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# Dead liveness/living deadness: Thresholds of non-human life and death in biocapitalism

**Annalisa Colombino**
University of Graz, Austria

**Paolo Giaccaria**
University of Turin, Italy

**Abstract**
The opening of a post-genomic age and the possibility of patenting life itself have changed the relationship between biopolitics and capitalism and contributed to the emergence of a new phase of capitalist accumulation, currently known as biocapitalism, the full integration of life and capital into complex architectures of control and ownership. In this paper, we combine Giorgio Agamben's concepts of the threshold and *bios*/*zoē* with Nicole Shukin's idea of rendering to address the connection between life and death in biocapitalism, through a specific focus on the commercialisation of the semen of the Piedmontese bulls. We show how death, rather than merely life, is productive in biocapitalism. Further, in proposing an analysis of some of the ways in which, social and biological, animal life gets incorporated (i.e. owned and sold), we contribute to recent debates in geography on more-than-human understanding of capital accumulation.

**Keywords**
Biocapitalism, bioeconomy, biopolitics, death, more-than-human-geography, animal geography

## Introduction

In this paper, we offer an analysis of the commercialisation of the Piedmontese bull semen to propose an understanding of death as a spatial and relational process, as opposed to an *event* ending life, in order to unravel some of the ways in which death, rather than life, is "put to work" under a biocapitalist mode of production (Morini and Fumagalli, 2010 [AQ2]). In geography, there are diverse bodies of work that uncover the relationships between life and the economy. Scholars have explored the geographies of labour (McDowell, 2015) and commodification of the human body, its parts and tissues (Parry, 2008); of reproductive and healthcare tourism (Parry et al., 2015; Schurr, forthcoming); and of biosciences, health and biomedical technologies (Greenhough and Roe, 2006; Guthman and DuPuis, 2006; Parr, 2002). More-than-human geographers have investigated the commodification and

bioinformatisation of nonhuman bodies and lives (Holloway and Morris, 2008; see also Robbins, 1998). More recently, geographers inspired by Haraway's (2008) work and exploring how animal labour and life are turned into 'lively commodities' (Barua, 2016; Collard, 2014) are developing a conceptual vocabulary to theorise more-than-human understandings of capitalism.

Beyond geography, there is a burgeoning literature that may be summoned under the rubric of 'studies of biocapitalism'. By introducing new – contested – ''bio-concepts'' (Birch and Tyfield, 2013) such as biocapital, biovalue, bioeconomy and biocapitalism, these studies tackle how contemporary capitalism exploits life (e.g. Rajan, 2006; Rose, 2006; for recent reviews of most these analyses, see Helmreich, 2008). However, most of these works seem to imply that what is novel about today's capitalism is the exploitation and manipulation of the *biological* aspect of life. Yet, as Twine (2010: 185) notes, ''the biological within capitalist economies'' is not a new characteristic of capital accumulation (see also Birch and Tyfield, 2013). In this paper, we suggest that biocapitalism is an emerging mode of production not only manipulates and exploits *biological* life. Drawing on Agamben's conceptual triad of *zoe*/*bios*/threshold, we highlight that biocapitalism can profit from both biological (*zoe*) and social life (*bios*) and, in proposing a spatial understanding of death as a process that entails life, we suggest that biocapitalism stretches its reach to colonise a new malleable 'territory'; namely, the space in-between life and death.

Whether, and how exactly, biocapitalism is a novel mode of production is still matter of theoretical debate and empirical investigation. However, an increasing number of authors – primarily, but not exclusively, in the Italian Marxist autonomist tradition – do conceptualise biocapitalism as a new regime of capital accumulation (e.g. Birch and Tyfield, 2013; Morini and Fumagalli, 2010; Negri, 2013). Consolidated in the last 30 years and triggered by the so-called molecular and informational revolutions, the internationalisation of the US model of intellectual property rights, the strengthening of financial markets in fuelling knowledge-based enterprises, biocapitalism turns life into property and manipulates it into a range of life-based commodities and services. It must be noted that most of this specific body of work primarily focuses on the cognitive, affective and socio-cultural aspects of life (*bios*) and it is largely anthropocentric. More generally, with a few notable exceptions (Shukin, 2009; see also Twine, 2010), scholars disregard to take into account how animal lives and deaths are intrinsic to this mode of production. In order to bridge the divide between the works that primarily focus either on the *bios* or *zoe* side of life, and to bring animals' (socio-material and symbolic) lives/deaths back into studies of biocapitalism, we elaborate on key concepts drawn from Shukin's (2009) zoopolitics and Agamben's biopolitics and we analyse the commercialisation of the semen of Piedmontese bulls.

Tackling human–animal relations through the conceptual lens of biopolitics is a novel approach emerging in geographical and posthuman research and theory (Asdal et al., forthcoming; Rutherford and Rutherford, 2013; Wolfe, 2014). In geography, the reflection on the biopolitics of animal life can be associated to a growing interest in farmed animals (Miele, 2011) and the politics of nature conservation (Biermann and Mansfield, 2014). Holloway and Morris (2012) have extensively written about the role of genetics in producing imaginations and practices concerning animal life in livestock breeding (Morris and Holloway, 2014). Mansfield (2012) has dwelled on the biopolitics and biosecurity of seafood consumption. Lorimer and Driessen (2013) have traced the genealogies of the Heck cattle in Nazi Germany as a biopolitical experiment of rewilding and dedomestication. This specific literature primarily deals with the 'life side' of biopolitics, and thus partakes in nourishing the distinction identified by Rutherford and Rutherford (2013) between 'vital and thanatopolitical geographies'. In Foucault's account, biopower is the ''right to make live

and to let die'' (Foucault, 2003: 241). It is the sovereign decision about who/what deserves life and who/what does not and, hence, can be abandoned to death. Federici's (2004) work demonstrates how Foucault's articulation of biopower, however, fails to account for the role that specific female bodies, their violent transmutation through torture and death into factories for the reproduction of labour, were crucial to the rise of capitalism. In so doing, Federici brings to light one of capitalism's thanatopolitical registers and emphasises how biopower is not only about fostering life, but also about administering death. In this paper, we point out that a specific form of biopower works at the service of biocapitalism by infiltrating animals' individual and collective bodies at the molecular scale to optimise them for production. Further, we highlight that biocapitalism puts to work not only life but also death.

The theme of death is gaining momentum in geography (Ginn, 2014; Lopez and Gillespie, 2015; Romanillos, 2014). Biermann and Mansfield (2014) have offered a biopolitical understanding of conservation biology as a sovereign decision about which (collective) life to preserve and which one to let extinguish (that is, collectively die). Death is particularly relevant when considering meat-products because the transubstantiation of the 'animal into edible' (Vialles, 1994) cannot but be mediated by slaughtering and death. Miele (2011) have worked on studying abattoirs to explore how a 'good kill' (humane and legal) is a complicated socio-technical affair (e.g. Higgin et al., 2011), and Buller (2013) has reflected on the interplay of 'plurality' and 'singularity' in herds, as a condition of possibility for making animal life killable. However, most of these studies seem to share the same conception of death as a neat caesura in the flow of life, as a border that establishes a before and an after, what is inside and what is outside life.

In this paper, we make an attempt to move beyond the idea of death as a caesura. We claim that liveness and deadness are not two distinct realms, separated by a knowledgeable border – the event of death.[1] We understand liveness and deadness spatially and relationally, as bleeding the one into the other, and we claim that death should be seen also as a process, and not just as a definite episode in farmed animals' life. We argue that, through the diffusion of artificial insemination (AI), liveness can persist as posthumous after the event of death. We suggest that death can anticipate the moment of slaughtering: through 'calculative breeding', animal lifespan is reduced to a cost, which must be minimised to achieve production targets. The entire animal's liveness is optimised to its death. The animal is already 'dead' at the moment in which its lifespan has already been calculated since its conception. It is also through this calculative rationality that animal life is turned into killable life. The implication of seeing death as a process is that it opens up the possibility of exploring how dead- and liveness entail each other, not only in the context we examine here, but also in other bioeconomies, as we suggest in the conclusion.

More specifically, we present a discussion of the commercialisation of the Piedmontese breed bull's semen to show how death and life can be understood relationally. We suggest that under biocapitalism, the widespread adoption of AI and molecular selection and breeding practices for the reproduction of animal capital change the relationship between the life and death of AI bulls. AI endows bulls with some sort of posthumous *potenza* (Agamben, 1999) to generate life. Furthermore, it affects bulls' *bios*, by isolating these animals from livestock daily life. In particular, through the lens of Agamben's (1998, 2005) idea of the threshold and Shukin's (2009) concept of rendering, we point to how AI (along with mass farming and industrial meat production) has altered the relationship between animal *bios* and *zoe*, and hence between non-human live- and deadness.

The remainder of the paper is structured into five sections and a conclusion. In the next section, we draw on Agamben et al.'s works to set the theoretical framework that enables us

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to think of deadness spatially as a process that involves liveness, and to explore the in-between life and death in the commercialisation of the semen of Piedmontese bulls under biocapitalism. In the Animal capital and biopower in biocapitalism section, we briefly argue what is animal capital to us and we point out that the spread of AI maximises its circulation and reproduction. We suggest that, with the molecular turn and diffusion of AI, new practices of selective breeding emerge and that a partially novel form of biopower is at work to optimise single and collective farm animal bodies. The mobilisation of the Piedmontese breed section offers an account of how the semen of Piedmontese bulls became an international mobile commodity. The paper then, in the Rendering the Piedmontese bull I: dead liveness section, discusses the extraction of the semen from the bulls' bodies and, in the Rendering the Piedmontese bull II: living deadness section, its marketing (respectively, what Shukin calls material and representational rendering). In the conclusion, we offer some directions for further research on current and emerging geographies of biocapitalism.

## Rendering at the threshold between bios/zoē and life/death

Agamben's (1998: 48, 2005) exploration of life and biopower focuses on the notion of *homo sacer*, a bare life "situated at the intersection of a capacity to be killed and yet not sacrificed, outside both human and divine law". To discuss bare life (killable life), Agamben builds on the distinction between *bios* and *zoe*: the latter term "expresse[s] the simple fact of living common to all living beings (animals, men, or gods)" and the first "indicate[s] the form or way of living proper to an individual or a group" (Agamben, 1998: 9). He explicitly addresses the issue of the fleeting and blurred threshold in between the human and the animal in *The Open* (Agamben, 2004). Agamben (2004: 33–38) here critically reads back the genealogy of the human versus animal divide, identifying what he terms the anthropological machine, a (modern and premodern) *dispositif* that has set the conditions of possibility for detaching the animal from the human, and for taking the biopolitical sovereign decision about what is 'human'.

Yet, despite preaching for a post-humanist overcoming of the human-animal divide, Agamben's approach is still largely anthropocentric. His writings "focus entirely and exclusively on the effects of the anthropological machina on human beings and never explore the impact the machine has on various forms of animal life" (Calarco, 2008: 102). Shukin's (2009) zoopolitical approach works well to bring into light the material and symbolic exploitation of animals' lives/deaths. In particular, animal death is central to her account of 'rendering', where "rendering signifies both the mimetic act of making a copy, that is, reproducing or interpreting an object in linguistic, painterly, musical, filmic, or other media [. . .] and the industrial boiling down and recycling of animal remains" (Shukin, 2009: 20). In other words, 'rendering' broadly refers to practices of representation and processing animal flesh and remains. Here, we combine Shukin's idea of fleshy rendering with Agamben's concept of *zoe*, biological life; then, we associate her notion of representational rendering with Agamben's idea of *bios*, social life. Throughout our analysis of Piedmontese bulls, material rendering is reflected into the transformation of AI bulls' life into *zoe* through the rapid erasure of their *bios*, which, however, remerges in the process of marketing the semen (i.e. Shukin's representational rendering).

It must be noted that Shukin (2009: 130)continuously refers in her work to the material presence of animals, but whilst recognising "the importance of also developing histories of animal agencies", she offers an account of rendering that primarily rests upon the discursive analysis of animals as a passive 'category' exploited in capitalism. Recently, Hodgetts and

Lorimer (2014) have invited geographers to pay more attention to 'individual creatures' to disentangle and make visible how individual animals' biographies and presences enter into heterogeneous associations with other agencies, both human and non-human (see also Barua, 2014b; Bear, 2011). Following the emergent debate on *animals'* geographies (Hodgetts and Lorimer, 2014), we adopt Agamben's distinction between *zoe* and *bios* to refocus Shukin's account of material and representational rendering towards the exploration of individual fleshy animal bodies and bio-geo-graphical lives (Barua, 2014a). In using Shukin's idea of rendering with Agamben's concepts of *zoe*/*bios* and, following Buller (2013), we argue that, first the singularity of the individual animal is the subject of *bios*, of a socialised life; second, the transformation of *bios* into *zoe* is strictly connected to the loss of animals' individualities and their rendering into the anonymous commodified animal mass (livestock).

Buller (2013: 157) has recently translated the *bios*-versus-*zoe* divide into the analysis of non-human animals' life: the two concepts can be used to investigate also non-human matters by comparing the individual and multiple lives of animals. From this perspective, what regulates the passage from *zoe* to *bios*, and vice versa, is death. Observing a farmed salmon cage, Buller asks:

> at what point, if at all, do these individual fish break out of their collective noun to become, at last, singular and the objects – or subjects – of our affective relationality? The answer, at one level, is at the moment of their slaughter when, albeit briefly, their individual sentience, their ability to feel pain, concerns us (2013: 156).

If the passage from *zoe* to *bios* takes place only through death, it is the transition from *bios* to *zoe* that makes those animal lives killable: "it is the sheer numbers that confound us and, in some cases, motivate us; that plurality which [. . .] not only masks the singular, individual lives but that marks animals always as different and, hence, 'killable'" (Buller, 2013: 161). As a consequence, the mass production of lives and deaths taking place in intensive animal farming denies the possibility itself of a non-human *bios*, and turns life into a truly biopolitical, calculative process (Buller, 2013: 162).

The ideas that the passage from *bios* to *zoe* is demarcated by death, and that death is present but concealed to the human senses in the commodification of animals' remains, help us to approach our analysis of the double rendering of a specific kind of animal by-product: the Piedmontese bulls' semen. The commodification of semen and its mobilisation via the increased use of AI challenge the very notion of death as a discrete event that divides the realms of live- and deadness. We claim that the commercialisation of their semen entangles AI bulls' life into a biocapitalist rendering apparatus (Shukin, 2009) and, more importantly, alters the biopolitical imbroglio of life and death, of *bios* and *zoe*. By borrowing the concept of the threshold from Agamben's biopolitics, we argue that we can start to think of death spatially, not as a border but as a border*land*. This, in turn, can help us to explore how *bios* and *zoe* bleed into each other in liveness and deadness, and in the material and symbolic rendering of animal lives/deaths.

In Agamben's philosophy, the threshold is a spatial metaphor indicating a mobile borderland, rather than a borderline, a space 'in-between', where apparently dichotomic categories are no longer discernible. Thinking of death spatially as a threshold, rather than linearly as a border, has implications for the way in which we consider live- and deadness, in both human and non-human beings. Liveness and deadness are no longer a matter of before and after, of inside and outside. Deadness cannot be considered any longer as the absence of life, and life cannot be reduced to "the set of functions that resist death", to borrow Bichet's famous definition (see Strauss, 2012: 111–114). Paraphrasing Agamben,

we might say that liveness and deadness are mutually involved in a relationship of inclusive exclusion ''which thus serves to include what is excluded'' (Agamben, 1998: 20): death excludes life to include it, and vice versa. As a consequence, in the case of the commercialisation of the Piedmontese bulls' semen, the semen's vitality disguises the death of the bull: it is a dead liveness. Simultaneously, the death of the animal is not the endpoint that definitively excludes life: it is a living deadness.

Before entering this threshold empirically, in the next two sections we first discuss our understanding of animal capital and biopower in biocapitalism, in relation to cattle breeding, AI practices and AI bulls. Then, we offer an account of how the Piedmontese turned from a local breed (reared and commercialised in Piedmont, Northern Italy) into an 'international breed'.

## Animal capital and biopower in biocapitalism

Cattle have been considered a mobile wealth since the beginning of their domestication: wealthy owners could increase their capital by trading and hiring them out (Velten, 2007: 21-25). Etymologically, ''the term 'cattle' is derived from the Middle English and Old Northern French *catel*, the late Latin *captale* and the Latin *capital*, meaning 'capital' in the sense of chattel or chief property'' (Velten, 2007: 22). In the meat industry, cattle can be seen as means of production (a sort of 'mobile' and 'living' fixed capital) to produce beef (a commodity). Interestingly here, the passage from capital to commodity is mediated by the destruction of capital itself, by death transforming flesh into meat, (living) animal capital into (dead) animal commodity. The equation animal-capital for bulls for reproduction may be more evident as they are (and were) selected according to their capability of reproducing cattle – the (live)stock of animal capital – to be turned into the (dead)stock of commodities. This very specificity, as we show later, influences AI bulls' lifespan and productivity under biocapitalism.

As Ritvo (2010) illustrates, the establishment of pedigrees contributed to construct (cattle) breeds as valuable sources of what she terms 'genetic capital', which, in turn, triggered the emergence of markets for its reproduction through the spread of artificial selection practices and use of stud services. Yet, the magnitude of these markets was rather limited until the development of technologies able to extend the spatial and temporal reach of the commodity constructed to incorporate such capital, i.e. bull semen (Parry, 2015). Developments in air transport, artificial insemination, cryogenic techniques and the informatisation of herd books contributed to turn the semen of bulls into bankable, mobile, lively commodities, thus increasing the speed and extending the spatial and temporal reach of the reproduction of (live)stock (*ibidem*). AI bulls today can reproduce themselves wherever their semen is employed and even after their deaths.

The spread of AI represents a turning point that changes cattle breeding by enrolling humans and animals into different socio-technical relations, where biopower is at work to maximise productivity. AI is today a profitable biocapitalist venture (cf. *ibidem*) nourished by a partially novel modality of biopower, emerging with the molecular turn and changing traditional breeding practices. For example, a biopower centred on a biopolitics that works with a ''micro-anatomo-politics'' to infiltrate (animal) bodies, ''at the macromolecular level, i.e. at the level of the DNA and proteins'' (Flower and Heath, 1993: 37), and ushering these bodies towards the maximisation of profits. As Holloway (2015) points out, thinking of an animal anatomopolitics is problematic as it is difficult to imagine how individual animals can self-regulate their behaviour to conform to a biocollectivity. Yet, if we think of biopower as a modality of power that co-enrols and co-constitutes humans and animals (*ibidem*), we can

start envisaging a micro-anatomo-politics working from the human towards the animal to increase livestock productivity. Animal scientists and professional breeders have long been working towards the production of specific and profitable animal bodies, at least since the diffusion of practices artificial selection, beginning in the latter half of the eighteenth century (Ritvo, 2010). Yet, what is novel under biocapitalism is that geneticists and breeders work through the magnifying and calculative lenses provided by the molecular turn and informational revolution and are thus able to intervene and shape bodies at the micro-level to optimise them for production. Further, in setting aside traditional selection and breeding techniques based on sensory and visual appraisal and tacit/haptic knowledge (cf. Holloway and Morris, 2008; Twine, 2010), this micro-anatomo-politics works with biopolitics to regulate and produce profitable animal (individual and collective) bodies by fostering the adoption of molecular selection techniques based on the calculation of profits and an understanding of the ''animal as biotechnology'' (Twine, 2010). For example, an understanding centred on a partial conception of animal life incorporated in numbers and images (Holloway and Morris, 2008). Moreover, this kind of micro-anatomo-politics operates in conjunction with 'global' IPR regimes and financial capital and facilitates the appropriation and commercialisation of animal life through patents, trademarks and copyrights (cf. Twine 2010: 100).

It should be clear that, in biocapitalism, human cognitive labour does play a crucial role. Yet, in AI bulls breeding, it is not the only kind of labour at work. Bulls are not simply the means of production to which human labour (both in the laboratory and farm) is applied to produce value (see also Barua, 2016). They are also actants co-enrolled with humans, in processes where biopower ''can be seen in operation in heterogeneous associations, co-fostering human and nonhuman life towards enhanced levels of efficiency and productivity'' (Holloway, 2015: 182).

Importantly, the widespread use of AI reduces the bull's *potenza* – in the original Agambenian meaning, as the possibility to act but also to refrain from any action. When the bull was free ranging among cattle or used in stud facilities, he had some degree of choice on whether to mate or not with cows.[2] On the contrary, AI practices are centred on the deception of bull's desire, as his whole reproductive life pivots around the absence of the cow and her substitution with a dummy, a true fetish turning the bull's libido into the mechanical and alienated production of 'live stock', i.e. semen, the commodity internationally sold as incorporating the features of the capital that produced it.

The international commercialisation of bull semen extends the bull's productivity beyond his death and location. Before the widespread use of AI, a bull for reproduction's ability was limited temporally to the end of his (active sexual) life, and geographically to the area around where he lived (see Parry, 2015). Through his commercialised semen, today, the (dead) AI bull is endowed with a nearly infinite (re)production potential, as we point out in our analysis. Moreover, the bull's premature death maximises profits as it eliminates the costs of keeping him alive and transforms his body into marketable beef. In our account, biocapitalism emerges as a mode of production that capitalises on the lives/deaths of specific farmed animals beyond space and time. Biocapitalism, to paraphrase Cooper (2008), exploits animal lives/deaths ''beyond the limits''.

## The mobilisation of the Piedmontese breed

The international mobilisation of the Piedmontese cannot be taken for granted as this breed is known in Italy for being 'local' and able to produce premium beef and, also in the USA, it is marketed by using the discursive repertoires borrowed from the rhetoric of alternative

food networks (AFNs); for example, a representational strategy that contributes to creating an amnesia of the zoopolitical realm of genetic intervention that also frames the commercialisation of this breed and its beef. The Piedmontese is Eataly's[3] official meat in Italy and the USA, and it is well renowned among gastronomists. In November 2000, Forbes Magazine inserted at the 29th place the Piedmontese steak in the list of one of the "100 things worth every penny" they cost.[4] Yet, such a gourmand's beef is the outcome of a complex interaction between the animal, the farmer and technology (Mansfield, 2003), where genetics, biosciences and biopolitical interventions play a key role in the safeguard and improvement of this bovine population.

In the scientific debate (Arthur, 1995), the qualities associated to the Piedmontese are considered to be the outcome of a specific genetic characteristic of the animal; ~~for example~~, namely, what is called 'the double-muscle factor', which we today know as being the result of the mutation of the myostatin gene. In practice, it refers to a morphological characteristic of the conformation of the animals presenting this trait and results into more muscular masses, particularly in the hindquarter of the bovines. Common to several cattle breeds, the appearance of this characteristic was first observed in 1886 in some animals of the Piedmontese livestock. The double-muscle factor was subsequently at the core of heated debates amongst veterinaries, livestock technicians, bureaucrats and farmers. For nearly a century, it was considered an abnormality in state-controlled breeding practices. Yet, in unofficial rearing practices, farmers, butchers and some veterinaries recognised that double-muscled animals produced more beef and quality cuts compared to the 'normal' Piedmontese. To summarise a contested centennial history, the double-muscled animals became the norm, rather than the exception, in the 1960s, when Anaborapi, the National Association of the Piedmontese Breeders, was endowed with the task of selecting and improving the breed. Today, Anaborapi's technicians basically operate to create an animal able of producing large amounts of premium beef, thanks to the inclusion of the double-muscle factor as valuable and 'normal' trait of the breed (see Colombino and Giaccaria, 2015).

Anaborabi and a cooperative of cattle breeders in Saskatchewan, Canada, played a key role in the early international mobilisation of the Piedmontese already in the 1980s, when Anaborapi dispatched nine bulls and six dams to Saskatchewan, thus providing the first genetic base for the Piedmontese in North America. Further genetic material (semen and embryos) was imported in the 1990s and today the Piedmontese is a well-established breed in the USA. This breed attracts international attention as it can be used for crossbreeding and improving "meat yield, meat tenderness and feed efficiency" (Arthur, 1995: 1507). Anaborapi today produces an average of 500,000 doses of semen per year for the market of the Piedmontese (Anaborapi, 2013), which has been expanding in several countries worldwide in the last two decades, thanks to the increase of consumers' demand for leaner meat (Arthur, 1995).

The inspiration for this article comes from a surprising (for us) situation that occurred when we interviewed Anaborapi's technicians in the Spring of 2012.[5] They showed us their monthly publication where the semen of the bulls selected for AI is advertised. We were interested in the personification of the animals – each of them has a name, a genealogical tree, an owner and farm. Perhaps naively, we asked if it was possible to see the bulls after the interview. At that point, our embarrassed hosts told us that all the bulls depicted in the magazine were slaughtered a couple of years ago. Suddenly, we were facing the animal's death, but also an inversion of the usual relationship between death and life, in the sense that the capability of generating life was attributed to a body that was not only dead but already eaten and digested.

## Rendering the Piedmontese bull I: dead liveness

The first meaning of rendering we consider refers to the industrial treatment of animal remains and the consequent extraction of economic value (Shukin, 2009). Historically, the rendering industry has focused on extracting economic value from animals' bones, skin, fat, cartilages and innards, which were considered not edible. In a strict sense, the semen is not a by-product of the slaughtering process. Yet, the molecularisation of life and the subsequent possibility of its mobilisation (Braun, 2007) under biocapitalism have changed the categories and modalities of extracting economic value from animal labour and bodies. In an industrial system of exploitation of animal capital, semen can be considered as something that *remains* after slaughtering. The semen is literally what is left, the biocapitalist remnant of the bull's life. The frozen semen itself maintains the *potenza* (potentiality) to generate life for years after the donor has been slaughtered and transformed into minced beef. Under biocapitalism, in cattle breeding for meat production, animal life is not only transformed into beef and other products. Nowadays, semen (and a large variety of animal tissues) is extracted from animal bodies, immortalised via cryogenics techniques, codified as bioinformation, even patented and transmuted into bankable commodities, which can be mobilised basically anywhere and put to work to generate new (live)stock (see Parry, 2015). Before the widespread use of AI, the development in air transport and cryogenics, bulls' generative potential was spatially and temporally limited: they could reproduce themselves whilst alive and only locally, as the semen could not be stored and transported for more than a few days (*ibidem*). As Styhre and Sundgren (2011: 2) note, in their anthropocentric account of biocapitalism, today "death is always someone's death but it may also produce life elsewhere". In sum, rendering, nowadays, implies the maximisation of the bulls' productivity by extending their generative potential in space and time: AI bulls are dead but able to reproduce themselves 'globally' through their commodified semen.

### *Bios*

More precisely, the semen-commodity is the outcome of the caesura of the bull's life into *bios* and *zoe*, and of its reduction to pure *zoe* (thus leaving temporarily apart the bull's *bios*, which will emerge again in the representational rendering).

In order to understand the biocapitalist rendering of the Piedmontese bull, it is important to discuss the status and life cycle of past and present bulls for reproduction. In Piedmont, until the late 1970s, before AI was widely used, fertilisation took place primarily in stud farms through a sex act. The ability of the bull of producing a good progeny was measured in an informal way. Informal were also the local 'archives' of the breed: buzz, reputation and personal acquaintances. In this context, the bull used to represent not only an economic capital, literally the means of (re)production of the livestock, but it was also part of the farmer's social capital. The ownership of a renowned bull was a matter of pride within the farmers' social networks. The bull's fertility was celebrated during social gatherings, such as fairs and exhibitions and, of course, there was a market for bulls: a well-renowned bull increased its value over time and represented a solid socio-economic capital for farmers. We might say that the bull used to have a socialised life, a *bios* ~~(cfr. Quaglino, interview, 13 October 2014)~~.

The socialisation of the animal life was also mirrored in the establishment of an affective relationship (incorporating the owner's pride of possessing a very profitable bull) between the animal and the farmer; epitomised by one of our interviewees, an old farmer who, in describing how his relationship to his cattle changed in the last fifty years, argued: "once, in

the morning when we arrived [to the stables], we used to hug the cows. The breeder was 'a member of the [animal] family'. [The animals] used to know him well! There . . . [now], they are free [i.e. freed of close human interaction]. [. . .] We are strangers to them'' (interview, 12 April 2012). This kind of connection directly affected the life of the bulls for reproduction, as they could live a much longer life than other less fertile/profitable bulls. The destiny of bulls for reproduction was significantly different from the cattle intended for the fattening-and-slaughtering cycle. A farm's bull used to live up to 10 years, and in extraordinary cases up to 15 years. Today, with the exception of dams (a dam's life expectation is still about 9–12 years), the lives of all 'males' (including castrated animals) are shortened, as farmers need to cut costs. Bulls for AI, calves and steers live no more than two years.

It must be highlighted that it is not our purpose to celebrate 'ye goode olde days' of an imagined lost tradition, in which humans and animals coexisted in harmony (cf. Buller, 2013: 159–160). What we want to emphasise here is that, under biocapitalism, the large majority of male animals in general and of bulls in particular experience a reduction of their *bios* into *zoe* in a much more rapid way than it used to be (i.e. before the intensification of the use of AI for the reproduction of animal capital).

## *Zoē*

Our main concern lies with the transformation of non-human *bios* into mere 'animal' *zoe* (i.e. killable life, a life 'worth only' of being turned into commodities). Importantly for our argument, socio-technological apparatuses (e.g. the adoption of AI by the majority of farmers and the subsequent disjunction of reproduction from the daily farming life; the modern architectural features of farms and the removal of killing from farms to slaughtering facilities) have contributed to accelerating the transformation of the bull's *bios* into *zoe*, bare life. Today, the relationship between death and life is radically modified. The status of bulls for reproduction is regulated by different norms and practices than before: they are selected even before their birth through their digitised genealogical tree, inspected in their home-farms, and transferred to Anaborapi where they are brought to sexual maturity and tested. Once they become fertile, if selected as AI bulls, their semen is collected, examined, diluted, frozen, stocked and then sold. It is important to recall here that just after the collection of the semen, the bulls are slaughtered and their carcasses sold. AI, in fact, eliminates the (costly) necessity of keeping bulls for reproduction alive to be profitable. Anaborapi's bulls, hence, enter into a zoopolitical threshold, where they are at the same time the means of production (through their semen which keeps the posthumous potentiality of giving life) and product (as their carcass is sold and transformed into meat). The relationship between life and death is no longer regulated by social institutions and practices attributing a social capital value to the bulls' life. It is regulated by a mere calculation of the bull's genetic potential, how many doses of semen from each bull are likely to be extracted and sold, how many months are necessary to get that amount of semen, and how much it costs to feed a bull. Interestingly, a similar biocapitalist process of compressing the time that reduces the animal *bios* to *zoe* occurs also spatially through the elimination of the physical proximity between farmers and animals. Selection practices are no longer based on visual and sensory appraisal of animals' bodies, temperament and reproductive potentialities: farmers select the bull on online catalogues and magazines and base their choices by judging the bull's picture and EBVs (Estimated Breeding Values). Under biocapitalism, the single bull's genetic potential is codified as (patented) bioinformation. It travels materially incorporated in the frozen semen and semiotically by being marketed through the globe via online catalogues and magazines. In the case of the

Piedmontese, where AI plays a major role, animal capital reproduction is now mediated by calculations and by at-a-distance (through computer screens or catalogue pages) selection practices. In sum, today, animal capital reproduction is no longer negotiated by proximity, sensory appraisal of the animal bodies, and socio-cultural institutions. As a consequence, animal life is rapidly turned into bare life in a much 'immediate' way than in the past. In the next section, we discuss the second rendering of the Piedmontese bulls, and we point to how the apparently erased *bios* of the bulls resurfaces, and operates, in the process of advertising the semen.

## Rendering the Piedmontese bull II: living deadness

Through the bull's nearly immediate death after the extraction of the semen, the bull's liveness moves from the real to the virtual. According to Shields (2003: 2) ''the virtual captures the nature of activities and objects which exist but are not tangible, not 'concrete'. The virtual is real but not concrete''. The semen, of course, is real and concrete. Yet, there is something more here at stake than the physical remnant of the former bull's life. There is a liveness that is incorporated in the bull's semen's posthumous *potenza* to generate life and that, simultaneously, exceeds this materiality and cannot be fully contained in it. In order to discuss the second part of our zoopolitical dispositive, we have to ask what is left of the bull's life besides that specific material remain that is the semen. The answer is that after – and together with – the (material and economic) rendering of the bull's posthumous liveliness (literally its capability to give life), what is left is the bull's (representational) rendering, its textual and visual depiction used to advertise the semen-remnant. This brings us back to the initial inspiration for this article, our virtual meeting with the bull through the pages of Anaborapi's magazine during our first interview with the technicians.

There are three main (interrelated) sources used to advertise the semen of the Piedmontese, on which we draw to articulate our account of the representational rendering of the Piedmontese bulls: *Büta Bin?*, the bulls' online catalogue; *La Razza Piemontese*, Anaborapi's magazine; and NAPA's (North American Piedmontese Association) website. The *Büta Bin?* contains all the information on most of the bulls examined and selected as AI bulls by Anaborapi's technicians since 1976. Here breeders can find up-to-date information on the potential sires for their cattle's progeny.[6] If we click on, for example, *Ultime Uscite,* we get a list of all the latest selected AI bulls with available semen for sale. Bulls are listed in alphabetical order and the viewer can get a first impression of the latest selected animals by reading, for each bull, the names of the respective sires and grandsires on the mother side, how many calves each bull has already had, and his selection and performance indexes (i.e. numbers that guide farmers through the selection of which bull's semen they should purchase to increase the value of their herds). Or, we can search on the *Büta Bin?* for the names of specific bulls. For example, if we look for the bull called Ribelle, we can see his picture, which we can enlarge to better appreciate his morphology, and we can read more information about his genetic potential and biography: his sire was Nobel and his grandsire on the mother side was Genepi; so far, his progeny amounts to 514 calves located in 239 farms and there is still semen available for sale; he was born in Cigliano, in the province of Cuneo, on 04-09-2010, at the farm of his human relative/owner, the breeder Sergio Arborio.[7] The bull is here in part socialised through the display of part of his animal–human family and biography. Yet, and importantly, there is no mention of his death. Nothing is said about whether this bull is still alive (i.e. if, after the collection of the semen, he was sent back to the farms to become a *toro aziendale*) or if he is already dead (we come back to this point towards the end of this section).

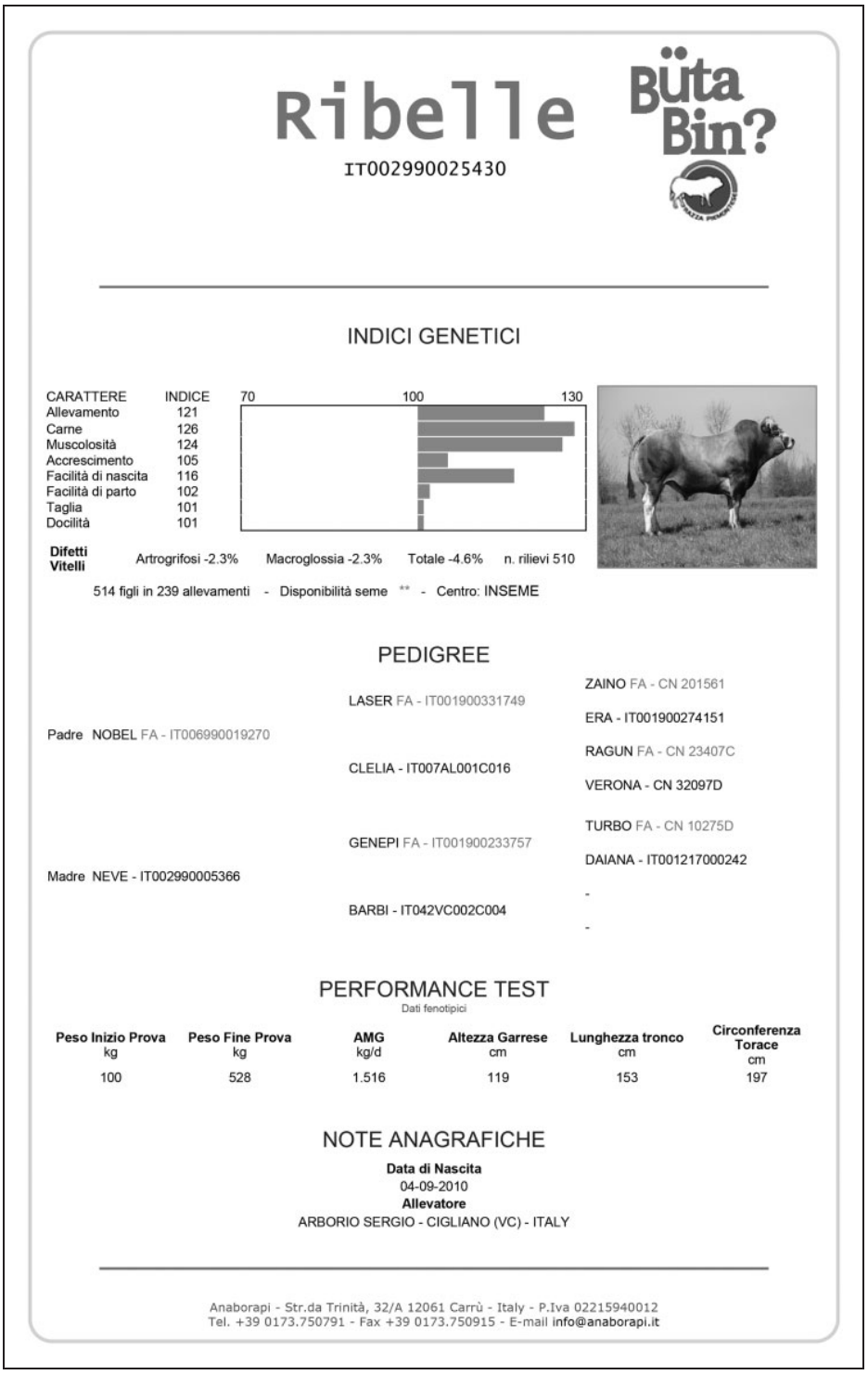


**Figure 1.** Ribelle [AQ3].

In Anaborapi's magazine, the new bulls selected for AI are advertised and presented by using the information from the *Büta Bin?* and by adding some comments that illustrate their future progeny and explain with which dam a specific bull's semen should be used, or not used (to avoid endogamic diseases in the offspring). It must be noted that both in the *Büta*

*Bin?* and Anaborapi's magazine, the EBVs represent the main bulk of information provided to the farmers to help them in making the right choice for the reproduction of their livestock. Yet, importantly, the EBV data are always accompanied by the bull's picture. The presence of the photograph brings us back to the times when the selection of the breed was sensorial, rather than purely calculative, based on the visual and pedigree evaluation of the calves, grounded on a ''tacit knowledge of the animal body'' (Holloway and Morris, 2012: 71). As Anaborapi's director argued, when choosing whose bull's semen to buy, farmers do consider the indexes important, but they always want to see the picture of the bull (interview, 13 October 2014). The tension between the calculative and the sensorial has important consequences for our understanding of the Piedmontese bull's virtual liveness, as we point out in this section's concluding sentences. What is important to acknowledge now is that it is not only the material rendering (i.e. the semen) that travels from Anaborapi's headquarters to the North American continent and elsewhere, but also (thanks to increased use of ICT) the virtual rendering of the bull, a powerful hybrid of numbers, images and texts. It is a virtual eternal life that takes place in its infinitive generative potential, with the consequent possibility of accruing the bull's biography and genealogical tree. For example, in the 'Piedmontese Hall of Fame' hosted on NAPA's website, we can see the pictures and read the history and geographies of famous Olmo:

> Olmo was born in Italy on July 28, 1988 – bred by Luciano Daziano. He was sired by a leading Italian AI bull of the day, named Lugano; and was out of the cow Modena. This fine bull was purchased as a weanling by master breeder, James Mulligan of Australia. However, import regulations at the time prevented Mr. Mulligan from importing live animals direct from Italy into Australia. Therefore, Olmo started a long journey – being shipped first to Denmark to stand in quarantine for a year – before ultimately being exported to Australia. While in Denmark, semen was collected for world-wide export. Olmo was an impressively long bodied, moderate muscled sire with brand new bloodlines for the North American market. Terry McCann of Columbus International Cattle Co., from Saskatchewan, Canada arranged for North American semen distribution rights with James Mulligan. The US and Canadian breeders responded enthusiastically and soon there were Olmo sired fullblood Piedmontese, and crossbreds, gracing the pastures in North America. They started to command attention in the show ring – and there were countless Champions, both male and female, by this great sire. Seven of the 19 Hall of Fame females are sired by this bull. Even today, some semen is available and in use. He left great daughters across North America and also in Australia in the Mulligan's program .... Making him a truly internationally famous sire. (NAPA website)[8]

Olmo acts as the legendary ancestor of the breed in the 'New World', with his progeny ''gracing the pastures in North America'' (*ibidem*). Through the traveling of his body and semen, Olmo transferred the prestige of the Italian breeder Luciano Daziano to the new owner, James Mulligan, in Australia, and from there to the tradesman Terry McCann in North America. Moreover, in the process of marketing the semen, some of the practices that denote companion pets' pedigrees and connote non-human social life (*bios*) – such as having an owner, receiving a name, having parents and offspring (i.e. having a biography), which means receiving an affectivity as well – are attached to the liveness of the advertised bulls; or, in other words, to their afterlife, to the frozen glory of a virtual hall of fame.

All these promotional materials highlight the bulls' dates of birth. Yet, silence is cast on their death. Only experts are aware that AI bulls are already dead when we look at them on catalogues. NAPA's Hall of Fame does not inform us whether Olmo had a long career as *toro aziendale* in Australia or if he shared the fate of AI bulls, i.e. being slaughtered soon after the extraction of his valuable semen. The silence on the death of the bull creates a threshold in which the animal is trapped in-between life and death. His *bios*

has been cancelled by genetic selection technology and mass production, and it has been reduced to bare life by economic calculation. Yet, the image of some of the bull's former social life remains attached to its biological remains, to the semen that is mobilised across the world.

What is at stake here is precisely posthumous liveness, which is produced by a twofold rendering. First, the semen is made available for AI for years after the bull's death. Second, the joint utilisation of images and numbers mirrors the tension between the sensorial and calculative assessments of the bull's vitality (i.e. capability to generate life). This is also an expression of a tension between *bios* and *zoe*. Assessment based on sight, touch and pedigree reputation embedded the bull into an actor-network of affection, connecting the human and the non-human animal into a relationship. Also, EBV-based communication is actually about life, where "'life' is represented through a proliferating series of numbers and statistics" (Holloway and Morris, 2008: 1714). The bull's liveness is epitomised only through the number of his progeny and through the potential life he can still generate (how much semen is still available for sale). Again, we do not mean to praise a pastoralist understanding of 'ye olde goode days' when farmers and animals supposedly lived in harmony. Our point here is that both *bios* and *zoe*, as they appear in marketing material of the Piedmontese, are virtual. These bulls are real (we can see them, they can generate life), yet they are not concrete (they live disembodied, only through pictures, EBV numbers and short narrative texts). Furthermore, through their material and representational rendering, these bulls' productivity is maximised in space and time.

In highlighting that, under biocapitalism, animals are productive even after their deaths, this paper contributes to an emergent body of geographical work that, by focussing on animals as whole-bodied organisms, provides a sophisticated analytical vocabulary to unravel how also non-human animals are part of the fabric of capital accumulation (Barua, 2016; Collard, 2014; Collard and Dempsey, 2013). Our account suggests that the value generated by the commodification of AI bulls far exceeds these animals' whole bodies and concrete existence. AI bulls' life gets 'incorporated' (i.e. made into property and repackaged) and commercialised into different commodities: living organisms (AI bulls), mobile material (semen) and virtual products (specific bulls' semen marketed online). By being circulated, these commodities contribute to taking capital reproduction far beyond these bull's lifespans and places where they are slaughtered. In our account of biocapitalism, life gets incorporated in a variety of living/dead commodity forms, capable of stretching capital accumulation beyond the limits of space and time.

## Conclusion

Our analysis of the rendering of the Piedmontese bulls has attempted to contribute to the on-going posthuman pursuit of disentangling some of the workings of biopolitics with other-than-human beings under a biocapitalist mode of production. Our focus on the threshold between life and death has tried to bridge two streams of geographical literature that, so far, seem to have been diverging: animal geography and research on current bioeconomies. The former tends to have a focus on animals' whole-bodied organisms; the latter, reversely, focuses mainly on organs, tissues and data, overlooking how (bio)capitalism puts also whole-bodied organisms at work to produce value, as recently demonstrated by Barua (2016) and Collard (2014). In exploring aspects of the bioeconomy of the Piedmontese cattle breed, our paper contributes to these geographical debates on more-than-human understandings of capital accumulation. In particular, our paper takes further Barua's (2016) analysis of 'encounter value', as it points to how encounter value may take diverse

forms, some of which transgress the spatio-temporal boundaries of more-than-human whole organisms' lives/deaths. Very specific forms of encounter value are at work in the reproduction of animal capital in the case of the Piedmontese. For example, when breeders select the eligible semen by encountering the living/dead bulls on the virtual catalogues and, simultaneously, referring to a mix of numeric indexes (expressing the bulls' genetic potential) and their tacit knowledge to visually assess the bulls' bodily morphology.

In the following paragraphs, we turn to suggest some directions for further research. Much work, in fact, still needs to be done to investigate the thanatopolitical and biopolitical registers of biocapitalism, and to bring the presence of animals into focus in studies of this mode of production. First, currently, the abnormal mass production of animal death seems to be primarily associated to CAFOs (confined animals feeding operations) rather than to AFNs. With few exceptions (e.g. Cole, 2011), an explicit biopolitics of AFNs has not yet been addressed. The Piedmontese cattle breed is an apparently 'local' and 'happy' bovine population, primarily reared in family-run businesses. These small farms, however, do play a role in the everyday (mass) production of animal lives/deaths and profit from them. The calculative logic that superintends the selection of the breed and optimisation of the time of animals' death is the same for the rearing of the Piedmontese and cattle farmed in CAFO's facilities. Moreover, today the slaughtering of animals reared in small farms and destined to niche markets, and the slaughtering of animals farmed for the mass meat market tend to take place within the same large facilities. Further research is needed to look at how food systems, such as AFNs, may not be exempt from the workings of biopolitics nor escape the thanatopolitical logics of biocapitalism. More generally, the geographies of production and consumption of animal by-products (cosmetics, duvets, asphalt, baseballs, etc.) may provide fruitful empirical fields of investigation to further explore how animals' deaths are vital to the reproduction of biocapitalism.

Second, and perhaps slightly contradicting our previous claim, in order to deepen our understanding of biocapitalism, it would be important to try to overcome the divide identified by Rutherford and Rutherford's (2013) recent review of the geographies of biopolitics; for example, the distinction that looks either at thanatopolitical or vital geographies. Biocapitalism, in fact, puts both life and death to work. In certain instances, as in the marketing of the Piedmontese bull semen, it may capitalise on the space in between life and death. Further, it does not only extract profit from biological forms and fragments of life, 'immaterial' bioinformation and knowledge production. It also targets animal and human *bios*. As Rose (2006) implies, when he considers cognitive enhancement drugs, current bioeconomies, in fact, profit also on human everyday desires for living a better and healthier life in the present and prolonging life expectancies, on our human emotional attitude towards the approaching of (or creating a distance with) death. In this sense, all those commodities and services that span from nutraceuticals, pharmaceuticals, ageing medicine and life-extending programmes to include cryonics, for example, can be seen as part of the circuits of contemporary biocapitalism that profits from the relationship consumers have with life(death), and that exploits non-human life/death. These bioeconomies capitalise, we think, also on the threshold in-between life and death. We therefore invite scholars to metaphorically enter this threshold to explore the ways in which death and life intertwine in the circuits of current bioeconomies and their (uneven) geographies of production and circulation. In other words, we invite further contributions that look into both the thanatopolitical and biopolitical interventions in the circuits of biocapitalism, which exploit and profit from animal–human life and death. Biopolitics is always, in fact, thanatopolitics, and vice-versa.

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## Notes

1. In this article, we sometimes use 'liveness' and 'deadness', rather than 'life' and 'death', to avoid some ambiguity embedded in the use of the latter terms. In fact, while in English (and in most European languages) there are two distinct words for becoming alive (birth) and being-alive (life), the term 'death' denotes both the event of dying and the subsequent status of being dead. Hence, we try to distinguish between death (the event) and deadness (being dead) as opposed to liveness (being alive).
2. As the local press reported almost 30 years ago, loss of libido was registered among Piedmontese bulls, as they were refusing to mate with the cows, http://ricerca.repubblica.it/repubblica/archivio/repubblica/1987/04/15/il-super-toro-all-estrogeno.html (accessed 15 February 2016).
3. Eataly is an international food mall that sells Italian 'high quality' food. In the USA, it has branches in New York and Chicago.
4. http://www.forbes.com/forbes-life-magazine/2000/1113/100things_9-28.html (accessed 15 February 2016).
5. This paper is the result of a multi-sited ethnographic study conducted between 2012 and 2014 on the Piedmontese breed and its beef. Fieldwork aimed to ''follow'' (Cook et al., 2006; Latour, 2005) the Piedmontese to uncover the socio-technical emergence of the breed and beef and their geographies of production and commercialisation. Fieldwork was conducted online and 'offline': primarily between Italy (esp. in Piedmont) and the USA, and also 'globally' by surfing the Net to explore the websites of the Associations of the Piedmontese located in different parts of the world. 'Offline' fieldwork involved several semi-structured interviews with spokepersons of the Piedmontese (breeders, AI technicians and geneticists, farmers, butchers, entrepreneurs, academics); participant observation in farms, butcheries and institutions (i.e. Anaborapi and the museum of the Piedmontese); participation to promotional events and fairs; and archival work in libraries. Online ethnographic activities included Skype interviews and email exchanges with actors involved in the commercialisation of the beef; consultation of the main online catalogue of the Piedmontese bulls; and accessing several international websites related to the commercialisation of the Piedmontese cattle, semen and beef. During our 'following-the-breed' fieldwork, in several

occasions the presence and affective agency of individual animals emerged. The biographies of the specific bulls mentioned in this paper were reconstructed by primarily drawing on the online bulls' catalogue (*Büta Bin?*), the websites of NAPA (North American Piedmontese Association) and the monthly magazine *La Razza Piemontese* published by Anaborapi.

6. http://lg.anaborapi.it/pbl/bbj?0010
7. The number of calves and quantity of available semen changes over time as data are continuously updated. Ribelle's informational sheet was last accessed on 14 February 2016.
8. http://www.piedmontese.org/Hall%20of%20Fame%20Piedmontese%20bull%20OMLO.html (accessed 16 February 2016).

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**Annalisa Colombino** [redacted] [AQ1].

**Paolo Giaccaria** [redacted].

Annalisa Colombino is assistant professor at the Department of Geography and Regional Science at the University of Graz. Her recent research interests focus on animal geography, food geography and more-than-human biopolitics.

Paolo Giaccaria is assistant professor in Political and Economic Geography at the University of Turin. After completing his PhD at the London School of Economics with a dissertation on the use – and misuse – of biological metaphors in geographical discourses, his recent research interests have been focusing on two issues, the biopolitical spatiality of the Third Reich and the Holocaust and non-human biopolitics in cattle breeding. His most recent book is Hitler's Geographies (edited with Claudio Minca, University of Chicago Press, 2016).