

Bovine Immunoglobulin E Levels of Bali Cattlesin Bangli and Nusa Penida island Bali Province, Indonesia

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Abstract. The aim of this research was to detect identify levels of Bovine Immunoglobulin E (BoIg.E), can be used as an indicator of response immune in bali cattle. Eighty serum samples were collected from Nusa Penida and Bangli region. Bovine Ig.E levels was measured using a commercial Enzyme Linked Immunosorbent Assay (ELISA) Kit. The data were analysis based on differences of farming characteristics andgeographic. The result of research that, of BoIg.E level of bali cattle kept in Bangli (34.16258 ng/ml), was higher than Nusa Penida (22.26047 ng/ml). We conclude that there was a significant effect of differences of farming characteristics and geographic conditions.

Key words: Bali cattle, Bovine Immunoglobulin E, Nusa Penida island, Bangli regency

I. INTRODUCTION

Bali cattle is an indigenous cattle breeds in Indonesia [1]. One of the important beef cattle breeds and the most predominant genotype within the eastern islands, e.g. in Bali, East Nusa Tenggara and West Nusa Tenggara provinces [2]. Bali cattle is a direct descendant of wild banteng (*Bos javanicus*), in Indonesia still available in Baluran National Park, East Java [3]. Therefore, it is important to increase reproduction and productivity and be kept purity. This breed is predominant in Indonesia, due to its resilience in tropic condition [4].

In Bali Province, bali cattle was reared in three different types of preservation areas in Bali Province namely gardens, fields and cultivated lands. In Nusa Penida Island was founded by the government as a breeding center of pure bali cattle. Bali cattle was raised in Nusa Penida in fields and cultivated lands with semi-extensive, meaning that the animal was partially stored in a stall with irregular weeds [5][6]. The other region of Bali Province for example in Bangli regency, bali cattle rare in with intensively management keep install and given additional feed, like mineral mixed.

Besides the differences on type of raising, geographic conditions between two regions are also different. Nusa Penida is an island with sloping and hilly land, tropical climate with low intensity of rainfall (1562.67 mm/year), air temperature ranged on 30,9°C (RPJMD, 2008). While Bangli is one of the high lands in Bali, with relative air temperature ranged between 150 - 300C, high intensity of rainfall, specifically: 3.500 mm/year. The differences on geographic and ways of management, caused a difference on immune response [7]. Proven by the fact that the bali cattle in Nusa Penida was free of Jembrana disease and Septicemia epizootica diseases.

A good immune response marked by how the animal's resistance to disease. As an indicator is the appearance of antibodies in the body that can be measured in the form of immunoglobulin existence. There are five classes of immunoglobulins: IgG, IgA, IgM, IgD and IgE [8]. The Immunoglobulin E (BoIgE) is most commonly associated with allergic disease and believed to mediate an exaggerated and/or mal-adaptive immune response to antigens[9]. IgE is extremely biologically active despite the low concentrations in the circulation [10].

Here we describe the level of bovine IgE in bali cattle in various method of raising in Bangli and Nusa Penida islands. The two separated islands represent different geographic, land fertility and cattle raising practices.

RESEARCH METHODS

Eighty serum samples of bali cattle from each area were selected using random sampling in two area. In Nusa Penida, namely, Batumadeg and Ped, and Bangli, namely Sale and Bebalang villages. The whole blood was drawn from jugular vein and collected using venoject10 ml vacuum tube without an anticoagulant agent, and followed by serum isolation

Immunoglobulin E measurement

The BoIg.E was measured using *Bovine Immunoglobulin Enzime Linked Immunosorbent AssayKit* [11], and conducted in accordance to the protocol described. Briefly, Bring all reagents to room temperature. Dilute the standard: pipette 50µl standard dilution in each tube. Pipette 100µl standard (900 mg/ml) in the first tube and take out 100µl from the first tube into the second. Pipette 50µl from the second tube to the third tube.

Repeat each of the concentration to get the mean value of each well. Pipette standard 50 μ l to testing standard well. Set blank wells separately (blank comparison wells don't add sample and HRP-Conjugate reagent, other each step operation is same). Pipette sample dilution 40 μ to testing sample well, then add testing sample 10 μ (sample final dilution is 5-fold), pipette sample to wells, don't touch the well wall as far as possible, and mix gently. Incubate: cover with the adhesive strip provided, incubate for 30 min at 37 $^{\circ}$ C, Configure liquid: dilute wash solution 30-fold with distilled water. Washing: uncover the adhesive strip, discard liquid, pipette washing buffer to every well, still for 30s then drain, repeat 5 times. Add enzyme: pipette HRP-Conjugate reagent 50 μ l to each well, except blank well. Incubate:

operation with, Washing: operation with 5, Color : Pipette Chromogen Solution A 50 μ l and Chromogen Solution B to each well, avoid the light preservation for 15 min at 37 $^{\circ}$ C. Stop the reaction if the blue change to yellow. Read absorbance at 450nm after pipetting Stop Solution within 15min.

RESULTS AND ANALYSIS

The profile of individual cattle based on type of raising and geographic conditions are presented in figure 1. The figure indicate that the individual Bovine Ig.E level was mixed population which tends to be higher in Bangli regions bali cattle. We found that the BoIg.E level of bali cattle kept in Bangli area: 34.16258 η g/ml and Nusa Penida area: 22.26047 η g/ml.

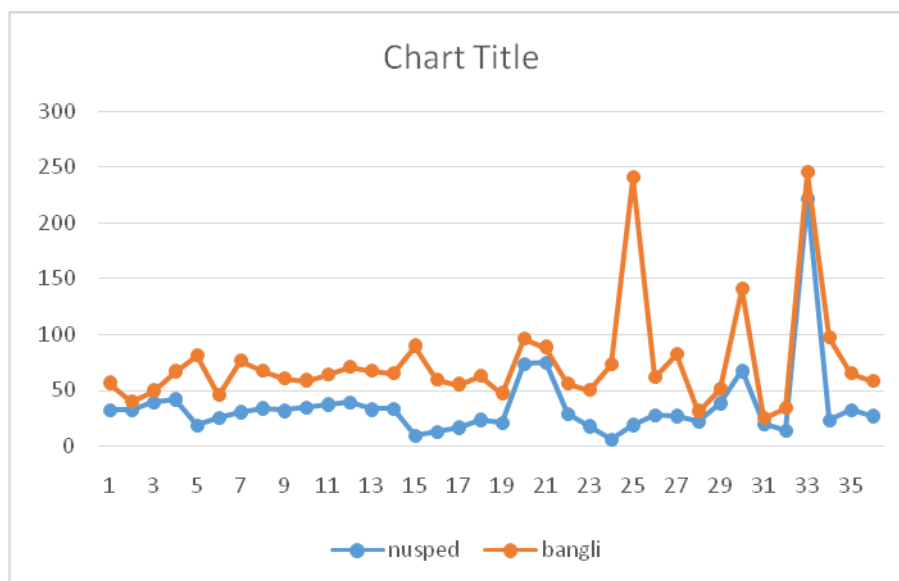


Figure 1. BoIg.E. levels of Bali Cattle in Bangli and Nusa Penida island

The BoIg.E level of bali cattle kept in Bangli area was higher than Nusa Penida. This is caused by the differences to the management of bali cattle, nutrients, and geographical conditions. Bali cattle in Nusa Penida with free grassing animal raising practices, and in Bangli keeping animal in the stall and given a mineral mixed.

The differences ways of treating caused difference at the intake of nutrients absorbed by the bali cattle. Bangli regency is a region with plantation and fertile soil. It soils fertility related with the presence of minerals in the soil, its subsequently absorbed and utilized by the plants and used as Bali cattle's food source in Bangli. Some minerals such as Cu, Fe, and Zn, are

indispensable to improve body resistance [12]. One of the body resistance indicators is, the presence of antibody, that characterized by increased of IgE level.

Bali cattle rising with intensive (stall) management and given additional feed. Feed additive formed as a mineral mix that able to increase the growth and immune responses. Feed supplement given in the form of additional minerals on the feed. In pig feed supplement can influence the bioavailability of several micronutrients important for the immune response (Fe, Cu, Mn, and Zn) and to assess if the dietary supplementation could potentiate an immune response which would improve pig health status after weaning [13]. Trace elements are

implicated in many physio-logical processes contributing to the body's natural defenses on three levels: support for physical barriers (skin/mucosa), cellular immunity, and antibody production [14]. Supplementation with these micronutrients support also a Th-1 cytokine mediated immune response with sufficient production of pro-inflammatory cytokine, and enhanced innate immunity[15] [16].

The lower level of IgE at bali cattle on Nusa Penida caused by the lack amount of feed source that caused by the low intensity of rainfall and dry land. The Lack of nutrients in Nusa Penida bali cattle's food sources impact the body resistance that, marked by the reduction of antibody level, especially Ig.E. Beside it, the maintenance wasn't done intensively, so there was no additional feed that given to the bali cattle at Nusa Penida.

These differences may be related to breed, nutritional and sanitary management of the herd, and the technique used in the Ig assay [17]. This high incidence of IgE could be due to higher incidence of parasitic infection as well as environmental pollutants that may be allergic increased serum IgE levels, may be due to increases in IgE-dependent

processes and cellular components of the immune system [18]. The secretion of IgE by lymphocytes defines the allergic state of an individual[19]. This largely results from poor nutrition of cattle managed under traditional smallholder feeding systems which rely on communal grazing of overstocked and weedy native pastures [20].

The bali cattle in Bangli are managed under different and better conditions compared to Nusa Penida areas. Its therefore have a higher BoIgE. Ig.E levels influenced of allergens [21]. In Bangli regency with high land with relative air temperatures, facilitate growing parasites that can increase BoIgE levels.

In addition to being a major source of dietary calcium, milk may also raise the immune responses especially level of antibodies. The low level of serum BoIgE seems merely to be caused by environmental factor. Bangli and Nusa Penida islands are different in plantation, rainfall and soil physic-chemical properties [20]. It was plausible to draw a hypothesis that the BoIg.E level in those areas is statistically different.

There is significance different of BoIg.E in bali cattle's grown in Bangli and Nusa Penida islands. This indicates that

the performance of the breed is influence of pasture quality. One genetic factor that leads to the low BoIgE levels of bali cattle is caused by bali cattle in Nusa Penida is pure breeds of bali cattle, due to prohibition of other region cattle to enter the region of Nusa Penida. Bali cattle are raising in Nusa Penida were originated from Nusa penida area. In addition to allergic diseases, elevated IgE levels are found in several types of immunodeficiency diseases. Production of Ig.E is modulated by many factors, including stress, exercise and nutrition. Immunodeficiency disease is very possible to happen to Bali cattle in Nusa Penida, due to lack of food sources caused by a climatic conditions with a very long summer.

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CONCLUSION

The BoIg.E level of bali cattle kept in Bangli: 34.16258 ng/ml, was higher than Nusa Penida: 22.26047 ng/ml. The different Ig.E level was related to farming characteristics and geographic conditions.

ACKNOWLEDGEMENTS

This research was funded by Directorate General of Higher Education through Penelitian Unggulan Perguruan Tinggi (PUPT) No. 415.33/UN14.4.A/PL/2017, and the research team of Watiniasih, Suartha, Kerta Besung, for the kind co-operation and providing us the research funds to conduct this project successfully.

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