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MEAT RABBIT PRODUCTION IN CENTRAL, WESTERN AND EASTERN THAILAND: SOCIAL NETWORK AND CURRENT STATUS

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ABSTRACT

Forty-one rabbit farms, three laboratory animal centers and two slaughterhouses were interviewed to study on social network and to reveal current status of meat rabbit production in Central, Western and Eastern Thailand. Two slaughterhouses are key actors in the social network which are based in the middle of farmers. Wood planks, ferrous metals and welded mesh are used to build cages inside open-housing system. Restriction of commercial pelleted diets at 70-80% is practiced with or without tropical forage supplementation. Lactating does and fattening rabbits at late periods are fed *ad libitum*. New Zealand White, Flemish giant and their crossbreeds are normally used. Rabbit production in Thailand is an extensive system without artificial insemination. Re-breeding is performed at 30-35 days after kindling with 35-45 weaning days. The length of fattening period is 75 days to reach slaughter weight at two kilograms. There is a little use of medication during the production. Around 17,000 fattening rabbits were produced per year from this study network. The demand is higher than supply which is suggested by the slaughterhouse owners. Rabbit meat is sold to local markets, hotels, restaurants and commercial stores, whereas rabbit faeces are used as fertilizers. A further study on market size and productivity throughout Thailand should be performed to understand consumer demand and to set up promotional strategies.

Key words: Management, Rabbit production, Social network, Status, Thailand.

INTRODUCTION

The characteristics of rabbit meat are protein rich, moderately high energy value, low sodium, high phosphorus, very low MUFAs, high PUFAs, appropriate PUFA/SFA ratio, rich in omega-3, low cholesterol and low omega-6/omega-3 ratio which are recommended for cardiovascular patients and are considered as healthy meat (Dalle Zotte and Szendrő, 2011). These benefits promoted a higher number of consumption rates, farmers and a better perception which continuously increased World rabbit production (FAOSTAT, 2015). Thailand is divided into six regions which are Northern, Northeastern, Western, Central, Eastern and Southern region and is located in the tropical area containing three seasons which are rainy (mid-May to mid-October), winter (mid-October to mid-February) and summer (mid-February to mid-May; Thai Meteorological Department, 2015). The rabbit production for meat in Thailand was widely promoted by the government and universities between 1975 and 1987 (Worawan et al., 1985). There were a large number of researchers, publications, conferences and workshops but they significantly decreased after 1988. Fortunately, farms from the promoting period have continued production until now. Therefore, the understanding on current status and their social network can provide important information for researchers and government to establish support strategies for rabbit production in Thailand.

To study and reveal the social network and current status of meat rabbit production in Central, Western and Eastern Thailand was the aim of this article.

MATERIALS AND METHODS

Methodology of survey and data interpretation

The study area was conducted in central, western and eastern region of Thailand including 11 provinces (Bangkok: BK, Chonburi: CB, Chachoengsao: CC, Kanchanaburi: KB, Kamphaeng Phet: KP, Nakhon Nayok: NN, Nakhon Pathom: NP, Nakhon Sawan: NS, Pathum Thani: PT, Phetchaburi: PB and Ratchaburi: RB). Information on history, management system (housing, feed, feeding, reproduction and health), productivity, marketing and farmer's suggestion obtained from people who involved on meat rabbit production by questionnaires, field survey, personal observation, publication and personal interview by participatory approach from January to August 2015. Information from the different sources was carefully interpreted to represent results as an informative blend.

Social network analysis

Snowball sampling technique was used to select the nodes which were meat rabbit farms inside the study area and ties indicated interactions between the nodes. Two main slaughterhouses were used to start the network. The study involved a total of 41 farms, 3 laboratory animal center and 2 slaughterhouses. NodeXL (Network overview for discovery and exploration in Excel; <http://www.codeplex.com/NodeXL>; Smith *et al.*, 2009) was used to construct a sociogram (Figure 1) and to calculate degree, closeness and betweenness centrality of each individual node.

RESULTS AND DISCUSSION

Social network of rabbit production

Farms and laboratory animal centers were divided into small- (<50 reproductive does) and medium-sized (≥ 50 reproductive does) which were 36 and 8, respectively. A high degree of closeness and betweenness centrality were observed in KB1 and NP1 which were a center of this network which contained around 400 and 100 reproductive does, respectively. The owner of these farms is also the slaughterhouse owner. KB1 and NP1 have an agreement and guarantee the price with small-sized farms to buy fattening rabbits. Interestingly, the small-sized farms did not have relationship across KB1 and NP1 except NN1. Parent stocks for breeding were purchased from BK1, NP3 and NP7 (a laboratory animal center belonging to university) by KB1 and NP1. Fattening rabbits were taken by the slaughterhouse owner when farmers have around 200 rabbits. Medium-sized farms (KP1, NS1 and PB1) did not contact other farms because they can produce enough fattening rabbits, whereas small-sized farms (CB1, PT1 and NN1) need to establish relationships with other farms to reach the number. Most of small-sized farms were located in PB. Two slaughterhouses (KB1 and NP1) were represented as the main actors in the social network of rabbit production in central, western and eastern region of Thailand which are involved in breeding, fattening, slaughtering and selling meat to markets.

Housing, feeds and feeding

Open system with gable roof is common housing in Thailand. Large deciduous tree are planted covering the roof, whereas banana tree (*Musa acuminata* Colla, *Musa balbisiana* Colla or hybrid breed) are placed around the housing to prevent heat because ambient temperature may reach 40°C (Thai Meteorological Department, 2015). Water is pumped up to the roof to decrease the temperature during summer season. Top-opening rectangular cages (70-120 x 60-80 x 35-45 cm) are installed closely together with one level. Alternation between wood planks (three cm) wide and empty space around 1 cm are placed as a cage floor. Wall and top of cages are built by welded mesh with wood or ferrous metal structure.

Bucks, does and fattening rabbits are kept in the same cage size and type. Few farms have concrete floor because there are high investment costs and unpleasant smell when farmers do not clean daily associated with them. An excretion is normally left on the ground and is removed every two to four weeks. Earthenware is used for serving feed pellets because of its low cost and rabbits cannot turn them over. Inverted water-bottle drinkers or water pipe with nipple drinkers are constructed. Balanced

commercial pellet diets are distributed throughout the study area. Feed restriction at 70-80% was practiced by providing feed once in the morning, except for lactating does and fattening rabbits which are fed *ad libitum* at late periods. Medium-sized farms use only commercial pellets because it is easy for management. Tropical forage (*Brachiaria mutica*, Forssk.) supplemented *ad libitum* in small-sized farms to reduce the cost and to prevent digestive disorders. High protein legume leaves (*Leucaena leucocephala* Lam.) provides around 5-8% of total feed intake to avoid adverse consequences.

Breed and management program

New Zealand White, Flemish giant and their crossbreeds are used for meat production. The ratio between male and female is around 1:10. Natural mating is performed when does are 5-6 month old, whereas artificial insemination is not practiced in Thailand. In small-sized farms, the mating is performed once in early morning (05.00) when observing red swelling vulva by individual inspection every week, whereas twenty does are mated with twenty bucks (one by one) as a batch breeding program which is discovered in medium-sized farm. Pregnancy is confirmed by abdominal palpation after 10 days after mating. Non-pregnant does are mated immediately after the detection. Kindling box is entered at 28 days of gestation. The milk line is used as indicators for nursing and checked after kindling.

The kits are separated for fattening at 35-45 days old and cross-fostering is applied. Re-breeding is performed 30-35 days after kindling. Most of the farmers do not mate rabbits at mid summer season (March-April) because there is a low fertility due to the high temperatures. Weaning female rabbits are kept as replacement does, whereas bucks are bought from other farms or laboratory animal center to prevent inbreeding and optimize the performances. Two kg of rabbits are sold to a slaughterhouse after 75 days of fattening period.

There is little use of medication in rabbit production. Ivermectin is used to prevent infestation of *Psoroptes cuniculi* in summer. Enrofloxacin or oxytetracycline is injected to rabbits with respiratory and gastrointestinal problems, but these diseases are rarely occur. The housing floor is sprayed with disinfectants every 3-6 months.

Productivity and marketing

The productivity parameters were received from the interview which were 4-5 litters/doe/year, 5-7 kits/litter, 70-80% of fertility rate and <5% of pre-weaning mortality. Breeding does and bucks was used for around 4 years because an extensive reproductive program was performed. The major causes of culling are infertility and abandonment in nursing which culling rate is around 15% per year. Low post-weaning mortality (less than 5%) should be due to a feed restriction technique and a forage supplementation (Gidenne et al., 2009).

The difference of rearing condition between control temperature (25°C) and open housing on growth performances were clearly observed (average daily feed intake: 95±8.21 vs 80±10.9 g/d, average daily weight gain: 32.8±4.21 vs 20.2±5.38 g/d and feed conversion ratio: 2.91±0.18 vs 3.91±0.38; respectively; Personal data). Rabbit skins are sold for fur garment industry and their faeces were used as fertilizers. Around 17,000 fattening rabbits were produced per year from the study network. The main objective of rabbit production in Thailand is for selling as meat product and not for consumption by farmers. From the interview of slaughterhouses, the owner said “demand of rabbit meat is still higher than supply”.

The slaughterhouse’s owners contact directly to local markets, hotels, restaurants and commercial stores for selling rabbit meat. Social or religious beliefs have influences on the consumption of rabbit meat. Boonprasert et al. (1980) studied rabbit meat perception of 1,186 Thai people who lived in Bangkok by questionnaires. Only 17.5% have eaten rabbit meat and 76.3% of them preferred to consume it again. Inability to find a selling place (60.5%) and considering rabbits as pets (39.5%) are the causes of uneaten rabbit meat.

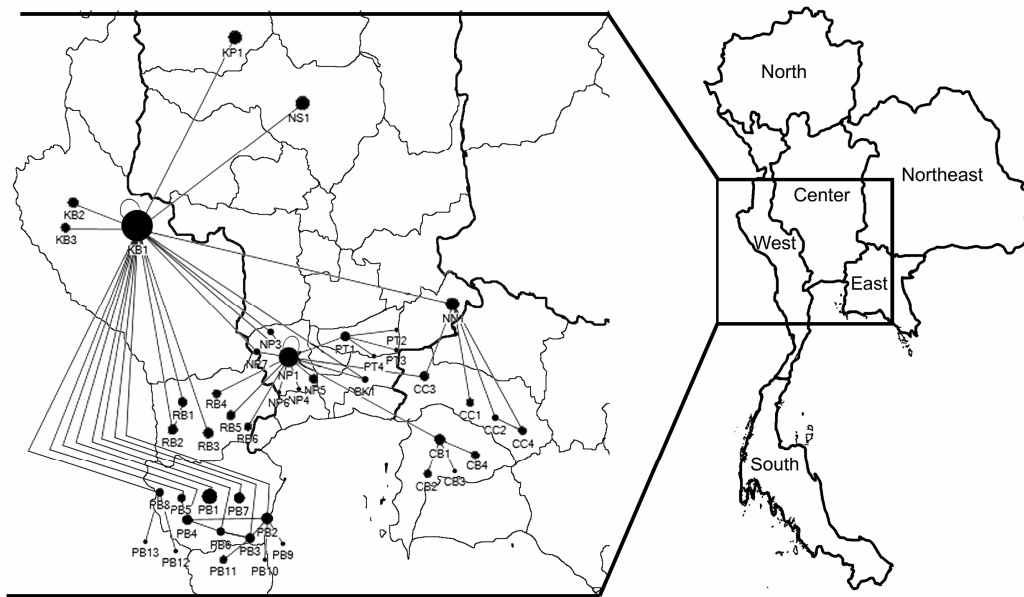


Figure 1: Social network of meat rabbit farms in Thailand (Node size represents number of reproductive does; nodes are not placed exactly in the same location of the farm, but they are placed in the same province of their location).

CONCLUSIONS

This article presented the social network and current status of rabbit production in Central, Western and Eastern Thailand. An extensive reproductive program was practiced. The productivity should be increased by development on breed, reproductive management, housing, diets and marketing. The study on market size and productivity throughout Thailand should be interesting topics to perform for understanding consumer's demand and to launch appropriate promotional strategies.

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