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LETTER TO THE EDITOR

Of dogs and cows: a quasi-artificial selection scenario

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In a recent paper, Megens and Groenen (2012) observed that thousands of generations of human-mediated (artificial) selection has produced a huge number of distinct phenotypes, which constitute 'the kinds of long-term genetic experiments researchers usually can only dream about'. Few people would challenge the power of artificial selection, but my last visit to the vet made me think that perhaps something more complex is going on. He has recently managed to define the standards of a new dog breed that blends the best characteristics of local herding dogs, which we call '*tabui*'. After having visited my Australian shepherd Rocco (which, by the way, was healthy as a horse), the vet patted his head and told me: 'He is four-eyed. Just like my *tabuis*'. He was referring to the two little brown spots on Rocco's forehead, which mimic the shape and color of his eyes (Figure 1). Australian shepherds come in three recognized color varieties, all characterized by the presence of the false eyes. *Tabuis* also can vary in coat color, but they are almost always four-eyed. The vet told me that he thinks the false eyes help the guardian dog to keep the cattle under pressure by confounding them. This seems pretty likely. Using eye spots to intimidate or confound is actually a common adaptation in many animal species (Ruxton, 2005; Ohno and Otaki, 2012). Perhaps, a four-eyed dog could also look awake while sleeping, thus being an effective guardian even when resting.

Figure 1 False eyes in Australian shepherds.

I do not think local shepherds have been aware of the potential effect of false eyes while breeding *tabuis* generations, and I am sure that being four eyed was not one of the main traits that were under direct artificial selection. But being a good guardian was. Many other breeds of herding dogs are four-eyed. It is hard to believe that this has resulted from a widespread conscious selection associated with the presence of the false eyes. Yet, we may hypothesize that, across generations, four-eyed dogs have worked better than their colleagues. On one hand, this is coherent with the concept of artificial selection: the breeder chooses to mate the individuals most suited for particular purposes (Driscoll *et al.*, 2009). On the other hand, being four eyed is not exactly the same as being short-legged and having a strong tail, which makes it easier for a hunter to pull his hound dog out of a hole. The false-eye issue cannot be assimilated to the Darwinian concept of artificial selection (Darwin, 1890), or to the modern one (Driscoll *et al.*, 2009), or interpreted as a correlated response to artificial selection of particular traits (Careau *et al.* 2010). It is a matter between dogs and cows.

I wonder how often the path of artificial selection is affected by characters that make an individual more likely to be selected, but are not under the breeder's control. Maybe scenarios of human-induced but not human-controlled, *quasi-artificial selection* are quite common. I will keep my (true) eyes open.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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