THE KEITH GOODERHAM WATERFOWL LECTURE

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The purpose of this paper might be described as fourfold.
l) To explain the purpose of this
2) Briefly to describe the place of waterfowl in the world.
3) To describe some highlights experienced over the past 42 years.
4) To indicate some things we might like to know.

1) I had the idea that, once in a while, a paper on some aspect of waterfowl should be encouraged and that a record of this be kept.
In time there would accumulate a source of reference.
The subject may be husbandry, nutrition, disease, incubation, reproduction, genetics or whatever as long as waterfowl (ducks, geese, swans) are the basis of the paper.
To encourage the presentation and publication of the paper as well as the provision of a trophy, a fund will be established.
The BVPA Committee will be responsible for overseeing the progress of this.

2) Waterfowl are different in many respects from other poultry species.
A high incidence of wild species occur. These not only fly, but also migrate. There are 148 species worldwide, but I have been unable to get a figure of their numbers.
Many wild species are also kept in collections, both in zoos and privately.
A range of domesticated species and breeds within those species exist.
A few of these breeds have been developed into commercial strains and selected for various traits.
The annual world production of waterfowl is about 2.8billion head, with China the dominant producer (2.l billion head) with other countries bring the Asian total to 2.5billion or 89% of world production.
A little under 20% of the world total is goose production.

In 1964 I was faced with investigating problems in commercial duck and goose production with little firm evidence on which to rely.
A mortality of 23% was described as Duck Septicaemia.
A programme was started of examining post mortem all the birds dead and culled from a placement of 800 birds each week. In addition all breeders dead and culled on one day each week and all losses from the elite populations were examined post mortem.
A large data base was established on punch cards which could be readily interrogated.
The range of diagnoses was considerable, but it was evident Anatipestifer Septicaemia was the main cause of loss. Investigation of the epidemiology of this problem led to recommendations in improved husbandry which reduced the losses to around 1% of placements.

One common lesion of septicaemia is salpingitis. Examination of breeder losses showed that salpingitis developed at an early age would lead to mortality at point of lay and a high incidence of blind layers. This last piece of evidence came from examination of non-layers from trap-nested populations.

It was found that by rearing replacement breeders on an all-in-all-out single age farm, salpingitis could be avoided.

Year-by-year loss of egg production and hatchability led to investigations into restricted feeding of parent flocks.
This was immediately rewarded with some 25% more eggs, a 15% increase in hatchability and better liveability of breeders. The number of day-olds per point of lay breeder increased from about 120 to over 160 in the 40 weeks of lay.
Egg size was found to be important for best hatchability, with 85 to 90 grams being the optimum range. This weight could be controlled by the amount of feed given during lay.
Coccidiosis is rarely described in ducks and no preventive programmes are operated. I showed that acute intestinal coccidiosis occurred between 1st. July and 30th. September each year, but only in birds in grass paddocks, not in houses. This could be prevented with in-feed sulphonamides.

A new production base in the USA was planned.
A programme for selecting eggs for this export was prepared with the aim of avoiding salmonella being found in quarantine. This was successful.
Some months later, the newly described EDS76 virus of chickens was shown to be endemic in ducks.
I was told by the USDA that the population of ducks we had established was the only one they could find EDS76 negative. It must have been the original egg selection programme which not only kept them clean of salmonella but also of EDS76.

The population of breeding geese was found to be infested with gizzard worm (Amidostomum). It was interesting to find that the average number of worms per gizzard was 2 during the feeding of breeder feed, but during the summer on grass this rose to 150.
A programme of rearing geese free from gizzard worm was established by describing clean and positive fields. A positive field was one which had previously contained infested birds.

Genetics.
Little work was done on selecting ducks for commercial traits until in 1964 some newly imported Pekin ducks were selected either for body weight or egg numbers. Later, selection for breast meat and for feed efficiency was practiced. Interestingly and perhaps without explanation, selection for feed efficiency selects away from breast meat yield.

I was fortunate in 1983 to be invited to start the genetics programme with a company in the USA.
This, over the ensuing 23 years has been extremely successful in improving growth rates, breast meat yield, feed efficiency, fat reduction, time of feathering and carcase maturity.

It is now possible, using a 3 way cross of the elite lines to produce a liveweight of 3Kg in 36 days with an FCR of 1.8. This bird has more breast meat than the equivalent weight bird at 49 days 20 years ago and which had an FCR of 2.8.

To monitor the improvements or otherwise of the genetic selection programme in the elite lines I developed a method of carcase dissection. This has been used in several countries by a few different companies. A standard method allows comparison between strains, between companies and over time.
This method not only confirms improvements but alerts to any detrimental aspects of the programmes.

The traditional method of duck production has varied country to country. Sometimes it involves expanses of water. Sometimes open fields.
When production has been semi-intensive or even intensive as over the past 40 years, little attempt has been made to avoid multi-age production.
Disease eradication and biosecurity have been largely neglected.

This leaves us with considerable difficulties in disease control.
In more recent years, the reason for multi-age housing or brood and move arrangements is one of economy of square footage (or Square metreage).

In fully controlled environment housing, birds may be grown at 6per sq.metre. In naturally ventilated housing perhaps 4 birds per square metre is nearer the norm. Stocking density is highly dependent on litter quality. This in turn is dependent on type of drinker and house drainage.

By brooding birds in one section of a house and moving to a second section 60% more birds can be produced from that house.

When I started in the duck industry, all birds produced were free range.
Now we are moving back to free range without having experienced the benefits of controlled environment housing on all-in-all-out sites.

How will we ever learn whether Reimerella anatipestifer septicaemia is a primary or secondary disease? What is the role, for example of circovirus.
How will we know if freedom from Mycoplasma is beneficial?

I mentioned drinker type as a means of helping conserve litter condition. Why is it considered necessary for a duck to immerse its head in water for best eye health?
Nipple drinkers can be used without detriment to clean bright eyes.
Producing ducks for meat (or eggs) in controlled environment housing using nipple drinkers and dry wood shavings or chopped straw litter should allow for better control of salmonella and campylobacter.
Diseases such as Reimerella septicaemia and E.coli septicaemia as well as the Cellulitis lesion caused by these organisms may be better controlled.

Feed efficiency. Birds in temperature controlled houses require less feed for maintenance and do not share their feed with wild birds. Thus overall feed efficiency is better.
Wild birds consuming duck feed are considerate in replacing it with faeces.

4) I would like to see the work on the various strains of Reimerella anatipestifer summarised, for standard typing sera to be available and for a description of the pathogenesis of each strain.
I would like to see results of work on the protective role of live Reimerella vaccines.

I would like to know the incidence of viruses endemic in duck and/or goose populations and whether they are pathogens.
Circovirus, Parovirus,Polyomavirus, Reovirus, Adenovirus ED76 and others.

I would like to know the aetiology of duck egg drop syndrome (DEDS)

An interesting feature of ducks is that they can be sexed by their voice.
This can be readily achieved from the age of about 4 weeks, although I can detect a difference in some individuals at 3 weeks.
If the different voice of the two sexes is due to the different anatomy of the syrinx then that difference exits at day old.

Is the inability to voice sex at day old due to the inability of the human ear to detect it? If a bat detector were used for reducing the frequency of the voice, would a sex difference become apparent.