

Goose production and utility in integrated agricultural systems

Key words: goose, weed control, tropics

Summary:

The agricultural sector in most developing countries is characterised by a predominance of smallholdings with low levels of income and productivity. In order to meet the food requirements of rapidly expanding populations, a systematic increase in productivity within the existing production systems must be achieved. Special attention is given to livestock species that are cheap and easy to maintain and providing animal protein as well as cash income for their owners.

There is a large potential for goose husbandry in the humid tropics. Geese are able to control weeds in a broad range of food and cash crops that are important for smallholders in developing countries, if the proper management techniques are applied. Geese represent an ecological alternative for weed control, free labour needed elsewhere at the farm and provide supplementary cash income through the sale of meat, eggs and by-products. Goose husbandry has proved to be feasible and economically viable for smallholders in developing countries with suitable climatic and ecological conditions.

The agricultural sector in most developing countries is characterised by a predominance of smallholdings with low levels of income and productivity. Continuing demographic pressure and the limited availability of arable land make it difficult for smallholders to expand the size of their farms. In order to meet the food requirements of rapidly expanding populations, a systematic increase in productivity within the existing production systems must be achieved.

Animal production is likely to play a key role in this development. The widespread use of poultry and waterfowl demonstrates the importance of small, easily managed, household livestock for smallholders. Yet, goose husbandry is not as popular as the production of other kind of fowl in most of the developing countries. This is probably due to a lack of awareness of the goose's potential (FAO, 1983).

The justification for introducing goose husbandry in integrated production systems in developing countries may be found in the utilisation of cheap natural feed resources. Geese are the only domestic fowl that can be almost exclusively raised on pasture. The birds supply nutritious meat, eggs and fat for cooking. Soft down and feathers represent valuable by-products. Geese provide farmers a supplemental cash income through the sale of eggs, meat and by-products. Geese are cheap and easy to maintain. Mature geese are independent, when kept in small flocks and allowed to roam the farmyard or field. They are adept scavengers and require less attention than any other domestic bird. Furthermore, geese seem to be more resistant to diseases than other avian species (National Research Council, 1991).

Some European breeds, such as Embden and Toulouse, have been introduced into tropical developing countries with notable success. Chinese geese seem to be well adapted to humid tropical conditions, as long as shade is available. They are especially well suited to aquatic areas and marshlands and are completely at home in warm, shallow waterways. Widely kept in Southeast Asia, they seem to be promising for smallholders. They are very good layers, active foragers (making them economical and useful as weeders), alert and "talkative" and they produce relatively lean meat (National Research Council, 1991).

A feasibility study conducted in north-eastern Thailand recommended that goose raising be incorporated into the region's existing farming systems in order to utilise farm waste products efficiently, hence providing smallholders with a source of extra-income and a much needed animal protein source for the family (Phalarasksh, 1984). In the rice growing areas of south-eastern China, keeping ducks and geese is common for smallholders throughout the countryside (Hugo, 1995).

An alternative for weed control

Most of the smallholders in developing countries employ highly labour intensive weed and pest control techniques and, to a lesser extent, agro-pesticides. The use of agro-pesticides causes often environmental and human health problems. Geese, if properly managed, represent an ecological alternative for weed control and free labour needed elsewhere at the farm.

Geese remove grass and weeds next to plants that cannot be removed by hoeing or cultivation without damaging the roots. Geese work even when the ground is too wet to hoe or cultivate. Their natural diet consists of grasses, seeds, roots, bulbs, berries and fruits and insects and snails.

Weed control functions can be performed by geese in a broad range of crops (see Table), as they relish grasses and shun most broad-leaved plants. They nibble perennial grass shoots until the plants eventually die, puncture vine and feed also on young sedges. However, they are not suitable for weeding corn (during the cultivation period), sorghums or small grains (Johnson, 1972). Before the introduction of selective herbicides, geese performed weed control functions in crops, orchards and vineyards in the United States. From Egypt, certain African countries and Latin America it is reported that geese have been successfully used for weed control in cotton fields, banana and pineapple plantations, etc. (Hugo, 1995). Geese have the potential for a prominent role within environmental friendly integrated pest management strategies in developing countries.

Management is probably the biggest single item for the success or failure of geese used for weeding. Failures occur mainly if the number of birds per acre is insufficient. Two to four geese (preferably Chinese geese) per acre cultivated land are generally sufficient in row plantings. However, depending on the actual crop and the degree of weed infestation more birds may be needed (Geiger & Biellier, 1963). Weeder geese should be placed in the fields or plantings early in the cultivation period when weeds appear because the birds prefer young tender grass shoots and dislike old grass (Conley & Peterson, 1957).

The birds should be given small quantities of grain supplement and grit in the evening. The proper amount is learned by experience since geese should be hungry to work most effectively. At the same time they have to be maintained in a strong, active condition. Thus, training is needed for the owner to detect signs of overfeeding or underfeeding.

Geese need clean fresh drinking water at all times (three pints per goose per day) and shade for protection from the hot sun and soil during midday. Where no shade is present, artificial shade should be provided (Johnson, 1960).

The animals should be protected against straydogs and predators. In case agro-pesticides are applied the birds should not be present in the field during spraying of pesticides and should not return for several days.

Water, feed or shade equipment should be placed in fields at the far end of the rows the geese are actually working in or placed where the effort of the birds is most needed. Thus, the whole field is cleaned evenly from weeds. It is also possible to use a guard for keeping the birds in a given area. The best method must be assessed individually, depending on the size of the fields, the number of birds, and the labour available (Arnold, no year).

Weeder geese in tropical countries: advantages and constraints

Although most of the above quoted authors state that geese may be used efficiently for weeding purposes, only few give detailed information such as number of geese needed to clear a specific crop from weed infestation, specify the weed species efficiently controlled by the birds, etc. However, it can be concluded that geese do clear a broad range of crops that are important for smallholders in developing countries. Beans and bananas, onions and tomatoes play an important role in the diet in many African countries. Cotton, coffee and tobacco are common cash crops.

Extension recommendations should emphasize that management for weeder geese differs considerably from management of geese kept for egg or meat production. Because geese may be exclusively raised on pasture, birds kept for meat and egg production compete with cattle, sheep and goats for feed resources. Furthermore, the diet has to be supplemented with grains or commercial feedstuff. If the birds are to be sold on a weight basis at the end of the cultivation period, they should be kept in a pen for an additional fattening period. As there are no established markets for geese, it must be carefully assessed if the additional inputs in labour, space and cash required for goose husbandry are profitable and feasible for the farmer.

Conclusion

Smallholders in developing countries usually employ highly labour intensive pest and weed control techniques in food crops. Geese represent an ecological alternative for weed control, free labour needed elsewhere at the farm and provide supplementary cash income through the sale of meat, eggs and by-products. Goose husbandry has proved to be feasible and economically viable for smallholders in developing countries with suitable climatic and ecological conditions if the proper management techniques are applied.

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Table 1: Cashcrops And Foodcrops Suitable For Weed Control By Geese

Geese are used for weed control in	Geese feed on	Region/Country	Reference
groves, orchards and vineyards	◊ weeds and fallen fruits ◊ weeds and fallen fruits ◊ weeds	Missouri, Tennessee, Pacific Area, USA Australia California, USA	Geiger & Biellier, 1963 NRC, 1991 Johnson, 1960, 1972
banana, coffee, pineapple	◊ grass and weeds ◊ weeds ◊ weeds	tropical countries throughout Asia Africa	Warren, 1972 Setioko, 1990 Sonaiya, 1990
kiwi	weeds	Africa	Sonaiya, 1990
nursery crops	weeds	California, USA	Johnson, 1960, 1972
nursery crops such as: seedlings, flowering plants, weeds		Missouri, Tennessee, USA	Geiger & Biellier, 1963
coniferous & hardwood shrubs, fruit- and shade trees			
cotton	◊ Johnson grass (<i>Sorghum halepense</i>), nut-grass (<i>Cyperus rotundus L.</i>), Bermuda grass (<i>Cynodon dactylon</i>) and others ◊ weeds such as Johnson grass (<i>Sorghum halepense</i>), nut-grass (<i>Cyperus rotundus L.</i>), Bermuda grass (<i>Cynodon dactylon</i>), crab grass, tickle grass, etc. ◊ young grasses and nutgrass (<i>Cyperus rotundus L.</i>), ◊ weeds	Missouri, Tennessee, USA California, USA . Africa	Geiger & Biellier, 1963 Johnson, 1960, 1972 Kasasian, 1971 Sonaiya, 1990
tobacco	◊ succulent young weeds ◊ weeds	USA Missouri, Tennessee, USA	NRC, 1991 Geiger & Biellier, 1963
corn	suckers and grains left on the ground after the last cultivation, when the corn has been "laid by"; giant foxtail and other weeds	Cornbelt, USA	Geiger & Biellier, 1963
potatoes	◊ succulent young weeds ◊ weeds	USA California, USA	NRC, 1991 Johnson, 1960, 1972
sugar beets	weeds	California, USA USA	Johnson, 1960, 1972 Geiger & Biellier, 1963
beans, castor beans, onions	weeds	California, USA	Johnson, 1960, 1972
tomatoes	weeds	California, USA	Johnson, 1960, 1972
asparagus	weeds	USA	Arnold, no year
blueberries and raspberries	weeds	California, USA	Johnson, 1960, 1972
melons	weeds	USA	Geiger & Biellier, 1963
mint	weeds	California, USA	Geiger & Biellier, 1963
strawberries	◊ crabgrass, other young weeds ◊ weeds ◊ chickweed, daisies, grasses, pigweed, clover	Missouri, Tennessee, USA California, USA Nova Scotia, Canada	Geiger & Biellier, 1963 Johnson, 1960, 1972 Fillmore, 1963
ornamental plants: roses, iris, chrysanthemums, peonies, dahlias, etc.	weeds	Missouri, Tennessee, USA	Geiger & Biellier, 1963
waterways: ponds, irrigation & drainage ditches	◊ weeds in irrigation ditches ◊ water hyacinth (<i>Eichhornia crassipes</i>) in ponds and drainage ditches	California, USA Florida, USA	Johnson, 1960, 1972 Damron & Wilson, 1983
waterways: ponds	◊ water hyacinth (<i>Eichhornia crassipes</i> Solms), paragrass (<i>Brachiaria mutica</i> Stapf), water lily (<i>Nymphaea</i> ssp.), water chestnut (<i>Eleocharis</i> ssp.), cattail (<i>Typha angustata</i> Bory and Chaubard)	Hawaii, USA	Ross, 1971