Geese For Water Hyacinth Control

By B. L. Damron and H. R. Wilson

The domestic goose has been helping man through the centuries to a greater extent than most people realize. They served as a source of writing quills, a source of feathers for stuffing mattresses, pillows and down-insulated coats and vests, as well as providing meat for the table.

Near the turn of the century there were more geese raised than turkeys or ducks and it has been reported that more goose than turkey was served at the first Thanksgiving due to the Pilgrim's customs while in England.

Domestic geese have been used for weeding a variety of crops and to keep fence rows, nurseries, irrigation ditches and other inaccessible areas clean. In Florida's warm climate the rapid growth of waterweeds is a continual problem. Some biological, chemical and mechanical controls have been successful but some have had undesirable side effects.

Utilization of the plants as a feedstuff for geese would be more desirable and efficient than their disposal as waste. The water hyacinth (Eichhornia crassipes), originally a South American plant, is among the ten most notorious weeds in the world and is capable of doubling its mass in 14 days. Development of nutritional management techniques that would maximize water hyacinth consumption by geese was the objective of research conducted.

Pilot Study

A pilot study was first initiated to determine if geese would voluntarily consume water hyacinths even though a complete feed was available free-choice and to see if any ill effects resulted. A small pond, located on the Florida Poultry Research Farm, with 4,000 square feet of surface area was evenly divided by a field fence forming two large pens, each with 2,000 square feet of water surface and 4,000 square feet of land area. Water hyacinths were moved into both pens from a nearby lake.

When the water hyacinths had covered the water surface, 20 White Chinese goslings (5 weeks of age) were placed in one enclosure and given free access to the pond and to a complete mash diet. Another 20 goslings were maintained in pens without access to the pond and served as controls. All birds were fed a corn-soy chicken starter diet until 9 weeks of age and a corn-soy chicken grower diet thereafter.

Within 2 hours of being placed in the pond, the goslings began eating grass and entered the water. Water hyacinth consumption began on the third day and increased noticeably by the seventh day. The goslings continued eating a combination of water hyacinths and feed throughout the remainder of the experiment. Approximately one-third of the pond had been cleared of hyacinths after 8 weeks.

Growth rate for the first 3 weeks of the experiment was less for geese on the pond than for the control group. Thereafter, growth was greater for those on the pond, and after 9 weeks on treatment (14 weeks of age). They weighed 330 grams per bird more than the controls.

Feed consumption was approximately 20 percent less for those birds consuming water hyacinths. There was no mortality in either group and no health problems were evident.

Subsequently, more extensive research facilities were constructed on an existing pond at the University of Florida Dairy Research Unit. Twelve pens (33.3 by 75 feet) were structured using 1-inch mesh nylon netting attached to stainless cables suspended between opposite banks. Netting extended to the pond bottom and was held there by weights. The center divider was of similar construction and was attached to a post on the land end, and to a barge anchored in the pond's center. This layout resulted in approximately 2,000 square feet of water surface and 2,500 square feet of total area within each pen.

First Study

For the first study, 300 White Chinese goslings were obtained to study the effects of feeding varying dietary protein levels upon water hyacinth damage and consumption. Water hyacinths were trucked in from a nearby marsh and allowed to establish in all of the pens for approximately 10 weeks before the experiment began.

All birds were reared indoors for the first 5 weeks of life on standard chicken starter feed (21 percent protein) and were then moved to a common outdoor pen for the remaining 5 weeks before transfer to treatment assignments. At 10 weeks of age (late June) 10 goslings (five males and five females) were assigned to each of the 12 pens, and four of these groups began receiving ad libitum one of the treatment diets by means of a covered circular turkey range feeder. These feeds contained 9, 12, or 16 percent total protein and were calculated to provide equivalent levels of phosphorus, calcium and energy. No supplemental source of water was offered.

Measurements of body weight change, feed consumption, and scores of water hyacinth damage and disappearance were determined at 28-day intervals. At least three visual scorings were made (by different individuals) concerning the extent of physical damage to water hyacinths at the hyacinth-open water interface and a subjective evaluation was made of the percentage weed coverage in the pen. Damage scores could range from one to five, with one being severe and five indicating no damage.

All groups gained weight during the study, with the geese receiving 9 percent protein gaining the greatest amount. This indicated that 9 percent protein was sufficient to meet a goose's requirement, and any deficiency, which might have encouraged weed consumption, was not created. It appeared from daily feed intake calculation that birds on the 9 percent treatment compensated initially with higher feed intake after which intakes stabilized.

The average subjective evaluations of pen coverage and water hyacinth damage also indicated that none of the diets encouraged increased hyacinth consumption. Water hyacinth growth covered at least 85 percent of the water area throughout the four periods and, although damage tended to be more severe in association with 12 and 9 percent protein regimes, these differences were not considered significant.

After four periods of feeding, the birds were regrouped into a second field trial in which three pens of either 14 or 15 geese would receive either full or no feed. Body weight change and waterweed damage were evaluated at varying intervals based on assessment of treatment effectiveness. This phase was begun on October 16 and subsequent measurements of body weight were made on the 28th, 35th, and 49th days of the test. Water hyacinth damage was assessed at the end of the 28th day and 49th day of test.

Birds not receiving a feed supplement were not able to sustain themselves by foraging and lost more than 1,600 g during the 7-week study. Geese not receiving feed did, however, increase their foraging activity. Water coverage after 28 days, as compared to full-fed pens, was reduced from 92.8 to 75.8 percent and damage severity went from 4.3 to 3.4. An additional 21 days (49 days total) of this treatment resulted in a further coverage reduction of almost 42 percent for non-fed geese, and damage went from 3.4 to 1.7. Coverage decreased and damage increased during the two periods for the fed group, but the changes were relatively small.

Second Study

Based on results obtained in the previous studies, a study was designed for the following year in which treatments were a 16 percent protein full-fed diet and additional groups that received a ration of 50 or 25 percent of full consumption.

The geese used were White Chinese hatched on April 14, brooded in indoor facilities on a 21 percent protein chicken starter diet for 5 weeks and a 14 percent grower diet from 5 to 10 weeks. Six males and six females were placed in each pen at 10 weeks of age. Water hyacinths had been introduced into the pen 7 weeks earlier and had covered the water area.

Growth, feed intake, and weed consumption measurements as described previously were taken at 14-day intervals. Feed allocations were adjusted at each of these intervals according to the consumption of the full-fed group during the previous interval.

After observing the birds for 4 weeks on this protocol and measuring an 800 g body weight loss for the 25 percent group, it was decided that allowances were too severe and they were subsequently increased to 50 and 75 percent of full feed.

Full-feeding supported a steady weight improvement over the entire experiment. After switching to the larger allocations, both treatments gained weight and the 75 percent ration returned birds to their starting weight. Fifty percent feeding was not sufficient to maintain body weight and resulted in a slow weight loss to a level of 500 and 650 g below starting values.

Geese receiving all treatments consumed water hyacinths well and the rate of consumption was not enhanced by feed restriction. Full-fed birds actually had the greatest reduction of coverage. In fact, the expected trend was reversed. The birds with 50 percent feed restriction had the least coverage reduction followed by those restricted to 75 percent. Plant damage scores reflect identical trends to those for water coverage with no real differences due to feed restriction.

Summary

White Chinese geese, noted for their weeding ability, consumed water hyacinths and were generally effective at the stocking rates used in making headway against the rapidly growing plant. Increased stocking densities would probably be necessary to remove an initial heavy infestation, but after clearing, a reduced number could maintain adequate control.

Geese have application on farm ponds, irrigation and drainage ditches and other small bodies of water where their beauty and grace might also add to the aesthetics of a farm setting. Their use as a source of meat and feathers might also be an added advantage of the bird.

In large part, the dietary variables of protein level or feed restriction tested in these experiments were not effective in improving water hyacinth consumption over control levels, but it was demonstrated that geese would consume the weed, even on full feed, and do an effective job on heavy infestations.

Removing feed access entirely did improve foraging, but birds were not receiving sufficient nutrition to sustain themselves. It is possible that in a larger area of natural setting the birds could do a better job of balancing their diet through the availability of a wider selection of natural forages, or through cracked corn supplementation by the farmer.

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