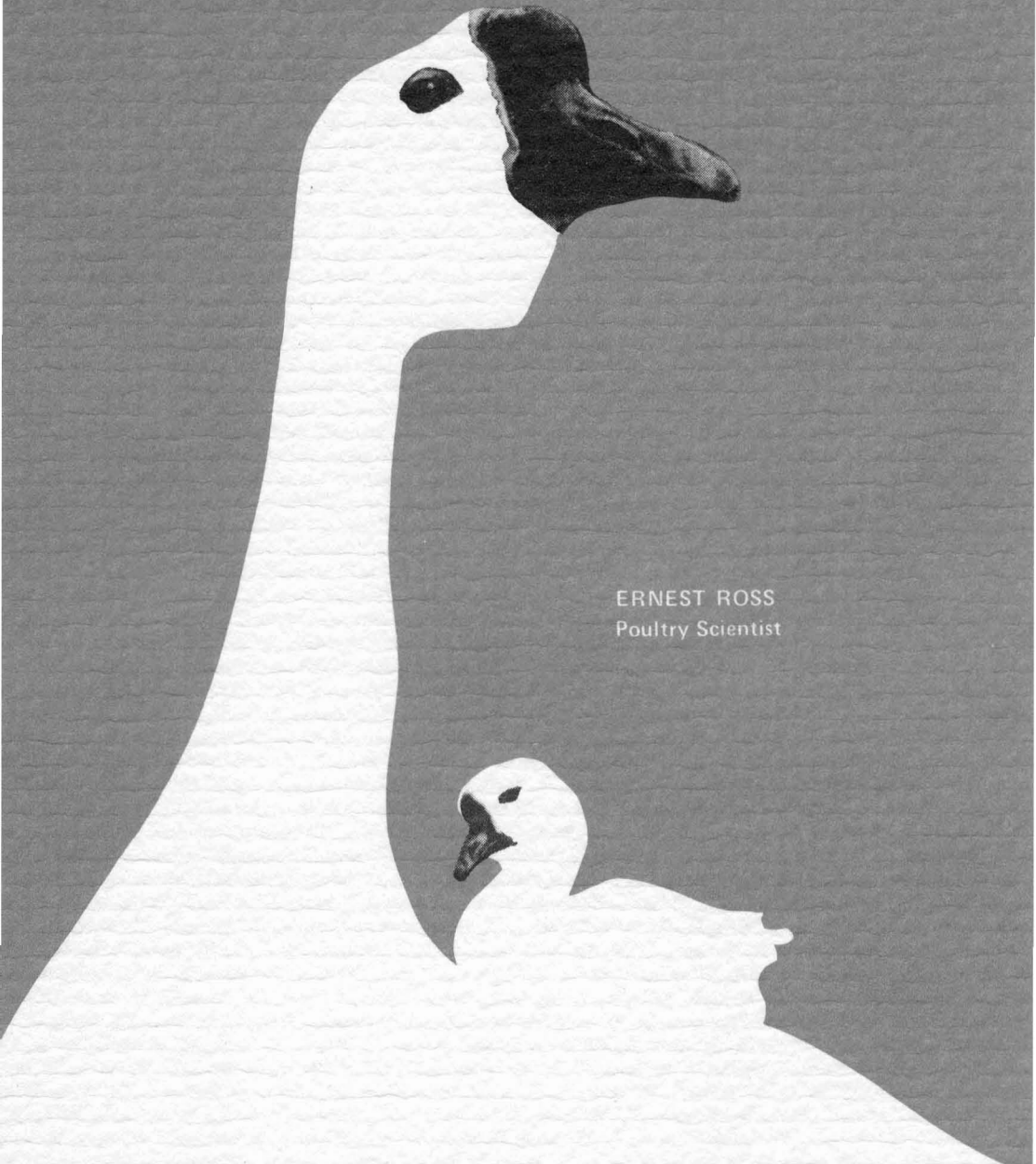


PRODUCTION OF
WHITE CHINESE GEESE
IN HAWAII



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A flock of White Chinese geese was established at Kalou Pond at the University of Hawaii Animal Research Center at Waialeale to control weeds that had overgrown the pond. Day-old goslings were received March 23, 1966, and were fed the standard University of Hawaii chick starter mash (Table 1). They were placed at the pond site at five weeks of age at an average weight of 4.4 pounds. They continued to be fed starter ration at the rate of approximately one-fourth pound per bird per day as a supplement to the panicum grass and other weeds growing in the pond. An estimated 65 geese survived the first year and constituted the breeding flock. The effectiveness of the geese in clearing the pond of weeds has been described in another publication.¹

Egg Production

Early in 1967, the geese started laying eggs in natural nests established along the banks of the pond. Many eggs were broken and eaten by mongooses living in the area. None of the eggs found during this period was set. The mongooses were extensively trapped, however, so that the population was greatly reduced by the next season.

The first eggs laid during 1968 were found January 29 on an island at the far side of the pond. At this time, the geese were placed on the standard University of Hawaii laying mash (Table 1) and the amount was increased from one-fourth pound to about one-half pound per bird daily. This ration was fed throughout the egg-laying period which lasted from January to the middle of May.

Eggs were collected daily to provide information on the laying cycle of the geese. Figure 1 shows the mean egg production of the flock based upon the number of intact eggs collected. It should be noted that we did not know the exact number of females and were therefore uncertain as to the number of eggs lost to mongooses and other causes. Egg production was spread over approximately four months, increasing rapidly to a peak lasting about six to seven weeks, and then rapidly declining. All eggs were set once weekly for eight weeks.

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¹Biological Control of Pond Weeds with White Chinese Geese, Hawaii Farm Science 20:11-12. 1971.

Table 1. Composition of starter and layer diets fed to White Chinese geese.

Ingredient	Starter diet	Layer diet
	%	%
Ground corn	61.75	70.00
Soybean meal	26.00	12.70
Tuna meal	5.00	5.00
Meat and bone meal	2.50	2.50
Dehy-alfalfa meal	3.00	3.00
Defluorinated phosphate	1.00	1.00
Oystershell flour	---	5.00
Salt, iodized	0.40	0.50
Microingredient mix	0.25	0.25
DL methionine	0.10	0.05

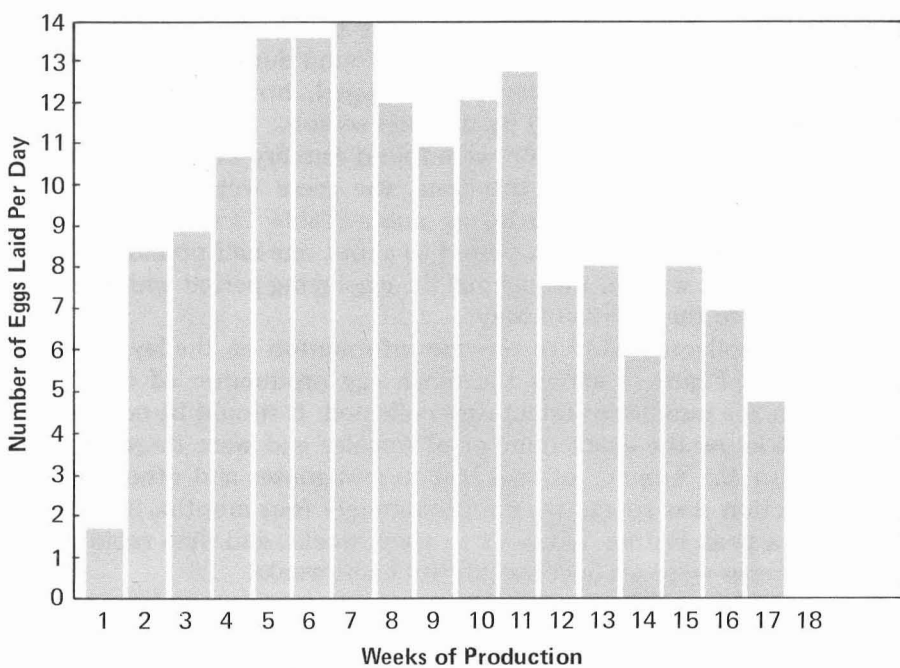


Figure 1. Average daily number of intact goose eggs gathered from the vicinity of Kalou Pond in 1968.

Incubation Procedures

Eggs were collected from the nesting areas daily, stored in trays in a reefer at 50 F for a maximum of seven days, and turned once daily. The first eggs were placed in regular chicken egg trays in a Jamesway Model #252 incubator. Because of their larger size, however, the eggs did not fit the tray properly and the turning mechanism turned them only 90 degrees, whereas the recommendation for hatching goose eggs is to turn them through 180 degrees. Therefore, the eggs were laid on their sides in a flat hatching tray and turned three times daily, at 7 a.m., 11 a.m., and 4 p.m. Sufficient space was allowed at the end of each row of eggs to permit the eggs to be rolled through a 180 degree turn on their long axes. To turn the eggs, the operator removed the stick holding the eggs in place, rotated the whole row of eggs, then replaced the stick at the other end of the row. A circle was marked on one side of the egg and an "x" on the other so the operator could tell when the eggs were completely turned.

Initially, the eggs were dipped in warm water (100 F) for 30 seconds twice a week. This was found to be time consuming, especially when several hatches were in the incubator at one time. A faster and equally effective method is to spray, sprinkle, or pour warm water (100 F) over the eggs twice a week.

Incubation temperatures were essentially the same as for chicken eggs, 99.25 to 99.75 F. Wet-bulb temperature was increased by using both top and bottom water trays and an additional water tray in the middle of the incubator. Semi-weekly wetting of eggs helped maintain high humidity. Under these conditions of temperature, humidity, and turning, goose eggs hatched in 30 days.

Table 2 shows the number of eggs set each week, averaging about eight eggs per day during the first week, increasing to about 14 per day during the sixth week, and then declining. Fertility of all eggs set during the eight-week study ranged from 85.7 to 96.6 percent, with an average of 92.5 percent. There were no consistent trends in fertility or hatchability. Hatchability of fertile eggs ranged from 72.2 to 87.5 percent with an average of 81.7 percent. Many operators report good hatchability as 40 to 60 percent.²

Brooding—One day to four weeks

An electric battery brooder set at 90 F was used the first week. Goslings were then transferred to floor pens with wood shavings as litter

²U.S. Department of Agriculture "Goose Raising". Farmers' Bulletin No. 767. Revised, 1960. 26 pp.

Table 2. Fertility and hatchability of eggs laid by White Chinese geese at Kalou Pond.

	Hatch number								Overall Mean ¹
	1	2	3	4	5	6	7	8	
Eggs set	59	62	75	95	95	97	84	77	
Number infertile	2	4	6	5	5	9	12	5	
% fertility	96.6	93.5	92.0	94.8	94.8	90.7	85.7	93.5	92.5
% hatch of all eggs set	81.4	74.2	73.3	80.0	68.4	79.4	71.4	77.9	75.6
% hatch of fertile eggs	84.2	79.3	79.7	84.4	72.2	87.5	83.3	83.3	81.7

¹All means in this and succeeding tables are weighted means.

and containing an infrared brooder. After the second week the brooder was turned on only at night; it was removed after the third week. Although goslings could have been allowed an outdoor run after the first week, they were kept confined until they were four weeks old to obtain weight gain and feed conversion data. During this period the goslings received free choice the standard University of Hawaii starter mash.

Table 3 shows average weekly body weights of eight broods hatched and reared to four weeks of age. There was considerable variability in body weight among hatches, probably related to size of hatch and brooding space. Since each hatch received approximately the same pen space, those with the most goslings (hatches 4, 5 and 6) had less space per gosling. The effect of crowding was also observed on litter condition. The litter in the more crowded pens became caked very quickly and had to be replaced several times. Turning or raking litter did little good as the webbed feet of the goslings quickly flattened it.

Feed efficiency (feed consumed per unit of gain) and survival data are shown in Table 4. Variation in feed efficiency is greater in the first half of the study, than in the latter. During the four-week growth period the average gain was 3.21 pounds, and feed consumed was just under six pounds per bird—a mean feed conversion of 1.85.

Mortality for the four-week period did not exceed three birds in any of the trials, although mortality for the first four or five broods was lower than that of later broods. Mortality ranged from zero percent in the first two hatches to 5.08 percent in hatch 8, with a mean of 2.88 percent for all hatches.

Growing Period on Pasture

At four weeks of age, each flock was put on an enclosed grassy range and given free choice feed and water. The first four hatches were intermingled, but each bird was identified as to hatch by a leg band. The next two hatches were intermingled in the same manner but in a different pasture.

Table 5 shows average body weight of goslings in the first six hatches after they had been on pasture five to ten weeks. Body weights appear normal since average body weight for young adult White Chinese geese is approximately 10 pounds for the gander (male) and eight pounds for the goose (female). Some geese are normally marketed from 10 to 13 weeks of age as green geese.

Growing in Confinement

The seventh hatch was kept confined until 15 weeks of age to obtain additional growth data. Hatch 8 was confined until eight weeks of age;

Table 4. Feed efficiency, weight gain, and mortality of White Chinese goslings reared to 4 weeks of age in confinement.

Item	Hatch number								Mean
	1	2	3	4	5	6	7	8	
Mean feed consumed, lbs./bird	5.34	--1	6.11	5.45	5.76	5.64	6.46	6.24	5.86
Mean body wt. gain, lbs./bird	3.44	--1	3.14	3.09	3.10	3.03	3.44	3.26	3.21
Feed/gain	1.69	--1	1.95	1.77	1.86	1.86	1.88	1.92	1.85
Number goslings started	48	46	55	76	65	77	60	59	--
Number surviving	48	46	53	75	63	74	57	56	--
Mortality to 4 weeks, %	0	0	3.64	1.32	3.08	3.90	5.00	5.08	2.88

¹This group was moved out on range at 3 weeks.

Table 5. Mean body weights of surviving goslings placed on pasture at 4 weeks of age.

Hatch	Age, wks.	No. of birds	Mean body weight, lb.	
			Both sexes	Range
1	14	11	8.97	8.0 - 10.4
2	13	15	9.61	7.2 - 11.0
3	12	36	8.62	7.3 - 10.7
4	11	53	8.13	6.8 - 10.1
5	10	31	7.71	6.0 - 9.5
6	9	61	7.55	5.9 - 9.5

Table 6. Mean weekly body weights of White Chinese goslings confined on concrete floors or placed on pasture at 8 weeks.

Weeks of age	Body wt., lbs.		
	Hatch 7	Hatch 8	
		Confined	Pasture ¹
5	4.67	3.99	
6	5.34	4.61	
7	5.78	4.60	
8	6.18	5.20	4.97
9	6.70	5.80	
10	6.88	5.88	
11	7.19	6.54	
12	7.44	7.10	
13	7.68	7.34	
14	7.85	7.49	
15	7.94	7.61	7.82
Mean gain, 8-15 weeks	1.76	2.41	2.85

¹One-half of hatch 8 placed on pasture at 8 weeks of age.

then one-half the birds were put on pasture and the other half retained in the brooder house.

Because of the difficulty of maintaining the litter in a reasonably dry condition, all litter was removed when the goslings were four weeks of age, and the goslings in hatches 7 and 8 were placed on concrete floors. Sanitation was maintained by hosing the floor daily. This system of management avoided some of the disadvantages of litter and simplified the task of caring for the birds. Goslings were uncomfortable on concrete, apparently due to hardness and coldness of the floor. Some goslings would alternately stand on one foot, then the other. Some birds developed leg weakness; others lost feathers from their undersides, possibly due to constant contact with the concrete floor.

Body weight of the goslings in hatches 7 and 8 (Table 6) was much lower than that of the previous six hatches which had been placed on pasture at four weeks of age (Table 5). Hatch 6 weighed almost as much at nine weeks of age as hatches 7 or 8 did at 15 weeks. For hatch 8, the average weight gain of the group kept confined on concrete from 8 to 15 weeks of age was 2.41 pounds, while the group placed on pasture at eight weeks gained an average of 2.85 pounds during the same period.

The effect of the lower weight gains in the confined groups from 8 to 15 weeks is also reflected in poorer feed per gain ratios. Table 7 summarizes feed consumption and feed conversion from one day to eight weeks of age and from 8 to 15 weeks. Overall feed conversion from one day to eight weeks of age was 3.22 and 3.55 for hatches 7 and 8, respectively, and average feed consumption per bird was 18.25 and 17 pounds for the two groups, respectively.

Feed consumed from 8 to 15 weeks of age was 22.5 pounds per bird for both groups, with a feed conversion of 12.8 for hatch 7, and 9.75 for hatch 8. No feed records were obtained on goslings put on pasture at eight weeks because they were intermixed with other geese. These data show that almost four times as much feed was required to produce a pound of gain in hatch 7 from 8 to 15 weeks of age as was needed during the first eight weeks. In hatch 8, the feed required to produce a pound of gain from 8 to 15 weeks of age was 2.75 times as much as was needed during the first eight weeks.

Feed consumption and feed conversion data presented above show that it becomes increasingly more costly to feed White Chinese geese in confinement as they become older. Goslings may be fed efficiently during the first four weeks, requiring only 5.5 to 6.5 pounds of feed per bird. In addition, confining goslings beyond four weeks seriously limits growth and results in high feed conversion values.

Table 7. Mean feed consumption and feed efficiency of White Chinese goslings confined on concrete floors.

Period	Hatch 7		Hatch 8	
	Lbs. feed per bird	Feed/gain	Lbs. feed per bird	Feed/gain
1 day to 8 wks. of age	18.25	3.22	17.00	3.55
8 wks. to 15 wks. of age	22.50	12.80	22.50	9.75

Dressing Procedures

A limited number of geese were slaughtered and dressed by different methods to develop a satisfactory procedure. They were killed by cutting the jugular vein in the same manner as other poultry. When the birds were thoroughly bled, they were soaked, scalded, or further processed.

In general, good results were obtained when the goslings were scalded at 150 F in a rotary scalding machine for two minutes and then plucked for 50 to 60 seconds in a rotary picker. Results were generally better when head, neck, and feet were removed prior to mechanical picking. Removal of the large wing and tail feathers by hand also improved the dressed appearance. Good results were also obtained by using an old drum-type picking machine after scalding for two minutes at 150 F.

Although most feathers were removed by the picking machines, considerable hand labor was required to remove pin feathers. Some commercial operators dip the picked carcasses in a special melted wax³ which is then sprayed with cold water and allowed to harden before the wax is peeled. Removing the wax also removes pin feathers and hairs. Although this procedure has been reported to produce a fine finish, our preliminary results were not too successful, mostly because of our inability to get a thick enough layer of wax on the carcass. Attempts were more successful when the carcasses were dipped two or three times to increase wax thickness.

Table 8 summarizes data for male goslings slaughtered and eviscerated at 9, 10, 11, and 12 weeks of age. Little difference appeared in percentage yield of the empty carcass, averaging 65.9 percent without giblets.

³ E. F. Zuber, Minneapolis, Minnesota 55420.

Table 8. Live and eviscerated weights of male White Chinese geese slaughtered at 9, 10, 11 and 12 weeks of age.

Age at slaughter	No. geese	\bar{x} live weight	Eviscerated weight			
			Empty		Plus giblets	
Weeks		Lbs.	Lbs.	%	Lbs.	%
9	3	8.8	5.4	62.1	6.4	73.2
10	2	8.1	5.6	68.5	6.2	76.0
11	4	9.6	6.4	67.0	7.3	76.0
12	4	10.0	6.6	66.0	7.7	76.7
\bar{x}		9.3	6.1	65.8	7.0	75.5

When giblets were included in the eviscerated weight, there was a slight increase in percentage yield with increasing age of the geese. Average yield of eviscerated carcass, including giblets, was 75.5 percent of the live weight. This yield is comparable to that obtained from chicken fryers.

Summary and Conclusions

A flock of White Chinese geese installed at Kalou Pond at Waialea Farm laid eggs from the end of January to the middle of May. All eggs laid during the first eight weeks were set weekly in a Jamesway incubator. Average fertility during this period was 92.7 percent, and hatchability of fertile eggs averaged 81.7 percent.

Eight broods of goslings, reared in confinement for four weeks, averaged 3.5 pounds and consumed an average of 5.9 pounds of feed. Mortality during the four-week growing period was 2.88 percent. Goslings reared in confinement beyond four weeks gained less weight than control flocks placed on pasture at four weeks of age. Therefore, young goslings should not be reared in confinement after four weeks of age. They should be allowed access to a grassy run in good weather as early as two weeks of age. Some feed should be provided even when growing geese are on range. The amount will depend on the quality of green feed available and age of geese.

Geese may be slaughtered and dressed in the same manner as other poultry. Eviscerated yield of live body weight was 65.9 percent of the live weight when the giblets were excluded and 75.5 percent when the giblets were included.

References

The following publications provide more detailed information:

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