

Animal Welfare Bien-être des animaux

Conceptualizing the ethical questions in the use of livestock protection dogs

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In the functioning of the mammalian eye complex, only one point in the visual field is perceived in detail, while all other points are perceived with progressive decreasing acuity towards the periphery of the field. The mental construction of an object visually perceived will concentrate attention with clearness on only one or a very few of the attributes available for examination. A tile mosaic or a Rembrandt painting is meaningless if visually examined from only centimeters distance. Our opinions of the ethical use of animals may function in a similar way. An individual may have a clear and convincing opinion on an aspect of a complex ethical issue of animal use; the particular tile which is the individual's primary focus of the mosaic. Around this strong personal conviction, there will be a twilight zone acknowledged but not clearly seen; by shifting the attention a little, a new tile will be brought into focus and the extent of the moral conviction may be changed although the identity of the concept is maintained. There will always be a zone about which one cannot say with certainty that a specific consideration is or is not within the concept of an ethical opinion (1).

This paper, using the example of livestock protection dogs (LPD), attempts to articulate on the difficulty or impossibility of drawing sharply defined lines around any ethical concept relating to the human use of non-human animals.

The concept of using dogs to protect sheep and other livestock from predators is an ancient one and can be traced back to Eurasia many centuries before the current era (2,3). Livestock protection dogs are still being used in Europe and Eurasia by nomadic cultures. Although there are a dozen traditional livestock protection dog breeds, they share the same basic behavior and morphologic features. Inherited behavior includes dogs which bond to livestock instead of people, travel with the flock/herd, stay with the herd day and night, and are an effective defense against would-be predators, although the actual basis of causing predator aversion is unclear. The phenotypic standard breed types are large breed, large skull, floppy-eared, sheep-sized, sheep-shaped dogs (4).

In the late 1970's, there began a resurgence in the use of LPDs in North America subsequent to the reintroduction of

wolves to previously eradicated areas and increasing restrictions on the use of poisonous substances to kill predators. In addition, there is a public interest and a desire by some farmers to use nonlethal methods of reducing the loss of livestock to predators (5-7). Livestock protection dog technology has been adapted to Australia (8,9), Norway (10,11), Finland (12), Germany, and Slovakia with the reintroduction of wolves (*Canis lupus*) (13,14), in cheetah deterrence in South Africa (15) and in protecting goats from large native felids in Patagonia (16).

Livestock protection dogs are raised from the time of weaning to adulthood with lambs and sheep (or other species they are intended to protect) to which they form a strong attachment. As working adults they are generally fed from a self-feeder, bed down with the flock and no avoidance behavior of the sheep is directed toward the presence of the LPD (5,8). Livestock protection dogs have additional behavioral characteristics that distinguish them from other breeds. They are submissive and show no predatory behavior towards livestock; they are strongly bonded to their flock-mates whom they will protect (3,5,6). Upon the appearance of a predator the adapted LPD moves to a position between the flock and the predator. Adapted sheep often will reposition themselves and tightly cluster behind the LPD upon a predator approach (3,4). The LPD may bark and chase the predator a short distance but quickly returns to the flock. The result is a "preventive" defense, usually without physical contact between dog and predator. LPD-wolf interaction is highly ritualized and physical contact is rare; however, the dogs are effective at deterring wolf predation on sheep flocks (10). Reports of LPD effectiveness against sheep and lamb loss vary, in part because various breeds of sheep differ in their tendency to cluster close to each other while grazing (4,5). Surveys in the USA extensive grazing management systems found that 53% of shepherds reported predation ceased and 77% reported a decrease in predation after placing LPD's (reviewed in 16).

An ethical barrier to LPD use is that the working environment is hazardous to the dog from other than predator threats. The average protection dog has a short working life. In a US study 32% of dogs intended for flock protection died before reaching adulthood; causes: unknown 23%, hit by vehicle 23%, maliciously shot 23%, health problems 18%, field accidents 9%, and unsuitable behavior (aggressive towards sheep) 4% (5). In a US experimental project operating for 10 y, the annual production of 100 plus pups/y was required to maintain a stable working field population of 300 LPD's (17) as LPD's are generally slow to mature and not fully effective until the third year of life and later (3).

An unintended consequence of implementing herd protection with dogs is that LPD's have been reported to kill slow moving

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Table 1. The five freedoms ethical matrix^a related to the use of livestock protection

| Respect for: | Freedom from hunger and thirst | Freedom from discomfort | Freedom from pain, injury, or disease | Freedom to express normal behavior | Freedom from fear and distress |
|----------------------------|--------------------------------|-------------------------|---------------------------------------|------------------------------------|--------------------------------|
| Livestock protection dog | 5 | 4 | 3 | 4 | 5 |
| The herd of sheep with LPD | 5 | 4 | 4 | 4 | 4 |
| Wild carnivores | 4 | 5 | 5 | 5 | 5 |
| Free ranging ungulate prey | 5 | 5 | 5 | 5 | 4 |
| Meso-predators | 5 | 4 | 4 | 5 | 4 |

^a The ethical matrix is organized so that the groups worthy of respect are listed in the Y-axis and the principals under consideration are listed across the X-axis. This matrix has Likert-like scale with numerical values from -5 maximal negative effects to positive 5 the best environmental conditions humans can currently imagine for ideal canine welfare. For example, a large breed dog kept in the dark in a box unable to stand up or lie down would score a -5 on "freedom to express normal behavior," whereas a working LPD never restrained in any way scores 5.

meso-predators such as raccoons, opossums, and skunks. This specific canine behavior may have the unintended consequence of decreasing predation of eggs and hatchlings of ground nesting birds the more common target food of these meso-predators (18), an outcome with a mixed benefit if ground nesting birds are endangered.

Ethical tools are methods or processes used to structure an ethical discourse by identifying a broad set of values and to encourage reflection on how particular choices or adoption of specific policy will affect a wide range of stakeholders (19). To identify what animals deserving of ethical consideration may be affected by the placement of LPDs with sheep in areas of Canada where sheep are lost to predation by coyotes and wolves; we construct two ethical matrices (20,21). The ethical matrix format is a problem-organizing tool for discussing problems of technology in which groups of humans have strongly held but differing opinions. As the ethical matrix is normally used to articulate human interests one usually has the 3 primary ethical considerations: care for well-being, respect for dignity, and justice on the x-axis and the groups of human individuals affected by the decision on the y-axis (22).

In our construct we focus on the primary non-human animals of moral standing (vertebrates). Living things such as the nose botfly of sheep (*Oestrus ovis*) and a tapeworm (*Taenia multiceps*) are considered to not have moral standing in this discussion. The original Ethical Matrix process was developed by Ben Mepham, Director of the Centre for Applied Bioethics at the University of Nottingham and a member of the Food Ethics Council of the UK, to apply to moral issues such as the use of genetically modified plants and animals in human food production (20). The ethical matrix has been an effective tool in articulation of ethical decisions in other contexts than in adoption of food technology (23).

Our first matrix is constructed, using for animal welfare principals, the 5 freedoms of The Bramwell Report (24). The second matrix uses moral principals from a wildlife management construct (25). Our matrix constructs do not include human interests at all and instead focus on the non-human animals affected by LPD use to prevent wild carnivore predation of sheep.

Most of the recent literature on animal protection is focused on the companion animal paradigm of assuring the welfare of the individual animal; treating all vertebrate animals as having inherently equal interests to remain alive; fulfill their "natural"

behavioral interests (within reason); and avoid pain at the time of death. In biologic conservation (environmental) ethics, a more geo-ecosystem view is taken in which it is permissible to sacrifice the interests of individual animals, if by doing so the integrity of the ecosystem and species diversity is maintained (26,27).

To discuss the ethics of LPD use in this example we assume 2 unproven statements to be true. First, respect or moral standing is only extended to sentient beings which are only about 1% of the fauna with the invertebrates representing 99% of species. Secondly, tradition demands that farmers have a right to graze sheep on large unfenced areas of land. This "right" places the domestic animals where they come into competition with free-ranging herbivores for the consumption of plant species and come into conflict with apex carnivores as a source of food. The ethics of this tradition is not discussed in this essay.

Generally scientifically supported facts about LPD's are that: i) they work to decrease predation on sheep by coyotes and wolves; ii) the interaction with wolves is best documented and the LPD interfere with the wolf behavior repertoire necessary to kill sheep. The LPD and wolf seldom come into contact and the deterrence is via ritual canine signaling common to both LPD's and wolves (7,28,29); iii) livestock protection dogs for the most part do not kill wildlife, or wandering farm dogs as the LPD will not pursue a carnivore more than a few hundred meters as they are behaviorally compelled to remain with the flock; and iv) the short lifespan of the LPD is due to the dangerous workplace; hit by cars, snake bite, shot by neighbors, accidental or intentional poisoning, and other accidents common to dogs on-farm not used as LPD's.

In considering the 5 freedoms ethical matrix (Table 1); the individual livestock protection dog has a very good life compared to an urban apartment-dwelling poodle. The risks to poor welfare are: poor weather can result in discomfort, possible delay in veterinary treatment when injured at work (remote and unattended), a painful death due to farm accident is a significant risk, and reproductive behavior is normally suppressed by surgical sterilization of both genders in working individuals. The sheep are across the board winners as they are minimally interfered with, endure less predatory activity by large carnivores, and probably less predation-related fear. Protection dogs are not universally successful in preventing all predation, especially in breeds of sheep that do not tend to remain in a single flock. In considering the effect of the LPD on potential predators,

Table 2. The Policy principals wildlife management ethical matrix related to the use of livestock protection dogs

| Respect ^a | Do no intentional harm | Treat all with respect and compassion | All animals have intrinsic value |
|--------------------------|------------------------|---------------------------------------|----------------------------------|
| Livestock protection dog | Equivocal ^b | Yes | Yes |
| The LPD protected flock | Yes | Yes | Yes |
| Apex wild carnivores | Yes | Yes | Yes |
| Free ranging prey | Yes | Yes | Yes |
| Meso-predators | No ^c | Yes | Equivocal ^d |

^a The “Respect” terms for ecosystem management are couched within a different ethical paradigm in which individual animals are held as a class of animal not an individual animal. The ethical question is centered on how the decision to place a livestock protection dog in the sheep grazing environment affects the stability or sustainability of the living system.

^b The LPD is neutered and placed in an environment known to be hazardous to dogs, so although no harm is “intended” harm is caused by neutering (violation of the integrity of the body) and anticipated by the type of animal use (decreased probability of normal lifespan). In livestock kept for meat production a short lifespan is an intended outcome of the production system and not considered a harm providing there is humane slaughter.

^c It is anticipated that meso-predator populations will decline in areas using LPDs. The decision to allow the unintended population decline is a consequence for which the decision-maker is accountable because it can be expected.

^d Inherent in managing ecosystems is the ethic that not all animal life is of equal value and some populations must have numbers controlled to maintain an ecological balance. All animals have intrinsic value but some animals are more valuable than others.

preventing the predation of sheep may cause the apex carnivore to work harder for food. In considering effect of the LPD on free-roaming ungulates, there have been reports of guard dogs treating reindeer as a potential threat in Norway where sheep and domestic reindeer grazing may overlap. This is a negative unintended effect (10,11).

It is also possible that the presence of LPD’s and sheep return apex predator behavior to more reflect the environment in the absence of domestic animal grazing. This may increase the overall health of the indigenous prey population by selective removal of the old and weak and allowing freer access to the healthy reproductively successful animals to choice habitat. This is a positive unintended effect.

The meso-predators such as skunks, raccoons, and wolverines which normally prey on rodents, lagomorphs, and avian animal sources are decreased in number by the presence of LPD’s as they do not retreat quickly enough outside the dog’s protection zone. The Final Report of the Committee of Inquiry into Hunting (Burns Inquiry, UK) indicated a negative affective state in the final seconds of life of a fox hunted by dogs and man on horseback: *There is a lack of firm scientific evidence about the effect on the welfare of a fox of being closely pursued, caught and killed above ground by hounds. We are satisfied, nevertheless, that this experience seriously compromises the welfare of the fox* (30). It is reasonable to extrapolate that a meso-predator being killed upon interaction with a LPD is at least as humane as being killed by hounds; however, in the absence of terrorizing the animal with the chase. Compared to the situation of being run to exhaustion and torn apart by hounds (the traditional British “hunt,” –5 moral score), an LPD meso-predator interaction would be rare, unintentional, quickly resolved, and a predictable but not an intended outcome of the use of LPD’s. Death of animals in and of itself is generally not a welfare issue as once dead, animals cannot experience either positive or negative states (31). It has been argued that the loss of potential positive experiences had the animal lived longer, is a possible injury to the now dead animal (32).

In considering the matrix derived from wildlife management ethical principles (26) (Table 2) it is clear that the placement of LPDs will result in meso-predator death and this is a welfare issue to the meso-predator. Conservation ecologists have argued

that “morally” this is a positive outcome in that ground-nesting bird populations are positively impacted by meso-predator population control (26). This consideration places the meso-predator as equivocal in the respect for all animals’ intrinsic value principal; however, intrinsic value does not mean equal value. In wildlife management, the ethical position that all animals have equal value is incompatible with complex sustainable ecosystems.

It is possible that placing an LPD in the field should be avoided because a shortened lifespan can be reasonably assumed for most dogs so employed. This forces a re-visit to the unanswered question of what is the value of life duration to an animal. Is a heroic life, outdoors with companion animals to which a dog is strongly bonded worth the risk, *to the dog* of premature accidental death? Compared to a long life of inactivity and boredom in solitude in an urban setting, the risk seems reasonable to take if dogs had freedom of choice and held anthropomorphic values, both of which are without objective support.

This discussion leads to no entirely convincing answer. From the principals articulated using these 2 artificial constructs it seems reasonable that society not interfere with the current farming practice of using LPDs. There remains a social responsibility to assure and to improve the work conditions of LPDs, as with all working dogs. The matrix constructs failed to capture externalities to widespread use of LPDs such as the possible benefits of altered human behavior such as stopping the poisoning of apex predators and the practice of predator kill-on-site, common in herding cultures. Society and the environment were intentionally not included in the list of moral agents; however, the scientific evidence would suggest that the best accommodation of extensive livestock grazing and ecosystem protection may include the use of LPDs with reasonable trade-off in moral costs.

The authors hope that this discussion will encourage readers to reflect on the possible currently unconscious matrices we are using in the many ethical decisions made by veterinarians daily.

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