



Aggressiveness in the domestic fowl: Distance versus ‘attitude’



Ane Rodriguez-Aurrekoetxea^a, Inma Estevez^{a,b,*}

^a Neiker-Tecnalia, Arkaute Agrifood Campus, P.O. Box 46, E-01080 Vitoria-Gasteiz, Spain

^b IKERBASQUE, Basque Foundation for Science, 48011 Bilbao, Spain

ARTICLE INFO

Article history:

Received 23 September 2013

Received in revised form 8 January 2014

Accepted 21 January 2014

Available online 28 January 2014

Keywords:

Domestic fowl

Personal distance

Inter-individual distance

Aggressive interactions

Behaviour

ABSTRACT

It has been suggested that invasion of the personal space by flock members is the main trigger of aggressive interactions in the domestic fowl (*Gallus gallus domesticus*). In large and dense groups of birds high frequency of attacks should be expected as the chances of invading the personal space of others is likely to occur. However, other studies suggest that after surpassing a certain group size the frequency of aggressive interactions decline. It is possible that the behaviour of the individuals themselves may be more relevant in this context. To test this hypothesis we analysed the onset of aggressive interactions in a laying strain of domestic fowl from videotaped behavioural sequences. A total of 60 interactions were analysed, for which we recorded the location (XY coordinates) of the giver (G) and receiver (R) of an aggression, the position of the two closest individuals to G (G1, G2) and to R (R1, R2), in addition to the behaviour and head orientation of all these birds with the software Chickitizer[®]. Distances between pairs of birds were calculated as Euclidean distances and analysed by mixed model ANOVA. Behaviours were ordered by ranges of activity and differences analysed by Kruskal–Wallis. Our results indicate that inter-individual distances at the onset of an aggressive interaction varied according to the specific pair of individuals, but contrary to the expected, distances between the G–R remained similar to the distance among the G–G1 and G–G2. R birds however, were consistently involved in more energetic demanding behaviours and with their head oriented towards G. These results suggest that aggression in the domestic fowl does not depend on the invasion of the critical distance per se, but would greatly depend on the activity level and directionality of the individuals which would be perceived as a threat by the aggressor.

© 2014 Elsevier B.V. All rights reserved.

1. Introduction

It has traditionally been considered that aggressive interactions in the domestic fowl (*Gallus gallus domesticus*) allows priority of access to resources and maintenance of its own personal social space, and that invasion of

this personal space will trigger aggressive interactions amongst group members (McBride, 1971). These interactions would occur while they are facing each other (McBride et al., 1963). However, results of a later studies by Hughes and Wood-Gush (1977), in which they found that aggressive interactions occurred at much higher frequency in spacious pens as compared to crowded cages for identical group sizes, lead the authors to suggest that aggressive interactions were more likely to occur when the birds had the opportunity to move around occasionally approaching the “personal space” of other birds, as oppose to birds being in continuous proximity.

* Corresponding author at: Neiker-Tecnalia, Arkaute Agrifood Campus, P.O. Box 46, E-01080 Vitoria-Gasteiz, Spain. Tel.: +34 945 121336; fax: +34 945281422.

E-mail address: iestevez@neiker.net (I. Estevez).

Based in Hediger's (1955) description of spacing and the concept of individual distances, McBride (1971) defined the personal space as the area around an individual that it is attempted to maintain free from co-specifics. However, it has been documented that inter-individual distances are dynamic, and differ according to the behaviour displayed (Keeling, 1994), with the density of animals (Keeling and Duncan, 1989). If invasion of the personal space by reducing the critical distance among flock members would trigger aggressive encounters, then theoretically, under extensive aviary production conditions (in which large and densely populated groups of laying hens have a wide range freedom of movements) a high level of interactions should be expected. Contrarily, studies on the impact of density, group size and space availability in the occurrence of problematic aggressive interactions in the domestic fowl, provided strong scientific evidences that would suggest that the frequency of aggression actually declined with increased density and group size (Carmichael et al., 1999; Estévez et al., 1997; Estevez et al., 2003; Hughes et al., 1997; Nicol et al., 1999). Originally, McBride and Foerster (1962) proposed that low aggression levels in large flocks could be maintained if birds remained within their close vicinity, allowing them to establish sub-hierarchical social structures within the large group. In reality their theory on spacing and aggression, while considered a classic paper, was not based in strong scientific evidences. This hypothesis would intrinsically imply a clear restriction in space use, for which evidence has never been documented in the domestic fowl (Estévez et al., 1997; Leone and Estevez, 2008; Newberry and Hall, 1990). As an alternative explanation to the decline in aggression as flock size increased some authors proposed the tolerance hypothesis (Estévez et al., 1997), or the pragmatic strategy (Pagel and Dawkins, 1997). Nonetheless, to date no studies have been conducted to determine the specific context in which the aggressive interactions take place in large flocks of domestic fowl which are commonly used in commercial settings. Neither have been studied the ultimate causal factors triggering an aggressive encounter across particular individuals within the group.

It is possible that as the invasion of personal distance may act as an indicator to determine the risk of attack by another bird, its behaviour may also play a very important role. The behaviour serves as a gradual communication signal in social groups. Usually it is correlated with the disposition of the animals to perform some action, thus it gives information about their motivation (Carranza, 1994). Many scientists have tried to determine if, for example, a display of aggression by an actor can predict the subsequent behaviour or the recipient (Nelson, 1984; Piersma and Veen, 1988). In this regard, only moderate correlations between behavioural sequences of an individual were found. However, more consistent correlations were detected between the action of a first individual and the response by another (Bradbury and Vehrencamp, 1998). If inter-individual distances vary with density, group and enclosure size or the behaviour of the birds composing the flock, it is difficult to imagine how a bird could predict the degree of threat by another individual by relying exclusively in the information conveyed by

their inter-individual distances. In addition, results by Hughes and Wood-Gush (1977) and Pettit-Riley et al. (2002) indicate that interactions occur when birds are in open areas where inter-individual distances are likely larger. All these would suggest that aggressive interactions among group members in the domestic fowl are triggered by mechanisms that are more complex than the simple violation of the boundaries of the personal space.

In this study we focused on examining the influence of the critical distance between individuals as a primary factor triggering aggressive encounters in the domestic fowl (specifically a commercial layer strain) maintained in extensive type aviary systems, but exploring the role of the behaviour as a factor that may elicit the occurrence of aggressive interactions among specific individuals. We hypothesize that the behaviour of the domestic fowl may be particularly relevant to predict the direction of the aggressive encounter, beside the invasion of the personal space. We predicted that active birds would be more likely be the recipients of an interaction due to the higher immediate risk that possess to the actor as opposed to birds in more passive behavioural states.

2. Materials and methods

2.1. Animals

For each observation day, two five minutes recordings were randomly chosen from video footage automatically collected 2 times per day (between 7.00 and 9.00 am and 11.00 and –13.00 pm). Videos were collected, three days per week, during 24 weeks, by video cameras installed at two commercial aviary egg production farms in North Carolina (USA). The video footage used for this work was part of a larger study on the behaviour of laying hens maintained under different production schemes. The birds for this study were between 40 and 66 weeks old Lohman Whites laying hens maintained under commercial conditions for egg production at a density of 5.93 and 5.6 hens/m² and at population sizes of 13,226 and 12,500 birds, respectively.

2.2. Data collection: inter-individual distances, orientation and behaviour

Video sequences were reviewed for the occurrence of aggressive interactions using *ad libitum* sampling. We analysed only the sequences of aggressive interactions located in a specific area, where the interaction could be correctly viewed in the computer screen, analysed and the perspective of the view allowed for correct measurement of inter-individual distances. Under these particular settings we were able to identify 30 aggressive interactions per farm (60 total).

Once an aggressive encounter was identified, we defined the individuals in the 'episode' as; the giver of the aggression (G), the individual who made the first aggressive movement towards another hen, and the receiver (R) of the aggressive interaction. G1 and G2 were identified as the two hens closest to the giver of the interaction, and R1 and R2 were the two individuals closest to R (Fig. 1).

Download English Version:

<https://daneshyari.com/en/article/6379720>

Download Persian Version:

<https://daneshyari.com/article/6379720>

[Daneshyari.com](https://daneshyari.com)