The egg fertility from offspring of crossbreeding results of Bangkok chickens and laying hens.

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Abstract. This study aims to determine the weight, fertility, and hatchability of eggs from the crossbreeding between laying hens and Bangkok chickens. The material used consisted of 15 females of Bangkok chicken, 15 females of laying chicken, 3 males of Bangkok chicken, and 3 males of laying hen. The crossbreeding was arranged in a ratio of 1 male: 5 females using IB (artificial insemination). The parameters measured in the study included egg weight, fertility, and hatchability of eggs from the crossbreeding of laying hens and Bangkok chickens. Data were analyzed descriptively and using T-test to determine the difference in parameters between the crossbreeding of BP (male Bangkok chicken x female laying hens) and PB (male laying hens x female Bangkok chickens). The results showed that there were significant differences (p = 0.05) in egg yields (BP chickens and PB chickens) for egg weight and egg fertility, but there was no significant difference (P> 0.05) for egg hatchability. Egg weight in BP chickens was 56.87g /egg greater than PB chickens 47.09 g/egg. However, egg fertility in PB chickens was 83.33% higher than BP chickens 71.11%.

Keywords: Crossbreeding, Bangkok Chicken, Laying Chicken, fertility

1. Introduction
Demand for local chicken meat that continually increases from year to year cannot be fully met due to the difficulty of getting seeds and slow growth. In local chickens, the availability of quality seeds is still a problem and weakness in raising them. The existing seeds are the result of mating a few strains freely, so it is possible for inbreeding. As a result, they are genetically having slow growth and low egg production. One way to increase local chicken production is by crossbreeding superior local chickens with laying hens, to produce a large number of hatching eggs which will eventually produce a lot of seeds (DOC) as well as fast growth and the taste of the meat is not much different from local chicken meat.

Bangkok chicken is a type of local chicken that originated from Thailand and known as a fighting chicken. Bangkok chicken has the advantage of high adaptability that it can adapt to environmental conditions and climate change, has a large body shape, compact and good muscle structure, and Bangkok chicken meat favored by the community. Laying hens have the advantage of being able to produce eggs in large numbers. Besides, laying hens have a large body frame, so that laying hens can still produce adequate meat. The purpose of this crossbreeding is to combine some of the characteristics that originally found in the two cross-breeds, the formation of new chicken race, grading up, and the use of heterosis.

2. Material And Methods
2.1 Material.
The material used in the study consisted of 15 females of Bangkok chicken, and 15 females of Laying chicken. Bangkok male chickens are three tails, and Lay Eggs male chickens are also three tails. The tools used in this research are 36 box battery cages, 1.5 ml micro-tube size used to hold male chicken semen, 3 ml syringes used for insemination of semen into the female reproductive tract of chickens, analytical scales are used to weigh egg weight and chicks (DOC), hatchery capacity of 100-150 eggs, the machine used is a homemade hatching machine, a candling tool is used to see the fertility and viability of the embryo, NaCl solution used as a chicken semen diluent.

2.2 Methods.

Generally, this research carried out a crossbreeding between a PB chicken (female Bangkok chickens and male laying hens) and a BP chicken (male Bangkok chickens and female laying hens). The crossbreeding was arranged in a ratio of 1 male: 5 females employing IB (artificial insemination). The feed given during this study consisted of 50% milled corn, 15% rice bran, and RK 24 concentrate produced by PT. Charoen Phokphand as much as 35% with 18% protein feed content. Feeding was carried out twice a day, namely in the morning at 07.00 and in the afternoon at 16.00 WITA.

Statistically, the data were analyzed descriptively and the T-test was used to determine differences in parameters between BP crossbreeding (Bangkok male chickens and female laying hens) and PB (male Laying hens and female Bangkok chickens). The variables observed in this study were egg weight, fertility, and hatchability.

3. Result and Discussion

Egg Weight. Chicken egg weights based on the crossbreeding between PB chickens (female Bangkok chickens and male laying hens) and BP chickens (male Bangkok chickens and female laying hens) is presented in Table 1.

| Hatching | Egg Weight (g) |  |
|----------|----------------|---|
|          | PB             | BP            |
| 1        | 47.30±5.19     | 56.13±5.61    |
| 2        | 47.63±5.27     | 57.30±5.07    |
| 3        | 46.33±5.52     | 57.17±5.39    |
| Average  | 47.09±0.68 b   | 56.87±0.64 a  |

Note: Numbers followed by different superscripts in rows and columns show significant differences (p <0.05)

The above data shows that the crossbreeding between PB and BP chickens is significantly different (p (0.05) in egg weight. Egg weight in BP chicken is 56.87 g/item greater than PB chicken 47.09 g/item. The high average weight of BP crossbreeding eggs shows that the crossbreeding was more controlled by the female laying hens, which means that egg weight was more influenced by genetic traits. Several factors that influence chicken egg weight are chicken age, environmental temperature, strain and breed of chickens, nutrient content in rations, chicken body weight, and egg time [1]. Laying Chickens are generally preferred to produce eggs that cause greater egg weight compared to local chickens. Bangkok chickens have an average egg weight of 44.37 g/item [2], while Laying chickens range from 50-60 g/item [3]. Genetic factors influence the length of the ovum growth period so that larger yolks will produce larger eggs [4]. Additionally, the chicken size, age, and nutrition also influence the egg weight [5].
Fertility. Chicken egg fertility based on the crossbreeding between PB chickens (female Bangkok chickens and male laying hens) and BP chickens (Bangkok male and female laying hens) is shown in Table 2.

Table 2. Average Chicken Egg Fertility Results of PB and BP Crossbreeding Based on Hatching Period

| Hatching | Fertility (%) |   |   |
|----------|---------------|---|---|
|          | PB            | BP|
| 1        | 86.67         | 70.00|
| 2        | 80.00         | 66.67|
| 3        | 83.33         | 76.67|
| **Average** | **83.33±3.33^a** | **71.11±5.09^b** |

Note: Numbers followed by different superscripts in rows and columns show significant differences (p <0.05)

The data in (Table 2) shows that the crossbreeding between PB chickens and BP chickens is significantly different (p˂0.05) on egg fertility. Egg fertility influenced by inheritance factors such as race, strain, environmental factors, and management factors [6]. Meanwhile, the factors that affect fertility are male quality, parentage, production, and feed quality. Other factors that can affect fertility include nutrients, sperm motility, and the percentage of sperm cells that are abnormal or dead [7]. Nutrition factors such as lack of vitamin E in food can cause eggs to become infertile. Sperm motility is agile and can fertilize so that fertility will be high and abnormal sperm can affect fertility [8]. PB chicken egg fertility data has an average percentage of 83.33% higher than BP chicken, with an average percentage of 71.11%. The results of this study indicate that crossbreeding between male Bangkok chickens and female Laying hens have improved fertility because the crossbreeding can reduce homozygous genes and increase heterozygotes. Therefore, the crossbreeding is one of the alternatives to form offspring which is expected to have a complementary effect (complementary influence) [6].

Hatchability. The hatchability of chicken eggs based on the crossbreeding between PB chickens (female Bangkok chickens and male laying hens) and BP chickens (male Bangkok chickens and female laying hens) can be seen in the following.

Table 3. Average Hatchability of Chicken Eggs from PB and BP Crossbreeding Based on Hatching Period

| Hatching | Hatchability (%) |   |   |
|----------|------------------|---|---|
|          | PB               | BP|
| 1        | 90.48            | 86.67|
| 2        | 90.00            | 93.75|
| 3        | 81.25            | 85.71|
| **Average** | **87.24±5.19^a** | **88.71±4.39^a** |

The data in Table 3 shows that the crossbreeding between PB chickens and BP chickens is not significantly different (p,00.05) in egg hatchability. This indicates that hatchability is not significantly influenced by the chicken race, but it is influenced by other factors such as the quality of broodstock seeds and hatchery management. The technical factors that influence hatchability that is when selecting the eggs to be hatched (egg shape, egg weight, eggshell condition, air space in the egg, and duration of storage), operational techniques of the officer when running the hatching machine (temperature, humidity, air circulation, and egg turning), and factors that are related to the
broodstock seeds [9]. Throughout the hatching process, the results obtained are usually able to hatch all the eggs, even though there are some eggs that sometimes may be left and cannot be hatched. These are a result of the factors that affect hatchability, including the influence of the season, especially in the rainy season, because the humidity is too high causing many rotten eggs [10]. The same temperature and humidity also cause relatively the same hatchability. Temperatures that are too high can cause neurological disorders, heart, respiratory, kidney, and membrane of the embryo to dry so that it kills the embryo while the low temperature at hatching causes disproportionate growth [11].

4. Conclusion
The crossbreeding between PB chicken and BP chicken was significantly different (p<0.05) on egg weight and fertility, but not significantly different (p>0.05) on egg hatchability.

5. References
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