



# Keynote Speech

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# **Overview of Human-Chicken Multi-Relationships and Future Prospects for Further Research of Domestication and Breeding of Varieties (The 15th AAAP Animal Science Congress) 121124v.**

## **INTRODUCTION**

According to statistics from the United Nations Food and Agriculture Organization (FAO), over 18 billion chickens are being reared in the world today, an exceptional number by comparison with other livestock such as oxen or swines. As the numbers are partly a function of the size of the animals, they may not be the single measure of the intensity of the relationship between humans and animals. However, we can at least say that chickens are one of the most frequently used animals in our daily lives, for economic motives and for rituals, entertainment, and appreciation.

Though they are in intimate contact with humans, little seems to be known about chickens. For example, when and where, and why or how, were chickens domesticated by mankind, and which wild species of junglefowl, genus *Gallus*, was the real ancestor of present-day chickens? Fortunately, the origin of chickens and the locations of their domestication are gradually becoming clearer as a result of recent advances in molecular biological studies. However, there are still unanswered questions of when, why, and how, related not only to domestication but also to the breeding of varieties after chickens were domesticated from junglefowl.

In elucidating these subjects, multidisciplinary approaches are considered quite useful, so I have implemented them by organizing the “Human-Chicken Multi-Relationships Research Project” in Thailand from 2004 to 2008 under the Royal Patronage of Her Royal Highness Princess Maha Chakri Sirindhorn. In this paper, I would like to introduce the outline of the project, and also propose and note some possible ideas for future studies of the domestication and breeding of varieties of chickens, based on my experience of travels throughout Asia.

## **OVERVIEW OF HUMAN-CHICKEN MULTI-RELATIONSHIPS RESEARCH PROJECT**

The Human-Chicken Multi-Relationships Research Project, or HCMR for short, started in 2004 using the model region of Chiang Rai Province in northern Thailand, with domestication as the keyword. In starting the project, four major research areas were specified, namely humanities, biology, economics, and geography because chickens are not merely living organisms, but are also cultural creatures bred by humans. Throughout the project, Japanese and Thai researchers from each of these fields worked together and implemented joint surveys in several places in Chiang Rai to obtain data to use in researching and anticipating the process of domestication and the breeding of varieties.

As a result of many joint surveys, we gained quite a lot of information on the subject of human-chicken multi-relationships, and the book entitled “Chickens and Humans in Thailand: Their Multiple Relationships and Domestication” was published by The Siam Society in 2010.

The contents of this book roughly consist of four parts, following a preface by Her Royal Highness Princess Maha Chakri Sirindhorn and my general remarks. The four parts are as follows;

**Part 1: “From Forest To Village”**

In this part, the early stage of the domestication process from junglefowl to chickens is explored by investigating the nature of the bird alongside human activities such as hunting, taming, rearing, and breeding.

**Part 2: “Spiritual Interactions between Chickens and Humans”**

Here we explore human intervention in the domestication process and in the “breeding of varieties” of chickens as domestic animals that live in intimate contact with humans. Examples of cultural roles in rituals, divination, and cockfighting are investigated, and traditional customs practiced among various ethnic groups are observed by the choice of chickens in beliefs and myths.

**Part 3: “Consumption and Utilization of Chickens”**

This part elucidates the new relationship between humans and chickens by investigating the actual conditions of production, distribution, and consumption of chickens, because chickens are still offer significant economic benefits to the present-day society of northern Thailand.

**Part 4: “Future Studies in the Biology of Junglefowl and Chickens”**

In this part, we provide fundamental information about the biological features of junglefowl and chickens such as their morphology, physiology, and molecular biology. As you may notice, the biological perspective is one of the effective approaches for clarifying the nature of junglefowl and chickens, and elucidating the domestication process.

Although we conducted research on a lot of matters related to domestication and the breeding of varieties, the research project has barely touched on molecular biological research, and zooarchaeological research has yet to start. These two subjects can contribute greatly to future domestication studies.

## **THE FUTURE OUTLOOK**

From a different perspective than molecular biology and zooarchaeology, I would like to note three research themes for future studies based on my personal research interests in investigating the domestication and breeding of varieties of chickens, and their multiple relationships, namely selection by color, cultural clustering of chickens using questionnaire-based surveys, and design based on geographic and cultural barriers.

### **1. Selection by color.**

In Southeast Asia, one key to the study of the domestication and breeding of varieties is probably coloration, such as that of the plumage, shanks, and meat. The results of the research conducted above in Sipsongpanna, Yunnan, China, and Laos, reveal that there is a clear distinction between good color and bad color that is related to whether the chickens are edible (good for health) or unpalatable (cause illness).

For instance, chicken shanks can be broadly divided into two colors: black and yellow. From my experience, most of villagers avoid eating yellow-shanked chickens because yellow may evoke illnesses such as fever, headache, diarrhea, back pain, and so on. On the other hand, black-shanked chickens are preferred for health, being considered good for the sick, helpful in overcoming dizziness, etc., and this kind of chicken is also used for rituals as well as for food.

These preferences have been developed based on customs and beliefs among the ethnic groups in Sipsongpanna and Laos including the Tai Lu, Lao, Jino, Hani, Lahu, Hmong and Khmu. I think it is worth considering these beliefs and customs that may contribute to creating chickens with uniform characters. However, the problem with this theory is that if these traditions are phased out as a result of modernization or urbanization of the villages, this selection process may come to a halt.

### **2. Cultural clustering from questionnaire-based surveys.**

Along with biological data, it is possible to say that quantitative cultural data can also be useful to clarify the cultural similarities of chickens. In this context, I once implemented cultural clustering by conducting questionnaire-based surveys consisting of more than 110 questions on the exploitation of chickens and the livelihoods of more than 40 villages that rear chickens in Yunnan.

The phenogram shown from this questionnaire is based on the idea that chickens reared in various villages represent the culture of those villages. In other words, it aims to compare chickens as cultural creatures, not as living organisms, by comparing the uses of chickens, and the livelihoods, between different villages.

Research that applies this kind of cultural clustering or organizes its results into this kind of phenogram is not necessarily viewed positively by present ethnology. However, visualizing relationships in this way may provide clues to understanding the breeding of varieties and their dispersal patterns as a cultural process.

### **3. Design based on Geographic and Cultural Barriers.**

It might also be useful to view the forms and color schemes as man-made designs and to investigate the ideas behind their creation in particular ethnic groups or areas. There are often geographical barriers such as mountains or rivers present where there are differences among ethnic groups or areas. And this also means cultural segregation. By applying this idea to breeding of varieties of local chickens, it is quite understandable that small differences exist among the same or similar types of chickens.

## **THE ULTIMATE GOALS FOR HUMAN-CHICKEN MULTI-RELATIONSHIP STUDIES**

Finally, I would like to propose the ultimate goals for human-chicken multi-relationship studies. One is to construct a model of domestication and the breeding of varieties, and the other proposal is to preserve chicken breeds.

### **1. Constructing a model of domestication and the breeding of varieties.**

One of the final goals of human-chicken multi-relationship studies is to construct a model of domestication and the breeding of varieties. The model that I wish to propose covers the entire process from what led to human encounters with junglefowl, as the progenitor of chickens, and why humans started to domesticate junglefowl, up to the factors that have led to the variations observed today through artificial selection by form and color. Constructing this kind of model would be helpful in providing insights into domestication and the breeding of varieties as a process. It may also apply to domesticated animals in general.

### **2. Preserving chicken breeds as a living cultural heritage.**

My second proposal is to preserve chicken breeds that inhabit various areas in their existing or preserved forms. According to FAO statistics, of the close to 8,000 registered varieties of livestock in general, around 20 percent are more or less endangered varieties. There are also many varieties that have already become extinct. This is also true of chicken breeds. I think that the existence of diverse varieties of chickens enables the breeding of varieties that suit local conditions and are disease resistant and tolerant.

In that sense, it should be emphasized that chickens, like other domestic animals, are human creations - a living cultural heritage - and I believe that we humans have a responsibility to preserve our creations. However, sometimes when it is difficult to preserve them in living form, conserving carcasses and DNA as preserved specimens would at least enable a proper understanding of what kind of varieties exist at present. I also believe that these specimens would play an extremely significant role in future studies.

As research of this issue is quite complicated, it will take considerable time and effort to clarify these matters. In this paper, I have pointed out some possible proposals for further research activities. However, further research subjects may need to cover areas other than those I have noted here. In order to carry out investigations on these subjects, various views related to surrounding areas of research need to be presented to enable deeper discussions. I hope this occasion will offer one of the opportunities for advancing research into domestication and the breeding of varieties of chickens.