

Annexes



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Featherless broilers may facilitate industrial production of quality meat under hot conditions

Avigdor Cahaner

The Hebrew University of Jerusalem, Faculty of Agriculture, Rehovot, Israel.

E-mail: cahaner@agri.huji.ac.il and avigdor.cahaner@gmail.com

Genetic enhancement in the growth rate of industrial broilers has increased their sensitivity to heat. The rapid growth is driven by higher rates of feed intake and metabolism, and is therefore associated with increased production of internal heat. Efficiency of heat dissipation is reduced by high ambient temperatures. Thus, under hot conditions modern broilers cannot dissipate all the heat they generate. Heat stress is further exacerbated by increased stocking densities, which result in higher litter temperatures and reduced air movement.

The negative effects of heat can be countered by cooling and ventilation systems, but they are associated with high costs for equipment, maintenance and electricity. Without effective cooling, modern commercial broilers acclimatize to hot conditions by reducing feed intake to minimize the excess production of internal heat. This leads to a significantly lower growth rate and body weight, poorer feed conversion, and specific reduction in breast-meat yield. Moreover, heat stress also reduces the quality of breast meat and may lead to PSE syndrome (the letters stand for three negative meat characteristics: pale, soft and exudative).

Heat dissipation from the body is hindered by feathers. Although advantageous in slow-growing chickens or in broilers that are reared under cooler conditions, under hot conditions feather coverage has a negative effect on thermoregulation. Accordingly, we hypothesized that genetic elimination of the feathers may provide fast-growing broilers with an inherent heat tolerance.

Our featherless broilers were developed by backcrossing scaleless mutants (homozygous *sc/sc*) to contemporary fast-growing broilers. The featherless broilers, their feathered sibs, and commercial broilers were reared at stocking densities ranging from 7 to 22 birds/m², under medium-hot conditions (about 30–32 °C) without cooling or forced ventilation. These conditions are less stressed than, or similar to, actual environmental conditions in simple broiler houses in tropical and subtropical regions.

As expected, the growth of the feathered broilers was depressed by heat, and this effect increased with stocking density and with the age of the birds; their mean body weight (BW) at 44 days ranged from 2.3 kg (7 birds/m²) to 1.8 kg (17 birds/m²). In contrast, growth of the featherless broilers was minimally affected by density, with mean BW ranging from 2.4



kg (12 birds/m²) to 2.2 kg (17 birds/m²) and 2.1 kg (22 birds/m²), with the latter resulting in overall live weight production per unit floor area of 46 kg/m². The stress of heat and high stocking densities reduced breast yield in the feathered broilers to 15–16 percent, whereas in featherless broilers, breast meat yield was in the range of 19–20 percent under all stocking densities, with superior industrial meat quality: not pale, not soft, and having better water holding capacity. These features, along with the ease of processing (because feather plucking is not needed) and minimal skin fat, make the featherless broilers especially suited for industrial processing, deboning and further processing.

In summary, standard (feathered) broilers suffer under hot conditions, as evidenced by depressed appetite, elevated body temperatures, and higher incidence of heat-related and disease-related mortality. These effects are rare in fast-growing featherless broilers reared under hot conditions. Moreover, featherless broilers can contribute to sustainable production in hot regions, in two ways:

1. There is no need to use costly energy (and equipment) for climate control in the broiler houses. In addition to saving scarce global resources, independence from costly cooling and ventilation facilitates efficient broiler production also in developing countries, especially in regions (or by farmers) lacking a reliable supply of electricity for climatic control in broiler houses.
2. About 15 percent of broiler feed nutrients, mainly the amino acids, are used to build the feathers that are later discarded as waste at the slaughterhouse. These nutrients are saved in featherless broilers, apparently contributing to their higher meat yield. Moreover, a 10 percent reduction in dietary nutrients was shown to have no negative effect on growth rate, feed conversion ratio or meat yield in featherless broilers.



Poverty reduction in Bangladesh through microfinance and poultry development

Jebun Nahar

Project Coordinator, Micro Finance and Technical Support Project, PKSF, Bangladesh.

1 INTRODUCTION: MICROFINANCE IN BANGLADESH

Bangladesh is a global centre of excellence in microfinance. Its microfinance programmes have been acclaimed worldwide for their success in providing poor people with access to credit. It has been shown that a series of successive micro-loans can not only lift a household out of poverty, but with over 90 percent of the loans being to women, also lead to considerable empowerment and improvement in the position of women at the household level. In 2006, Dr. Muhammad Yunus and the Grameen Bank, the pioneers of microfinance in Bangladesh, were awarded the Nobel Peace Prize for their work.

2 THE ROLE OF PALLI KARMA-SAHAYAK FOUNDATION IN MICROFINANCE

Palli Karma-Sahayak Foundation (PKSF) is the world's largest apex lending and capacity-building institution in the field of microfinance. It presently services about 200 microfinance institutions, many of them NGOs. The loan portfolio is US\$ 275 million and the total number of members is 7 million. On the assumption of five members per household, this indicates an outreach to 35 million people. In microfinance programmes the borrowers' repayment rates are typically high – at 98 percent or even higher. PKSF's repayment rate to the government is 100 percent.

3 PKSF AS A PARTNER IN THE USE OF POULTRY AS A DEVELOPMENT TOOL

PKSF has worked with donor and development organizations such as the International Fund for Agricultural Development (IFAD), Danida and the Asian Development Bank (ADB) in projects that use, or have used, poultry as a tool in human development. The background to this is that poultry production adds more value than any other industry accessible to poor women and their families. The following points are also important:

- that the government has declared poultry as a thrust sector and classified it as an agro-based industry;
- that the government has liberalized its policies by introducing easier loan procedures, lower interest rates, and tax holidays; and
- that poultry production contributes to poverty reduction, to the generation of new employment, and to people's nutritional status.



4 FACTORS CONSTRAINING POULTRY DEVELOPMENT IN BANGLADESH

Factors that constrain poultry development in Bangladesh include: (i) inadequate and inappropriate training of the various livestock cadres; (ii) lack of technical staff within the Micro Finance Institutes (MFIs), and poor linkages between the government veterinary services and the MFIs; (iii) immobility of the government staff; and (vi) lack of clear understanding of the modalities of the poultry model among MFIs and at government level.

5 SMALLHOLDER POULTRY – AN EXCELLENT TOOL FOR POVERTY ALLEVIATION

Despite the above-mentioned constraints, smallholder poultry can be an excellent poverty alleviation tool (Dolberg, in FAO, 2003) because nearly all rural, poor and landless households own poultry, because poultry is mainly owned and managed by women and children, and because ten chickens under improved management are enough to create a positive impact. The following technical features of smallholder poultry development should be noted:

- it can be started with hardly any assets;
- the technology is simple and easy to adapt and apply;
- it is based on traditional poultry-rearing knowledge;
- the inputs required are locally available; and it has a built-in marketing mechanism.

6 IMPACT

The impact can best be illustrated through a case study.

Case study: Jhumi is no longer a burden on anybody

Abdul Mannan is a poor man, who is more than 50 years old. He lives in Lalkhatangi Village 10 kilometres from Sylhet town in the northeast of Bangladesh. He has three daughters and one son. Because of his age he cannot work as he once did. His family lives from hand to mouth.

Jhumi is Abdul Mannan's eldest daughter. She had to give up her studies for tenth class examination, as her father was unable to continue to support her education. Instead, she became the only family member earning an income. She sacrificed her education and devoted herself to housekeeping, together with her mother. After some time she became frustrated with her inactive life. She heard from her neighbours about the Micro Finance and Technical Support Program (MFTSP) of VARD (a partner organization of PKSF which is working in eastern Bangladesh).

She joined VARD as a member of the Lalkhatangi Group on 19 June, 2004, and because she was able to read and write she became cashier of her group. The first training she received was on social development. She learned about the savings and credit programme, human nutrition, cleanliness, vitamins and minerals, child care, child education, women's rights, homestead gardening and integrated farming. The loan she took was a small one – taka 5 000 (US\$ 70). With this she started a very small grocery shop. Her parents helped her to run it. After seven to eight months she heard from VARD's Field Worker and the Live-stock Technical Assistant (LTA) that with less labour, time and investment it would be possible to earn more profit by keeping poultry, provided she had the right knowledge – and



this she could get through the project's training programme. The LTA told her that there are many opportunities in the poultry business, especially by becoming a Parent Breeder. Jhumi thought that she could run this business in her house.

In the meantime, the Project Coordination Unit of the MFTSP arranged training on Model and Parent Breeder management at TMSS (a partner organization of PKSF) in Bogra District. Here Jhumi attended a seven day training programme on keeping and managing a flock of poultry that produces hatching eggs. In the project's terminology this is called a Parent Breeder. After she returned from the training she took her second loan, which was US\$ 3 000. Her first loan was repaid by profit she earned from running the grocery shop. From the US\$ 3 000 she made a house for her chickens – 46 hens of the Fayoumi breed and six cocks of the Rhode Island Red breed. After five months, she was getting 35 fertile eggs on average per day. The LTA helped her to establish a link with the hatchery that used her eggs. This hatchery – called the Rice Husk Hatchery – is another enterprise under the project (Nahar *et al.*, 2006). By now, Jhumi sells fertile eggs to Mira's Mini Hatchery for taka 6 per egg. Mira (the lady who runs the mini-hatchery) is another participant in the MFTSP.

After meeting all her expenditures, Jhumi is now earning US\$ 50 per month from her Parent Breeder Farm alone. Her future plans are to establish a larger Parent Breeder Farm. She has not only become self-dependent, she ensures food for all her family and has become a role model for the young ladies of her village. Another three young ladies have started poultry farms. The villagers are taking advice from her as a specialist. She is proud of her profession and the villagers are also proud of knowing their own specialist.

7 LESSONS LEARNED

- Demand-driven microfinance approaches with appropriate technical support provided to savings and credit groups work very well, and produce significant impact among beneficiaries.
- The livelihood of rural poor (especially women) can be improved significantly by providing training in activities pertaining to natural resources, such as poultry production.
- Poultry rearing is highly successful in reaching the poor, particularly women, and has generated significant benefits in terms of poverty reduction.
- Poultry is one of the few enterprises in which a large number of landless and poor women can participate.
- Intensive supervision and monitoring is needed for the success of the programme.
- Commitment on the part of the NGOs, and the establishment of linkages with service and input providers, are extremely important.
- Continued NGO support (microfinance and technical) beyond project closure is essential for the sustainability of the programme.

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Continuing education in the prevention and control of highly pathogenic avian influenza: a case study on Indonesia

Alders, R.G.^{1,2,3} Bagnol, B.^{3,4} Brum, E.^{1,2} Lubis, A.S.⁵ and Young, M.P.^{1,3}

¹ Food and Agriculture Organization of the United Nations, Jakarta, Indonesia.

² The Department of Environmental and Population Health, Cummings School of Veterinary Medicine, Tufts University, Massachusetts 01536, United States of America.

³ The International Rural Poultry Centre, KYEEMA Foundation, Brisbane, Australia. E-mail: robyna@kyeemafoundation.org.

⁴ The University of the Witwatersrand, Johannesburg, South Africa.

⁵ Campaign Management Unit, Ministry of Agriculture, Jakarta, Indonesia.

1 INTRODUCTION

Highly pathogenic avian influenza (HPAI) subtype H5N1 is now endemic across much of Indonesia. This situation has revealed a lack of human-resource capacity in many institutions especially in terms of understanding of, and experience in, the control of poultry diseases. An example of this situation is the endemicity of Newcastle disease and very virulent infectious bursal disease; outbreaks of these diseases, particularly in smallholder and village flocks, are not actively reported or controlled.

2 PREREQUISITES FOR EFFECTIVE HPAI PREVENTION AND CONTROL

The effective control of HPAI requires:

- understanding the behaviour and ecology of influenza viruses generally and of this subtype in particular;
- understanding the perspectives and decision-making processes of key stakeholders (e.g. poultry producers from all production systems, workers, traders, disease control officers) with regard to poultry health and disease control;
- understanding the different local poultry production and marketing systems, in themselves and within the wider system (e.g. within the local farming system for sectors 3 and 4);
- understanding how the characteristics of the local poultry production and marketing systems affect the evolution of HPAI;
- mobilizing all stakeholders to engage in the preparation of HPAI responses and to actively practise adequate measures in all three phases of an HPAI outbreak – pre-outbreak (prevention), occurrence and post-outbreak (Bagnol, in FAO, 2007);
- ensuring that donors, national governments, media and civil society collaborate and are involved in the development of the strategy; and

FIGURE 1
A PDSR Officer shares information about the prevention and control of HPAI
with a community in Yogyakarta, Indonesia



- adapting the communication process to the anatomy of outbreaks and the needs of the different stakeholders (Alders and Bagnol, 2007).

3 IMPLEMENTING HPAI PREVENTION AND CONTROL

Cost-efficient prevention and control of HPAI are built on a sustainable poultry health programme that incorporates collaborative research and development activities involving the public and private sectors. The programme must provide appropriate education, communication and services to: all poultry producers, workers and traders; community animal health workers; field veterinarians including Participatory Disease Surveillance and Response (PDSR) Officers, livestock officers and extension workers; and senior decision-makers at national, provincial and district levels.

4 CONCLUSION

Education and communication materials developed in collaboration with field veterinarians (both public and private) and small-scale and village poultry producers involved in HPAI prevention and control communicate more effectively and provide information appropriate to the local context.

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Promotion of HIV/AIDS mitigation and wildlife conservation through improved village poultry production in Southern Africa

Alders, R.G.^{1,2,3} Bagnol, B.^{1,4} dos Anjos, F.^{1,5} and Young, M.P.^{1,3}

¹ International Rural Poultry Centre, KYEEMA Foundation, Maputo, Mozambique. E-mail: robyna@kyeemafoundation.org.

² The Department of Environmental and Population Health, Cummings School of Veterinary Medicine, Tufts University, Massachusetts 01536, United States of America.

³ Food and Agriculture Organization of the United Nations, Jakarta, Indonesia.

⁴ The University of the Witwatersrand, Johannesburg, South Africa.

⁵ Veterinary Faculty, University of Eduardo Mondlane, Maputo, Mozambique.

1 INTRODUCTION

Many poor rural households in developing countries rely on village chickens (FAO, 2004a). In rural households affected by HIV/AIDS and areas surrounding protected wildlife populations, they play a particularly important role (Alders *et al.*, 2007; McDonald, 2006). In farming households, the illness or death of family members due to HIV/AIDS leads to loss of valuable labour resources (FAO/UNEP, 2002). Consequently, the focus of household activity turns to maintaining family food security. In affected households, food security is maintained through revising the complex division of labour in accordance with the possibilities presented by the local farming system. Throughout Africa, expanding human populations have created situations in which large numbers of poor people live close to protected wildlife populations. Inevitably, the needs of people and wildlife come into conflict. One approach to ensure that meat intake is maintained while reducing bushmeat hunting is to improve the ability of people to subsist on alternative sources of protein and income.

Village chickens provide a scarce resource – animal protein – in the form of meat and eggs, and can be sold or bartered to meet essential family needs such as medicine, clothes and school fees. Village chickens are active in pest control, provide manure, are required for special festivals and are essential for many traditional ceremonies. The output of village chickens is lower than that of intensively raised birds, but it is obtained with minimum input in terms of housing, disease control, management and supplementary feeding. The chickens are generally owned and managed by women and children (Guèye, 2000) and are often essential elements of female-headed households (Bagnol, 2001). As women are the main carers of sick people, chickens can play an important role as they provide the women with additional resources to carry out their important task of supporting people living with HIV/AIDS.



The components of village poultry production include indigenous poultry breeds, feed, shelter, disease control, and community collaboration and group formation (FAO, 2004b).

2 PROJECT: HIV/AIDS MITIGATION IN MOZAMBIQUE

The main activities of this project include: baseline studies and annual participatory rural appraisals; training local NGOs volunteers as community vaccinators against Newcastle disease (ND) (Alders *et al.*, 2003); training NGO technical staff and local government agricultural staff in ND control; implementing ND vaccination campaigns; training farmers to experiment with low-cost improvements to village poultry husbandry; working with volunteers and NGO staff, local health posts and primary schools to promote village poultry production and consumption of poultry meat and eggs; and technical backstopping, and monitoring and evaluation. The project has demonstrated the potential to deliver triple benefits: direct support to people affected or infected by HIV/AIDS (FAO, 2005); income generation for carers and community-based organizations; and an increase in the capacity of communities to support welfare activities.

3 PROJECT: WILDLIFE CONSERVATION IN ZAMBIA

This project focuses on the sustainable control of ND in village poultry (Alders *et al.*, 1994; Songolo and Katongo, 2001); improved village poultry husbandry and management strategies including marketing (Alders, 2007; McDonald, 2006); and improved household

FIGURE 1
Sra (Mrs) Celestina Zimbabwe, a widow in Manica Province, Mozambique



Celestina received one rooster and three hens. Six months later, she had 21 birds. She was delighted with the results and so were her children. Celestina also helps with the training sessions for child-headed households and continues to provide advice to four households in her local area



welfare, including improved nutrition and food security as a means of reducing the need for communities surrounding South Luangwa National Park to hunt, eat and sell bushmeat (Faiela *et al.*, 2007).

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