



International Seminar on Animal Industry 2012

**FACULTY OF ANIMAL SCIENCE
BOGOR AGRICULTURAL UNIVERSITY**

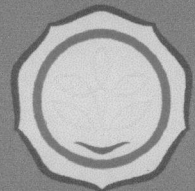
THE SECOND INTERNATIONAL SEMINAR ON ANIMAL INDUSTRY
**"Empowering Local Resources for Sustainable Animal Production in Adapting
to Climate Change"**

5-6 July 2012
Jakarta Convention Center, Jakarta-Indonesia

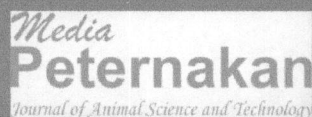
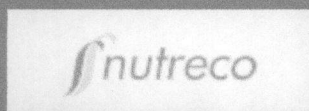
PROCEEDING



Organized by:



Supported by:



PROCEEDING

The Second International Seminar on Animal Industry

“Empowering Local Resources for Sustainable Animal Production in Adapting to Climate Change”
Jakarta Convention Center, Jakarta-Indonesia, 5-6 July 2012

LIST OF EDITORS

Scientific Editors

Chief : Prof. Dr. Ir. Dewi Apri Astuti, MS.
Member : Prof. Dr. Ir. Komang G. Wiryawan
Prof. E. R. Orskov
Prof. H.M. Shelton
Prof. Jong K. Ha
Prof. Dr. Ir. Wasmen Manalu, M.Sc
Prof. Dr. Ir. Ronny R. Noor, M.Rur. Sc.
Prof. Dr. Ir. Muladno, MSA
Prof. Dr. Ir. Cece Sumantri, M.Sc
Prof. Dr. Ir. Toto Toharmat, M.Sc
Dr. Sri Suharti, S.Pt., M.Si.
Ir. Anita S. Tjakradidjaja, M.Rur.Sc.
Tuti Suryati, S.Pt., M.Si.

Technical Editors

: Irma Nuranthy Purnama, S.Pt.
Nur Hidayah, S.Pt.
Titis A. P. Apdini, S.Pt.

List of Reviewers

Prof. Dr. Ir. Dewi Apri Astuti, MS.	Dr. Despal, S.Pt., M.Agr.Sc.
Prof. Dr. Ir. Komang G. Wiryawan	Dr. Anuraga Jayanegara
Prof. E. R. Orskov	Dr. Ir. Dwierra Evvyernie, MS
Prof. H. M. Shelton	Dr. Ir. Henny Nuraini, M.Si.
Prof. Jong K. Ha	Dr. Ir. Idat Galih Permana, M.Sc
Prof. Junichi Takahashi	Dr. Irma Isnafia Arief, S.Pt., M.Si.
Dr. John B. Moran	Dr. Ir. Luki Abdullah, M.Agr.Sc.
Prof. Dr. Ir. Muladno, MSA	Dr. Ir. Panca Dewi MHKS, MS
Prof. Dr. Ir. Ronny R. Noor, M.Rur. Sc.	Dr. Ir. Rarah Ratih A.M, DEA.
Prof. Dr. Ir. Toto Toharmat, M.Sc	Dr. Ir. Rita Mutia, M.Sc.
Prof. Dr. Ir. Wasmen Manalu, M.Sc	Dr. Rudi Afnan, M.Sc.Agr.
Prof. Dr. Ir. Erika B. Laconi, MS	Dr. Ir. Rudy Priyanto, MSc.
Prof. Dr. Ir. Iman Rahayu, MS	Dr. Sri Suharti, S.Pt., M.Si.
Ir. Anita S. Tjakradidjaja, M.Rur.Sc.	Dr. Ir. Sumiati, M.Sc.
Tuti Suryati, S.Pt., M.Si.	Dr. Ir. M. Yamin, M.Agr.Sc
Dr. Ir. Asep Sudarman, M.Sc.	Dr. Ir. Yuli Retnani, MS
Dr. Ir. Asnath M. Fuah	

Faculty of Animal Science, Bogor Agricultural University

Jln. Agatis, Kampus IPB Darmaga, Bogor 16680 Indonesia
Phone: +62 251 8620553; Fax: +62 251 8620553/ 8622842
e-mail: isai_ipb@yahoo.co.id

Effect of Climate Change on Livestock Production in Pakistan. Muhammad Younas, Kashif Ishaq & Iftikhar Ali.....	555
Performance of Pre-weaning Javanese Thin-Tail Lambs under Semi-Intensive Management at Different Age and Sex. M. Baihaqi, S. Rahayu, & Y. Saputra...	563
ANIMAL PRODUCT'S TECHNOLOGY	569
Protein Quality of Fermented Beef by <i>Lactobacillus plantarum</i> 1B1. I. I. Arief, R.R.A. Maheswari, T. Suryati, & N. Kurniawati.....	571
Cashmere Quality of Racini Goats Kept by Nomads in Iran. H.R. Ansari-Renani, J.P. Mueller, B. Rischkowsky, S.M. Seyed Momen, O. Alipour, M. Ehsani, S. Moradi	577
Properties of Salt Coagulated Cheese Produced by Calcium Chloride and Calcium Propionate. Aphirak Phianmongkhol & Tri Indrarini Wirjantoro.....	583
Wool Fibre of Local and Crossbred Sheep: Production, Processing Technique and Performance. Mohamad Yamin & Sri Rahayu.....	589
Fiber Quality of Carpet-wool Sheep Breeds. H. R. Ansari-Renani, S. Moradi.....	595
Training Programme of Biogas to Minimize Environmental Pollution in the Tempok Village Sub Tompaso District. Femi H. Elly	602
Microbiological Characteristic and Antimicrobial Activity of Koumiss Against <i>Salmonella typhimurium</i> and <i>Mycobacterium tuberculosis</i> . R. Yahya, R. R. A. Maheswari, & R. H. Mulyono	608
Potency of Wool Handicrafts Production in Indonesia. Mohamad Yamin & Sri Mulatsih	614
Physical, Chemical, and Microbiological Characteristics of Healthy Drink that Contains Honey and Duck Egg Yolk in Difference Age. Z. Wulandari, R.R.A. Maheswari, & S.M. Anggraini	620
Microbiological Quality of Probiotic Yoghurt Jelly Drink During Storage in Refrigerator. Adhitama, G.S., R.R.A. Maheswari, & Wulandari, Z.....	627
Tenderness and Cooking Loss of Yearling Brahman Cross and Mature Ongole Cross Beef Treated Tenderizing Method. Tuti Suryati, Irma Isnafia Arief, & Bernadeth Nenny Polii.	632
SOCIAL ECONOMICS AND POLICY IN ANIMAL PRODUCTION	639
Productivity of Kalung Crickets (<i>Gryllus bimaculatus</i>) Cultivation (Case Study in Central and East Java). Rahmawati, Y. P., H. C. H. Siregar, L. Cyrilla.....	641
Public Perception in Thai Native Chicken (Pradu Hang-Dum Chiang Mai) via Food Contests. Aphirak Phianmongkhol, Tri Indrarini Wirjantoro, Charan Chailungka, Chartri Prathum & Amnuay Leotaragul.....	646

Productivity of *Kalung* Crickets (*Gryllus bimaculatus*) Cultivation (Case Study in Central and East Java)

Y.P. Rahmawati, H. C. H. Siregar¹⁾, & L. Cyrilla²⁾

¹⁾Department of Production Science and Technology Faculty of Animal Science,
Bogor Agricultural University, Bogor 16680 Indonesia

²⁾ Department of Production Science and Technology Faculty of Animal Science,
Bogor Agricultural University, Bogor 16680 Indonesia,
e-mail:luci_usmar@yahoo.co.id

Abstract

The research was conducted to analyse technical and economical of Kalung crickets cultivation productivity and to analyse any factors that influence them. The research was conducted in Central Java (Demak, Kudus, and Purwodadi) and East Java (Tulungagung, Kediri, and Porong) from March 3rd until March 12nd, 2010. The research consisted of two stages: (1) determination of research area and the number of samples and (2) data collection. Survey method was used in this research and the samples were selected purposively based on farm scale and farmer's experience. The farm's productivity, income and R/C ratio were analysed descriptively. The average of cricket's production in Central and East Java were 9.78 and 12.69 tons/year respectively. Technical productivity in both provinces was not different, in contrary to economical productivity. The average income in Central Java was IDR 134,714,300.00 or 72.21% from IDR 186,566,666.00 revenue, while in East Java was IDR 149,899,333.00 or 58.56% from IDR 255,960,000.00 revenue. The R/C ratios in both provinces were more than one which meant the enterprises is profitable and feasible economically. The value of R/C ratio in Central Java (3.5) was higher than East Java (2.6). Low R/C ratio value in East Java was caused by high cost in feed, equipment and cage. The farmers should utilize local resources optimally.

Key words: income, kalung crickets (*Gryllus bimaculatus*), productivity, R/C ration

Introduction

Crickets are animal from insects class that has great potential to be developed as a protein resource in livestock feed. Some researchers have showed that cricket has high protein content (61.58%) with a fairly complete amino acid (Novianti, 2003). Tremendous potential of crickets is what makes the community of Central Java and

East Java Province attempted to cultivate cricket so that the area is renowned as a centre for the cultivation of crickets. The research objectives were to evaluate the productivity of the cultivation of *Kalung* crickets technically and economically as well as the factors that affect the productivity of *Kalung* crickets cultivation.

Materials and Method

The research was conducted in the community of *Kalung* cricket's cultivators in Central Java (Purwodadi, Demak, Kudus) and East Java (Tulungagung, Kediri, Porong). Research was carried out for two weeks, from March 3 to 12, 2010.

The materials used in this study were stationery, thermometers, cameras, and questionnaires to obtain primary data cultivation of *Kalung* crickets in the farmer's community. Primary data was collected using a questionnaire through direct interview with respondents. The respondents were purposively selected in each region; one person was taken of each region. Selected farmers are cricket's cultivators that have greatest and longest cultivated for more experienced and skill of the cultivation of crickets. Secondary data was obtained from the literature and report documents from related government agencies.

This research was designed as a survey. Descriptive analysis was used to describe the characteristics of cricket's cultivation techniques, cricket's productivity, and income analysis.

Results and Discussion

Kalung Crickets Cultivation Techniques

Kalung cricket's hatching eggs are usually derived from their own cultivation or some were obtained from cicada eggs merchants. Egg harvesting is done using a strainer or sieve to separate the eggs from the sand and dirt. Harvesting is done every day. Eggs that have been harvested then incubated for hatching. Meanwhile the media is returned to the nesting box for brood stock maintenance. This must be done to anticipate the possibility if not the entire parents spawning. Examination of spawning media is done every 3-4 days. The characteristic of a good quality cricket's eggs are cream-colored, translucent, shiny, clean, not dingy, and warm when wrapped (Paimin, 1999; Paimin *et al.*, 1999). Cricket's cultivators use cloth, sand, and sawdust for hatching media. The relative humidity required for hatching eggs range between 65-80%, with air temperature 26 °C. Temperature and relative humidity needs to be maintained to prevent the hatching failure caused by poor egg quality, unsuitable moisture and many predators. Nymph's maintenance is important in cricket's cultivation.

Cultivators in Central Java use cages made of bamboo and plastic, while in East Java they used cages made of wood and plywood. There are two type of box,

open and closed or compound and no compound. Selection of the type is more due to the ease of feeding and drinking, maintaining, harvesting, cleaning cages and for the prevention from predator. The crickets are placed in an area free from direct sunlight and complemented with a hiding place, made of dried banana leaf or egg tray. Observation in the field showed that the cage cleanliness was maintained properly. Farmers always change the hiding media and the cultivator used pedestal in feeding their crickets. Cages were also prevented from predators such as lizards, ants, mice and other animals by covering the cage with gauze, cloth, anti-ants chalk or putting mat containing kerosene or used motor oil on each foot cage. The average size of the cage for 4000 crickets per cage in Central Java was 250x112x50 cm and 230x112x58 cm in East Java. Cage density in both provinces was lower than the density reported by Widyaningrum (2001) that was 5000 crickets in every cage. This cage density affected the cricket's mortality. Problems that affect cricket's mortality are low hatchability, cage's density, unsuitable temperature, dwarfism, cannibalism, disease and death-smelling diarrhea.

Crickets feed on Central and East Java consisted of concentrate and forage. Cultivators used laying quail or broiler feed for cricket's concentrate. Forages used by farmers in Central and East Java, were banana stems, squash, cassava leaves, thorns cottonwood leaves, cabbage leaves, grass, mustard greens, fruits and stems of papaya. Variation of forage feed depended on the forage resources available in each area. Vita chick and vitamins were commonly given when the environmental conditions of cultivation was not good.

Cricket's Productivity

Technical productivity of the cultivation of *Kalung* crickets in Central and East Java vary in each production period. This is due to many factors that influence cultivation such as temperature and humidity environment, predators, egg quality, feed quality, and cultivator's management skills (Widyaningrum, 2001; Praditya, 2003; Fitriyani, 2005). The average production in Central Java was 9.78 tons/year, which was lower than in East Java (12.69 tons/year) (Table 1). Average production in East Java crickets was higher due to better management of cultivation.

Income Analysis

Farm income analysis (Table 1) showed that the average income per year cultivators in Central Java was Rp134,714,300.00 and Rp149,899,333.00 for cultivators in East Java. Feeding cost in Central Java was Rp8,000,000.00 and in East Java was Rp27,712,000.00. The cost of feed in East Java needs to be reduced through the use of local resources to increase benefit. Equipment cost in East Java is also higher (Rp17,892,000.00) than in Central Java (Rp216,000.00). The analysis showed that in Central Java the largest proportion of variable cost was cost of labor (46.29%) and hatching eggs (30.23%), whereas in East Java was the cost of feed (26.13%),

Table 1. The characteristics and productivity of kalung cricket's cultivation

Indicator	Central Java	East Java
Average production	9.78	12.69
Scale	Large	Large
Average initial scale (box)	18	4
Average scale during research (box)	38	28
Business typology	Main (33,3%) Part-time (66,7%)	Main (100%)
Capital	Self-equity	Self-equity
Harvest time	Every 32 days	Every 27 days
Harvest frequency	8 times/year	More than 10 times/year
Packaging material	Plastic bag	Plastic bag & box
Packaging size	2 kgs/pack	According to consumer's demand
Marketing target	Collectors	Retailers, consumers
Marketing area	Inside the region	Inside & outside the region
Average farm gate price (Rupiah/kg)	19,166.67	19,500.00
Payment system	Delayed (in 1 weeks)	Cash & delayed (in 2 days)
Revenue (Rupiah)	186,566,666	255,960,000
Cost (Rupiah)	51,852,366	106,060,666
Profit (Rupiah)	134,714,300	149,899,334
Revenue/Cost Ratio	3.5	2.6

labor (25.08%), and equipment (16.87%). The percentage of hatching eggs cost in Central Java was high because 33.3 per cent cultivators bought eggs from cicada eggs merchants. Production cost in *Kalung* crickets was affected by farm scale, and wage rate in each region. Fixed costs consist of depreciation of cage and equipments. The average cricket's prices in Central Java was Rp19,166.67/kg, while in East Java, the average price was Rp19,500.00/kg. The farmers stated that they will get a break-even if the price of crickets was not less than Rp10,000.00 per kg. Revenue-Cost Ratio (R/C) of *Kalung* cricket's cultivation in Central Java and East Java was 3.5 and 2.6, respectively. Value of R/C ratio is more than one indicates that the cultivation of *Kalung* crickets that cultivators in Central Java and East Java run this business profitable and viable, despite fluctuations in the price of each harvest period (Hernanto, 1993; Soekartawi, 1995).

Conclusion

The productivity of *Kalung* cricket's cultivation in Central Java and East Java provinces technically was not different. Farm income analysis showed that *Kalung* cricket's cultivators in East Java get higher income than cultivators in Central Java. The R/C ratio in both location was more than one, means that *Kalung* cricket's cultivation is economically profitable and feasible to run.

Cricket's farmers in East Java are necessary to save the cost of feed, through the use of local resources without reducing the productivity of crickets. Similar research can be done by larger number of farmers and areas included so we can get more accurate data to increase productivity and income of cricket's cultivators in the future.

References

- Fitriyani, J. 2005. Performance of *Kalung* crickets (*Gryllus bimaculatus*) in cages with and without smearing mud and insulation. Thesis. Faculty of Animal Sciences. Bogor Agricultural University, Bogor.
- Hernanto, F. 1993. Farm Management. Penebar Swadaya, Jakarta.
- Mukson, E. Prasetyo, B. M. Setiawan & H. Setiawan. 2005. Analysis of factors that influence the development of farms in Central Java. Journal of Social Economics of Livestock. Vol 1. 31-37.
- Novianti, J. 2003. The chemical composition of *Kalung* cricket's (*Gryllus bimaculatus*) flour at various age and different drying temperatures. Thesis. Faculty of Animal Sciences. Bogor Agricultural University, Bogor.
- Paimin, F. B. 1999. Overcome the Problem of Crickets. 1st Edition. Penebar Swadaya, Jakarta.
- Paimin, F. B., I. E. Pudjiastuti & Erniawati. 1999. Successful Cricket's Breeding. 1st Edition. Penebar Swadaya, Jakarta.
- Praditya, A. A. 2003. Optimization of *Kalung* cricket's management in brooding period. Thesis. Faculty of Animal Sciences. Bogor Agricultural University, Bogor.
- Soekartawi. 1995. Farm Analysis. UI-Press, Jakarta
- Widyaningrum, P. 2001. Effect of solids spreader and the type of feed on the productivity of three species of ideal cultivated crickets. Dissertation. Graduate Program. Bogor Agricultural University, Bogor.