggs Are a Delicacy

Japanese Coturnix production is presently flourishing and considerable amounts of the Coturnix eggs and meat are consumed in Japan. It is even possible to purchase small cartons of quail eggs in that country, and they are considered a highly prized gift from one person to another, since eggs are regarded as a delicacy.

Attempts to establish these quail as a game bird in the United States during 1955 to 1957 failed. The failure to develop this prolific species for game purposes has been attributed to their migratory nature and the fact that the pen-reared birds are unable to survive in the wild.

The value of Coturnix quail as an experimental animal has increased in recent years. Much work has been conducted in avian physiology with Coturnix, and the University of California has conducted research in genetics, effect of lighting, and hormonal interrelationships with quail. Auburn University has been the forerunner in the use of Coturnix in avian research in the United States, first using the Coturnix in 1953. Most of the work to date has been applied to poultry management. Little on the nutritional requirements of the Coturnix has been attempted.

Desirable for Research

The advantages of using Coturnix quail in research are primarily related to cost and time. They are inexpensive to maintain, require a relatively small area and the high metabolic rate makes them excellent test animals for drugs and metabolites. Their short life cycle is a great advantage to the geneticist. Space requirements are about one-tenth that of chickens.

Coturnix quail, compared with many laboratory species, are unselected and exhibit a high degree of individual variation. Special care must be taken in rearing quail chicks, due to their inability to maintain their body temperature during the first critical 4 to 5 days. Generally, a 24 to 28 percent protein diet, highly forti-

(Continued on Next Page)

The authors are members of the Department of Poultry Science, Dr. Reid being head of that department.

(Continued from Previous Page)

markets were widely scattered geographically—Ft. Worth, Kansas City, Denver and Ogden. The higher price at Ogden, Denver and Ft. Worth is due to local preference for small carcasses and local feeding of heifers to meet this preference. Kansas City's location near the Corn Belt accounts for its price position.

Prices received for Good 500-700 pound stocker-feeder heifers also indicate the preference in certain areas for lighter-weight carcasses, i.e., Denver, Amarillo, Ft. Worth and San Antonio. In the case of San Antonio, part of the cattle that qualify for this category of stocker-feeder cattle also qualify as slaughter calves. This resulted in San Antonio having the highest average price.

The prices paid for Good and Choice 250-500 pound stocker-feeder heifer calves reflects the preference for a smaller carcass in the Ogden, Omaha and Kansas City areas and demand for replacement heifers in these, as well as the Billings and Amarillo, marketing areas.

Phoenix Inconsistent

Los Angeles, Omaha, Kansas City and San Antonio had the highest average prices for Medium 500-1,000 pound stocker-feeder steers. Phoenix, Ogden and Billings had the lowest average price. However, Phoenix's position is inconsistent with the fact that large numbers of this category of stocker-feeder cattle are brought into the state for feeding. Apparently, there was not enough of this kind of cattle offered for sale to make it economical for the feeders to sort them into uniform lots (approximately same weight and age) of 50 head or more.

Billings had the highest average price for Medium steer and heifer calves. This can be explained by the demand for thin-fleshed stocker calves to stock ranges and wheat pastures in winter wheat areas. Otherwise, the higher priced markets were in California and Arizona.

Results of these analyses are consistent with the movement patterns of stocker-feeder cattle. The Corn Belt is the major market for Good and Choice grade stocker-feeder steers and calves. The higher prices for stocker-feeder heifers were paid in areas where there was a demand for stocker heifers and where smaller carcasses are desired. The major area for feeding Medium grade stocker-feeder cattle is the southwestern United States.

San Antonio Unique

The San Antonio area was unique in that it was the highest priced market for Good grade stocker-feeder heifers. Also, it was one of the highest priced markets for Medium grade stocker-feeder steers. These prices reflect the relative demand for lower quality beef and slaughter calves in that market, and use of these categories of stocker-feeder cattle for feeding in the south Texas area.

(Continued from Previous Page)

fied in vitamins, minerals and antibiotics, is fed throughout their life cycle. Coturnix have been reported to be susceptible to some common poultry diseases such as fowl pox, Newcastle disease and infectious bronchitis viruses. They are also susceptible to the following bacterial pathogens: *Salamonella pullorum, S. gallinarium, S. typhimurium, Pasteurella multocida* and one pathogenic strain of *Escherichia coli.* They are also subject to fungus infections by *Aspergillus funigutus.* Although the list of diseases may appear ominous, the Coturnix, under proper management conditions, remains healthy.

After the first three weeks of age, the sexes can be determined by inspection of the breast and throat feathers. Both male and female have light, charcoal wing and back feathers. The upper throat and lower breast feathers of the male are cinnamon color and slightly rounded, while the female breast and throat feathers are of a lighter shade and are pointed. The male's voice has been described as a loud, castanet-like crow that sounds similar to "pick-per-awick" or "ko-turro-neex."

Make Rapid Growth

Day-old Coturnix weigh approximately 8 to 12 grams. The adult male and female weigh 120 and 150 grams respectively. Maximum body weight is reached about the same time birds reach sexual maturity (35 to 50 days), and feed requirements from hatching to maturity are only one pound per bird compared with 25 to 28 pounds for chickens.

The eggs received from the University of California were placed in the incubator and hatched 16 days later. The time between hatching and the onset of egg production was 40 days. The birds were producing at a rate of 90 percent by 52 days of age.

Egg weight averages approximately 10 grams or about 8 percent of total body weight of the females, in comparison with 3 percent in chickens and one percent in turkeys. A variety of color patterns is characteristic of Coturnix eggs. Colors range from dark brown, blue, white and buff, heavily mottled with black, brown and blue. The dark pigment is prophyrin. A blue coloration found on many eggs develops from calcium deposits over the pigmented layer.

The University of California at Davis has observed that individual Coturnix produce eggs of similar shape, size and color pattern. The characters for egg color patterns are highly heritable and may be selected.

Total eggs produced varies from bird to bird, but averages around 250 per year. It is possible to maintain the females as egg producers for as long as 18 months. Under this situation, it is not unusual to obtain as many as 400 eggs per female.

In Nutritional Studies

The Poultry Science Department of the University of Arizona has initiated studies using Coturnix quail in order to evaluate their effectiveness as experimental animals for nutritional and physiological studies. If the information obtained through the use of these birds can be applied to chickens, the time and expense of such studies will be reduced considerably. In addition, the use of quail will also make possible experiments of a more sophisticated nature involving the feeding of chemically pure amino acids rather than intact protein. Such studies should greatly facilitate a more precise determination of the amino acid needs of poultry for egg production by eliminating the factors of ingredient quality and amino acid availability, which tend to complicate studies employing ordinary feedstuffs.

Battle of the Bulge.

CROWDED CANTALOUPS SHOW SHIPPING LOSS

By Norman F. Oebker and Robert F. Kasmire

Is it necessary for western shippers to bulge pack crates of cantaloups? We don't think so. In fact, we feel that the whole produce industry would be much better off if this method of packing were eliminated.

The practice of cramming oversize melons in a crate is standard procedure with most cantaloup packing and shipping operations. When one asks why, the usual answer is, "The buyer wants them that way," or you are told that melons not packed tightly will have more scuffing or will become "shakers". (A "shaker" is a melon with loose seeds). The purpose of this report is to present evidence which questions the validity of bulge packing.

Results in Loss

The damage caused by bulge packing is not taken seriously enough. Many retail produce men estimate that two to four melons are lost from each crate because of compression due to overpacking. Experimental laboratory studies in California have supported this claim.

To show what losses do occur from this practice in actual handling and transportation, a cooperative study was made last summer by The University of Arizona and the University of California, with support and encouragement of the Western Growers Association.

During the first part of July, 1965, two test shipments of cantaloups were made from Yuma to midwestern markets. Both commercial (bulge) packed and level packed crates were included in each shipment. The 13 inch W.G.A. crate was used. Level packed crates averaged nine pounds less gross weight than the commercial (bulge) packed crates. One railroad car with both packs went to St. Louis; another to Cincinnati.

After seeing the cantaloups packed, loaded and on their way, we went to St. Louis to examine the first shipment as it was unloaded at the grocery warehouse. Two days later we studied the other shipment in Cincinnati.

With each type of package we observed the cantaloups individually for overall market quality (condition), bruising, scuffing, firmness and seed

(Continued on Next Page)