

Broadening the ethical debate on breeding innovations, public engagement and the role of the Democs Game

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Abstract

As genomic selection becomes increasingly important in livestock breeding, it also entails ethical and societal issues, and we are examining these as part of the BovReg project, funded by the Horizon 2020 programme of the European Union, on advanced cattle genomics. We argue that discussion of these issues must have broad scope, in at least three respects. Firstly, it should go beyond risk and animal welfare. Secondly, it should consider not only what is novel but assess also existing ethical issues in the light of genomic innovations. Lastly, because issues of animal production are of interest to European society, public engagement is an essential element for responsible innovation. To stimulate debate on genomic selection, we have created a Democs card game to engage with general publics and stakeholders. The game explains the context of current production and selection in cattle, examines ethical and social issues raised by breeding techniques, and invites players to form their own views.

The need for ethical reflection

Genomic selection has become an important tool in livestock breeding, with further potential to widen both the traits and the breeds to which it can be applied. It also entails ethical and societal choices, for example in balancing such factors as animal health and welfare, fertility and climate impact alongside improving yields. As part of the BovReg project (www.bovreg.eu) on advanced cattle genomics within the FAANG network, we are examining these ethical questions. In contrast to some other reproductive technologies in animal breeding, such as cloning or genome editing, genomic selection has not raised much ethical attention. This can be explained partly by the characteristics of the technology itself, which is about the use of genome-wide genetic markers to predict the breeding value of selection candidates. Genomic selection therefore does not cross species boundaries, or require applying new invasive techniques on animals. However, that genomic selection is in certain respects continuous with earlier breeding techniques does not imply that it raises no ethical issues. It is also the result of a rather limited view on what counts as relevant ethical considerations. However, genomic selection has not so far resulted in extensive public debate.

An analysis of the academic literature found only few papers pay attention to ethical aspects. One of them is by Mark & Sandøe (2010). They highlighted issues such as unexpected effects on animal welfare due to correlations with non-measured traits, a higher risk of spreading deleterious mutations, the centralisation of capabilities and increasing dominance of specific breeds. They also discuss concerns over increased monopoly within dairy cattle breeding. The paper stresses the importance that stakeholders monitor the effects of genomic selection and that breeding companies act responsibly. This is in line with the development and regular updates of Code-EFABAR which since 2006 has aimed to define and maintain good practices for farm animal breeding (Code-EFABAR 2020).

In this paper, we first argue that the discussion on genomic selection needs to reflect a wider range of ethical issues than is commonly the case. Secondly, we focus on extending discussion

beyond the novel concerns, and lastly we argue that the current comparative lack of public debate provides an opportunity to work on public engagement. For this purpose, we have created a Democs card game to engage with general publics and stakeholders, on which we will elaborate in the second part of the paper.

Three factors to broaden the debate

A broader ethical scope: beyond risk and animal welfare

It is important to move away from confining ethical discussion to risk and safety. In response to legal frameworks and a no-harm principle, there is a tendency for ethical evaluation to focus primarily on the question to what extent a technology can harm others and what risks are involved (Fleming et al. 2018). Notwithstanding the importance of minimizing risks to food safety, genetic diversity and economic risks, an ethical evaluation of breeding innovations should encompass more than this dimension. In addition, given the duties we have towards animals and the environment, the ethical considerations should not be restricted to human-related issues.

There has been attention to the positive and negative impacts the technology can have for animals and their welfare (Mark & Sandøe, 2010, Windig 2012). This is a crucial dimension of the ethical assessment, as animal welfare is a core concept in animal ethics. Focussing ethical and public debates on animal welfare may overload the concept, however, because this invites people to ‘translate’ their wider concerns into issues of welfare. Therefore, we argue for a broader scope in the discussion on the ethics of genomic selection that includes risk and animal welfare related arguments, but also goes beyond them. Our mapping of the potential ethical issues showed views on genomic selection that cannot be reduced to animal welfare concerns. These included questions raised by more critical voices, of justice, autonomy (Coles et al., 2015) and ‘biopower’ i.e. changing animal bodies and populations in a direction dictated by particular human interests (e.g., Twine, 2010). There needs to be room to discuss such ethical issues as the instrumentalization of animals, changing power relations among stakeholders in animal breeding, or human-oriented ideas about perfecting animals. Most of the latter concerns are not specific to genomic selection and are relevant in conventional breeding programs or even livestock farming in general. But we argue that this is a reason to take into account a second factor in broadening the ethical discussion.

Beyond what is novel

Especially when changes are mediated by technology the ethical analysis tend to focus what is, ethically speaking, novel about those technologies.’ This starts from the assumption that the situation before the innovation was morally justified or acceptable. On that basis, genomic selection should be assessed only by considering whether it introduces novel ethical issues, compared with existing breeding practices. This view is problematic for two reasons, however. Firstly, adding one element to an existing practice can have far-reaching consequences that expand dimensions that were already present in the existing situation. Not without reason, genomic selection is portrayed as a next step in the development of existing breeding programs and as a paradigm shift at the same time (Meuwissen et al. 2016). Secondly, it fails to reflect back on what may be ethically problematic in existing practices. The assumption that livestock breeding is an uncontroversial practice cannot be taken for granted, as the ethics of breeding animals has been widely discussed in various contexts (Olsson et al. 2006; Leenstra et al 2012; Farstad 2018). Therefore, ethical reflection on genomic selection should not only address novel issues of the technique on itself, but should consider it as part of the existing practices of breeding and livestock farming. This does not make the discussion easier, but can do justice to the complexity at stake. It is important that the discussion on the societal and ethical dimensions

is not a task for only ethicists or social scientists. It needs the inclusion of stakeholders and the general public. This leads to our third factor.

Public engagement

Genomic livestock breeding is a complex technical field that requires multiple forms of expertise of highly skilled persons and specialised organisations, which tend also to be international. The infrastructure needed to guarantee high quality in research, product development and implementation also leads to a gap between the experts in genomic selection, the users (farmers) and the general public. The economic relation between breeding companies and their clients, means that farmers may participate in discussions on breeding innovations, or have their views studied (e.g. Lund et al. 2021), but the general public is seldom consulted. This is problematic because public engagement is recognised as an essential element in responsible innovation (Owen et al. 2021). Only engaging with technical experts risks limiting the debate to dominant perspectives (Kayumova et al., 2019). Two-way public engagement is crucial to invite lay persons to form their own views and enable them to participate in the debate, and to give the general public a voice in making breeding organizations, companies and governance institutions more responsive and accountable. In line with this step, it is important to engage with wider publics, who are showing an interest in animal production but are rarely consulted about the priorities and direction of livestock breeding. By the same token, general public comments need to be informed to have credibility, and communicating a complex subject such as genomic selection is challenging.

The Democs game

An integral part of the European BovReg project is to conduct public engagement as part of our aim for making responsible innovation. For this purpose, we have created a Democs card game, the purpose of which is to stimulate wider debate among stakeholders, and to give small groups of lay people in different European countries the opportunity to discuss and express their views about genomic selection in cattle, including ethical questions about breeding priorities and practices more generally. Democs has been a proven tool for 20 years to enable grassroots engagement on many technological issues in small groups, assuming no prior knowledge. The cards are the 'expert' and provide the basis for group learning and discussion. These cards have been written in a detailed iterative process drawing upon the technical, ethical and Democs game expertise and insights from BovReg partners.

Story cards introduce different aspects of cattle production, genomics and breeding through case studies of imaginary people involved the field or affected by it. These include a breeding company CEO, a genomics researcher, a veterinarian, an Alpine dairy farmer of specialty cheeses from local breeds, a government climate scientist, an environmentalist and an critical consumer. Each one explains their involvement and an ethical dilemma which it presents. Information Cards provide the context of different approaches of cattle production, with which publics may not be familiar. They explain genomic selection and its potential, and give information on animal health and welfare, land use, climate and environmental impacts. Issue Cards then open up relevant ethical and social issues arising from advanced breeding and production, expressing differing standpoints to reflect the range of opinions.

Players are invited to discuss and to form their own views built up from the suite of cards. There are two outputs. One is group opinion statements, written on Cluster Cards, based on the cards the group members have chosen to discuss. The second output is individual votes by each player on priorities and questions in cattle breeding, with their reasons in their own words. These outputs will be analysed, and are expected to provide valuable qualitative information on public views on genomic selection in cattle and related issues.

The game was first produced in a pilot version for beta testing for accuracy, balance and being understandable by lay people, and is now being finalised for distribution, with the expectation of being translated into various languages, so that people can take part in their ‘mother tongue’. Covid restrictions on small face-to-face group meetings have delayed playing somewhat. We are investigating the feasibility to adapt the game to be played on-line, which is not a simple task for a tool that is designed to feature interactive discussion.

Conclusion

Breeding innovations raise ethical issues that are not limited to risk and animal welfare, and that go beyond what is novel about such innovations. Responsible innovation requires discussing such ethical issues with a wide range of stakeholders, and we invite engagement with those involved in livestock breeding and innovation. The Democs game that we have created facilitates the engagement of stakeholders, but especially of lay publics in ethical discussions on genomic selection and cattle breeding.

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