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Raising Prairie Chickens in Captivity

BY

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1955

KANSAS FORESTRY, FISH AND GAME COMMISSION
PRATT, KANSAS

Wm. W. DeGale
Wild Game Research Survey
Coordinator

REPRINT FROM KANSAS FISH AND GAME MAGAZINE, OCTOBER, 1955

A Research Progress Report . . .

RAISING LESSER PRAIRIE CHICKENS IN CAPTIVITY

By JIM COATS, Game Biologist

(Photographs by author unless noted otherwise)

In southwestern Kansas where the lesser prairie chicken, *Tympanuchus pallidicinctus*, holds forth, it is commonplace for the numbers of this bird to fluctuate widely. It was thought by Dave Leahy, director of the Kansas Forestry, Fish and Game Commission, that the status of the prairie chicken could be improved by the periodic release of a supply of these birds raised in captivity.

However, for a long time it has been considered impossible to raise prairie chickens in confinement. So, it was decided to study the problem to determine the methods by which such propagation might be accomplished. The credit for undertaking this research project should be given to Director Leahy.

Most people acquainted with the problem agreed that feeding the young was the most important problem to solve. And there were other numerous important questions to be answered in trying to develop a system for raising prairie chickens in numbers.

We have now concluded about 3½ years of work. We have talked to a great many people concerning the problem and have encouraged them to give us their ideas. Some had had experience in working with these birds. All have been helpful.

We are a long way from solving completely the many related problems arising in this work, but we feel that it is timely to give a report of our progress. Changes and alterations in procedures no doubt will be made, but the over-all plan and the general techniques are expected to remain much the same.

ACQUISITION OF BREEDING STOCK

A problem of this nature inevitably poses the perplexing situation of obtaining the initial breeding stock. Purchase of breeding stock was out of the question—no one had this bird in quantity for sale. There were two courses, obtaining eggs from the wild and trapping wild birds, both of which have been followed.

In the case of lesser prairie chickens, obtaining eggs from wild nests has been of limited value. These birds in their natural habitat nest in, under and around clumps of grass or sagebrush. The nest itself is a slight depression in the soil, sparsely lined with residual plant matter from the nest locale. Apparently, prairie chickens are, from the start of incubation, "tight setters." One has to approach very, very closely before they move from the nest.



Prairie chickens were trapped for the research project of raising them in captivity in traps like the one above. (Photo by Marvin Schwilling.)

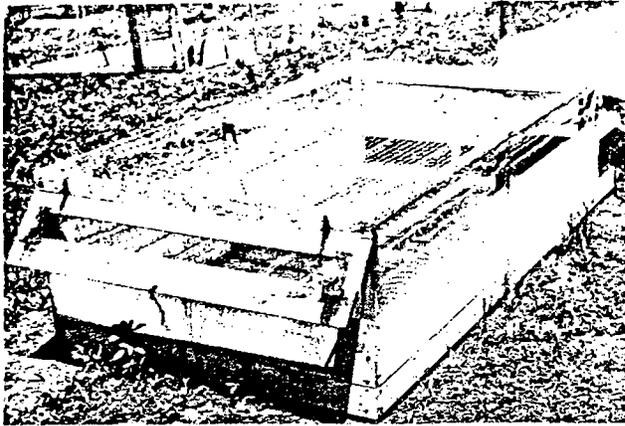
Therefore, the vegetation in which nests are found, their extreme concealment and the behavior of the incubating hen make it very unlikely that nests will be discovered. We learned that nests had never been found on many ranches where nesting by prairie chickens had occurred. Only a few ranchers told us they usually figured on finding at least one nest every season.

The second course for obtaining breeding stock was to trap wild birds. Lesser prairie chickens are notably difficult to trap. However, Stokley Ligon, former biologist with the federal Fish and Wildlife Service, had determined methods for taking these birds, and, through his guidance, we were able to obtain our start of birds for breeders. These birds were taken in several locations to insure a variety of blood lines.

HOLDING PENS AND REARING PENS

Acquisition of wild prairie chickens for breeders led to our design of a special holding pen for these birds. Confining them in ordinary pens was not successful, since they were always jumping or flying into the wire panels and receiving serious injuries.

This special pen has a wire bottom to minimize the incidence of disease; it has a partition of fish netting which keeps the animal from hitting the wire top when jumping; and it has a solid panel side to minimize nervous pacing and jumping. These holding pens have proved suitable for holding wild stock without injury, for rearing young chicks after they leave the brooder house and, even for breeding pens when our regular breeding-pen facilities were crowded.

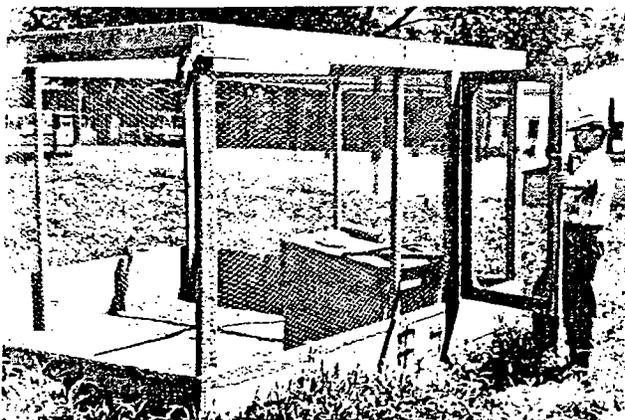


This is a new type holding pen which proved best for holding prairie chickens without injury. The pen is designed to minimize chances for disease.

BREEDING AND BREEDING PENS

The breeding behavior of prairie chickens in the wild is well known. In the spring the cocks congregate on "booming grounds." Here they display for several hours each day. Near the end of the "booming" season, in late April or early May, the hens occasionally visit these grounds. The complicated and unusual breeding behavior of prairie chickens posed the question of how well these birds could be encouraged to breed in close confinement.

We were tempted to try large enclosures of several acres for breeding pens, but, since our objective was development of mass production methods, we immediately tried pens of more practical sizes from 20 feet square to smaller sizes. By trial we have found that a pen about 10 feet or 12 feet square, similar to a common type of pheasant breeding pen, is satisfactory. This pen is placed directly on the ground. It is equipped with shelters for the birds and food.



Satisfactory size for breeding pens for lesser prairie chickens, like the one shown above, was found to be 10 or 12 feet square.

MATING

In each breeding pen, we usually place one cock and one hen by arbitrary selection. Our experience has indicated that there are a surprisingly high percentage of successful matings by this forced-pairing method. In some instances we have placed several hens with one cock, but our evidence so far is inconclusive that this is the proper procedure for highest production. We have seen positively that putting several cocks in a breeding pen results in fighting and possible death to all but the dominant cock. Breeding stock of one or two years of age apparently results in the highest production. Breeders are moved from the holding pens to the breeding pens about the first week in March.

We can expect a seasonal production of about 25 eggs per hen to occur in the May-June period. Hens



Captive prairie chicken cocks behave in normal way during booming season, as shown by this cock in one of the project breeding pens. (Photo by Byron Walker.)

lay at a rate of about an egg each day. We found that the hens usually formed a depression under the lean-tos in which they laid their eggs. Collection of eggs once or twice each day minimized the possibility of damage to the egg by exposure to heat and sun.

Eggs were stored in a cool place in the same manner as other eggs. It was our practice to store them for not longer than three to five days before setting.

INCUBATION

Our first experience with the artificial incubation of prairie chicken eggs in forced-draft machines was in machines being operated for quail. The conditions prescribed for quail were not at all satisfactory for the lesser prairie chicken. Therefore we have since used a separate machine for incubating and hatching lesser prairie chicken eggs.

The number of eggs with which we have been working has not been of sufficient magnitude to rely heavily on statistical results. At no time have we had rigidly controlled incubation experiments.

Lesser prairie chicken eggs are light colored with small brown specks. They are smaller than pheasant eggs and larger than quail eggs. For egg positioners in the incubator tray we found the positioners for chukar partridge eggs were about the correct size.

We have found the following conditions in our forced-draft incubator to give satisfactory results:

99% degrees F dry bulb temperature (average). Checked by ordinary clinical thermometer placed in a central position in one of the middle egg trays. Since our incubator operated about $\frac{1}{4}$ of a degree above and below average ($\frac{1}{2}$ degree from maximum to minimum) this meant that our clinical thermometer read 100.0 degrees F.

81-85 degrees F wet bulb temperature. Usually a reading of 82 or 83 degrees at the first of the incubation season in May and gradually higher to 84 and 85 degrees in July.

Ventilation—moderate.

Turn eggs five times each day.

Transfer eggs to hatcher on twenty-first day.

Incubation period 25-26 days.

For the hatching stage we used a separate still-air hatcher. This we operated in the same manner as for other types of eggs—102 $\frac{1}{2}$ degrees F average temperature at top of egg; moisture pans full; ventilation low until hatching is complete.

In summary, we are quite sure that for the first 21 days in the incubator the conditions should be significantly drier than for quail or pheasants. During the last four or five days in the hatcher, moisture conditions should be quite high to facilitate emergence from the shell.

INCUBATION WITH DOMESTIC HENS

We have used bantam hens for incubating and hatching our eggs but we have not found them more practical than artificial methods unless only a small number of eggs are to be set. In case the use of bantams is desired or required the normal procedure for housing, care and sanitation can be followed as for other kinds of eggs.

BROODING

Standard procedures were followed in brooding the young birds. We used a battery brooder throughout. Drafts were minimized by every means possible. For the first week the wire floor of the brooder was covered with a feed sack to reduce drafts. The birds do not need extra brood heat after five or six weeks if outside weather is warm.

FEEDING

The most challenging problem in raising prairie chickens in captivity hinged upon perfecting methods

for feeding the young. The problem is not now completely solved but sufficient progress has been achieved to view the problem with much more confidence. Under methods previously used it was largely a matter of luck if chicks survived. Now the problem is resolved to the matter of increasing the percentages of chicks raised.

The chicks of prairie chickens have instinctive behaviorisms which seem to account for the problems involved in feeding the young. They are:

1. The chicks characteristically inspect for food at their eye level or above, often stretching or jumping after objects. They do not ordinarily inspect or scratch the ground in search of food.

2. The chicks instinctively react only to moving insects or rarely inspect odd metallic or shiny objects. Ordinary foods, such as poultry mash, etc., do not incite their interest.

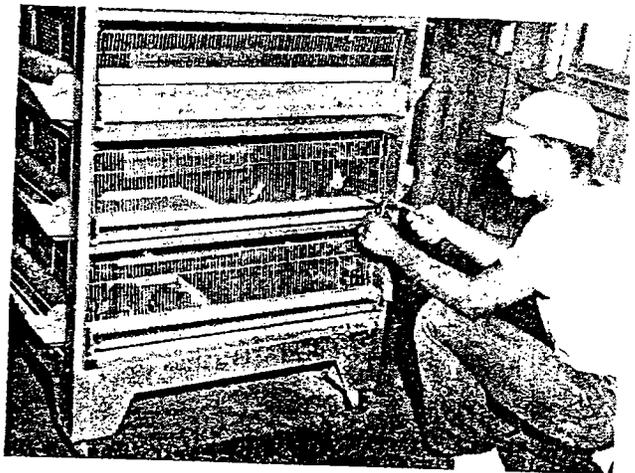
3. The chicks are most inclined to find water if it is in droplet form, rather than standing water in a trough or fountain.

4. The chicks are more inclined to search for food if they have ingested good quantities of water.

The type of food and water and the manner used in presenting them must be attuned to their instinctive behavior.

WATER

A water trough or water fountain was provided in the brooder at all times. Water also was sprayed with an atomizer on some grillwork placed in the brooder. A grillwork made up the partitions in our battery brooder so we sprayed the partitions of the brooder. Droplets of water formed on the grillwork and were particularly attractive to the chicks. The chicks were encouraged to drink the first day in the brooder. This spraying was done many times each day, the more the better. The chicks often were noted going directly to feeding after drinking. After it was certain that the



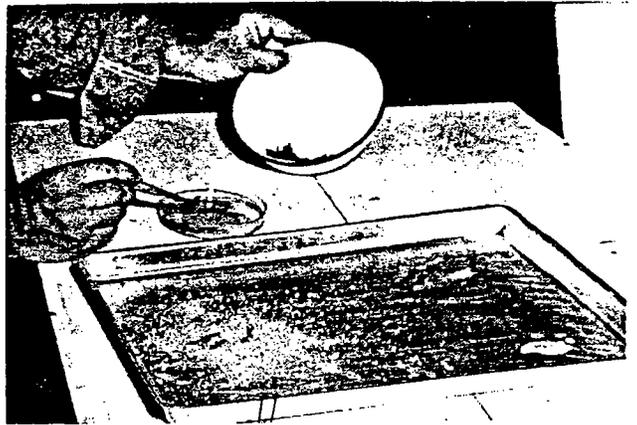
Chicks first take water in droplet form when it is sprayed by atomizer on the grillwork of their brooder.

chicks had begun using the regular water fountain, the spraying was discontinued.

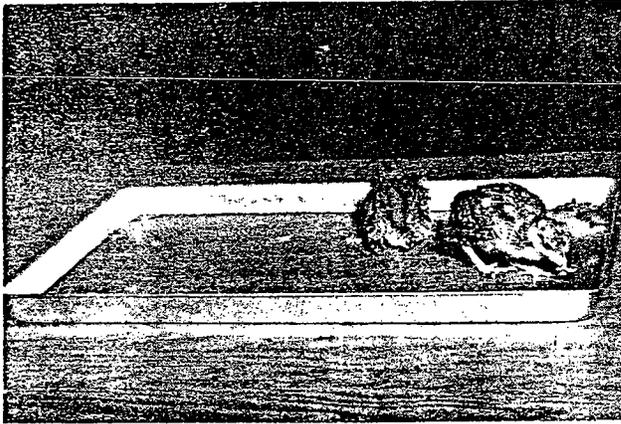
FOOD

We found that when the chicks reach three weeks of age they begin to take inert, prepared feeds such as poultry mashes, etc. From that time on the feeding techniques can be similar to feeding pheasants or quail and, consequently, there is no big problem. The problem of feeding the chicks occurs from hatching time until the chicks are about three weeks old.

We have developed a feeding technique which in simple form and in final analysis is to get a balanced food of high protein content into the chicks by use of insects as "attractors and carriers." Knowing that the chicks instinctively take insects eagerly we use the larval form of the mealworm (*Tenebrio sp.*) as the at-



Preparation of the "breaded pork chops." Mealworms are being dipped in egg yolk and rolled in the rich chick starter.



Chicks first had to learn to seek their food on the ground rather than at a higher level. Live mealworms were used to attract their eye to the bottom of a cookie pan and they readily ate the worms. Actually, the chicks in the picture are at the stage of eating the treated mealworms, but the birds are used in this picture to illustrate the initial feeding practice.

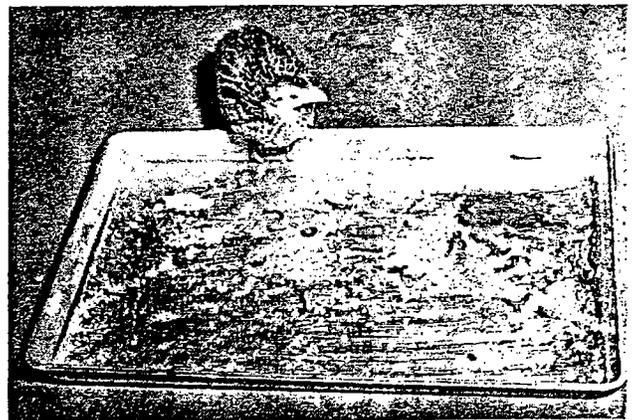
tractor and carrier. By dipping the mealworm in a substance such as egg yolk or corn syrup the mealworm is made quite sticky. It is then dusted with a high-protein chick-starter-mash. The mealworm with the sticky substance and starter mash then is a "breaded pork chop." Getting the starter mash into the chicks by this trick is the crux of the matter.

Since these chicks instinctively look for food "up high," they must be taught to expect their food on the floor. This we do the first two or three days by presenting untreated mealworms in aluminum cookie pans. Mealworm larvae are always available since they cannot crawl out of these pans. The pans have slick sides about three-fourths inch high. This type of pan will keep the larvae in and allow the chicks easy entrance and exit. By having a quantity of mealworms constantly before them, the chicks soon learn to inspect at the floor level for food and to associate the pan with food. We scarify the bottoms of the pans

with sandpaper to create a rough surface for the chicks to walk on. Small-size larvae are used for the first few days since a full-grown mealworm is too big for the chicks to handle.

Within several days the chicks usually are drinking water droplets well and eagerly take the small-sized untreated larvae from the cookie pan. Then the "breaded pork chops" are presented. Since the chicks have learned to expect food in the pan in the nature of mealworm larvae they readily accept the treated mealworms. Once these transitional steps are accomplished it is largely a matter of giving them enough to fulfill their feeding and drinking appetites un'til they naturally begin to ingest inert, prepared foods from the feed troughs at three weeks. Oftentimes in the first three or four weeks we supplement the "breaded pork chops" with a small quantity of shredded lettuce and egg yolk placed on the cookie pan. It may be found that other foods are of minor supplemental value.

Young prairie chickens are not different from other animals. As youngsters they are mighty thirsty and



This chick surveys his dinner of "breaded pork chops," mealworms to which he has become accustomed, dipped in a sticky substance and rolled in a high-protein chick feed.

hungry. They instinctively search in their particular manner for food and water of a certain kind. We feel that the use of insects as a means of getting a quantity of high quality food into the chicks is a distinct step forward in developing a new system for feeding the chicks. The use of mealworm larvae is not new. But the treatment of the larvae with high quality foods is a new concept.

Summary

We can now state conclusively that the lesser prairie chicken can be raised in captivity by mass-production methods modified to the requirements of this species. We are not satisfied that we have developed completely satisfactory methods in all stages of operation. But we are at a point of relative success. From here on it will be a matter of improvement.

Conclusion

Our research facilities are geared to about 25 breeding pens. We have now reached the point where we can release all the old, wild-trapped breeders and work only with hand-reared stock for breeders. We can see that detailed experimental work remains to be done to improve our methods.

For instance further experimentation needs to be done in determining exactly the proper conditions for artificially incubating the eggs. Also slip-joint shows up in some of the chicks. This indicates a need for close check on the nutrition of the chicks. Some chicks upon hatching lack development and vigor to such an extent that a check of the proper nutrition of breed-

ers is indicated. Other aspects of this work need further attention. In some cases we will try to turn to other agencies to perform this work because of its extreme technicality.

Our objective is to perfect methods for raising the lesser prairie chicken in captivity; to provide a limited number of birds for releases in southwestern Kansas to test this practice for rehabilitating areas with depleted stock; to provide stock for display and educational purposes; and to provide stock and the know-how for game breeders.

Acknowledgments

There were many persons who assisted in this project. Personnel of the Kansas Forestry, Fish and Game commission who participated were: Byron Walker, Marvin Schwilling, Roy McKinsey, Jack McNally, Clement Gillespie, Edwin Gebhard, Willis Hall, Max Stone and Clyde Scott. Other persons who assisted were: J. Stockley Ligon, Carlsbad, N. Mex.; Gardiner Bump, U. S. Fish and Wildlife Service; Ralph Hahn, Joliet, Ill.; August Ginkel, Cedar Rapids, Iowa; George Atwood, Elkhart, Kan.; Bob Kincaid, Independence, Kan.; Gilbert H. Gladish, Higginsville, Mo.; Dale Arbuckle, Arkansas City, Kan.; H. C. Schaefer, St. Louis; A. H. Leonard, St. Louis; Jack Insko, Lexington, Ky.; L. E. Erwin, Manhattan, Kan.; G. D. McClaskey, Topeka; L. F. Payne, Manhattan; James Cox, Carlsbad; William Dome, Ashland, Kan.; Lawrence Krier, Ashland; Del Randall, Sitka, Kan.; E. E. Fellers, Lawrence, Kan.

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FEEDING SCHEDULE

	DESCRIPTION	NOTES
1st day to 3rd day	Small, untreated larvae in cookie pan. Keep larvae before them at all times. Spray a grillwork, which can be easily reached by the chicks, with drops of water.	Small chicks take small larvae best. This is the critical stage—get the chicks to eating and drinking!
3rd day to 25th day	“Breaded pork chops.” Medium and large sizes of mealworm larvae can be used. Use high protein type starter mash or starter crumbles. Sprinkle a little starter crumbles on the tray. Feed four times daily. Starter crumbles in feed trough. Provide some shredded lettuce and boiled egg once a day. Spraying for drinking water can be stopped whenever it is seen that the chicks are drinking freely from water fountain or water trough.	Mealworms alone do not seem to be sufficient to sustain life in the chicks. Make sure they are getting a good supply of the manufactured feed on the larvae. When the <i>treated</i> larvae are first presented to the chicks it is best that the larvae are “lightly treated” so that the larvae are still moving. Near the end of the period the chicks begin to ingest the starter crumbles from feed troughs.
from 25th day to 6 weeks	Occasional feeding of “breaded pork chops.” Starter crumbles in the feed troughs, free choice.	Schedule similar to quail or pheasants.
6 weeks on	Gradually change to grower pellets and grain and then with advent of breeding season in March gradually change to a breeding ration, grain and oyster shell grit.	Here the schedule is the same as for pheasants or quail.

PRINTED BY
FERD VOILAND, JR., STATE PRINTER
TOPEKA, KANSAS

1955



26-1219