Welfare Implications of

Hot-Iron Branding and Its Alternatives

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THE ISSUE

Brand (brānd) n. A mark indicating identity or ownership, burned on the hide of an animal with a hot iron.[1] Branding is a means of identifying livestock and has been practiced for thousands of years. Alternatives to hot-iron branding have more recently come into use. Current methods of livestock identification include but are not limited to: ear tags, ear notches, back tags, neck chains, tail tags, freeze brands, hot-iron brands, tattoos, paint marks, leg bands and electronic identification (e.g., electronic ear tags, microchips, electronic collars).[2] These methods all have advantages and disadvantages, including the varying degrees of pain experienced by the animal.

WHAT IT IS

Branding of livestock is accomplished by thermal injury of the skin. Most commonly, a hot iron is placed on the unanesthetized skin for the amount of time needed to remove all hair and burn the skin sufficiently to leave a permanent scar in the shape of a symbol.[3] The hot-iron induced scar results in permanent alopecia.[3] Freeze branding causes the death of pigment-producing cells in the hair follicles.[3] This results in an area of depigmented hair upon regrowth.[2] Both hot-iron and freeze branding are considered to be painful for ruminants.[3,4,5]

WELFARE CONCERNS

Assessing pain associated with routine management procedures can be difficult. Physiological methods such as blood cortisol concentrations and heart and respiratory rates are frequently used to assess the amount of pain experienced.[6] However, the interpretation of data is often confounded by stress responses associated with handling and restraint of the animals.[7] Behaviors such as vocalization, kicking, tail-flicking, and escape have been shown to be reliable indicators of pain in cattle.[6,8] Studies have also evaluated exertion force.[5,9] Exertion force is measured by fitting the headgate and squeeze chute used to restrain the animal with strain gauges and load cells.[9] Animals are restrained for 10 seconds prior to branding to obtain baseline measurements of the force exerted.[9] Measurements are then taken during branding for comparison.[9] The amount of time each animal exerts force on the headgate and squeeze chute can also be recorded.[9] Another method of evaluating pain is image analysis of behavior. With this method the motion of each animal's head is videotaped during branding.[5] The camera is positioned such that the entire range of horizontal and vertical head movements can be taped.[5] Each animal is videotaped for the entire length of time required to complete each brand.[5] The video is then analyzed using a digital image processing system.[5] The distance and velocity with which the head moves are calculated and compared across treatments.[5]

Hot-Iron Branding— One study revealed elevated mean plasma epinephrine concentrations in hot-iron branded animals compared with freeze- or sham-branded animals.[4] Another study revealed higher plasma cortisol concentrations in hot iron-branded animals than sham-branded animals.[8] Hot-iron branding has been shown to cause pronounced behavioral responses (see above) at the time of iron application.[4,8,9,10] When exertion force (see above) is evaluated hot-iron branded animals exert higher

average[9] and maximum[5,9] force against the headgate load cells than freeze-branded or sham-branded animals. Hot-iron branded animals also exert force for longer periods than freeze- or sham-branded animals.[9] When image analysis of behavior (see above) is conducted, hot-iron branded animals had higher maximum, average, and cumulative head movement distances than freeze- or sham-branded animals.[5] Hot-iron branded animals also had higher head velocities than freeze- or sham-branded animals.[5]

Freeze Branding—One study has shown freeze-branded animals have greater plasma cortisol concentrations than sham-branded animals with the concentrations being similar to those of hot-iron branded animals.[8] Another study has shown freeze-branded animals have increased tail-flick frequencies compared with sham-branded animals.[9] When exertion force (see above) was evaluated freeze-branded animals exerted higher maximum force against the headgate load cells than sham-branded animals, however, the exertion was not as great as in animals that were hot-iron branded.[5,9] Freeze-branded animals also exert force for longer periods than sham-branded animals, but once again, the value is less than that exerted by animals that are hot-iron branded.[9] When image analysis of behavior (see above) was evaluated freeze-branded animals had higher maximum head movement than sham-branded animals, but less than hot-iron branded animals.[5] Freeze-branded animals also had higher head velocities than sham-branded animals, but lower head velocities than hot-iron branded animals.[5]

Other Alternatives—There is a lack of peer-reviewed literature pertaining to pain caused by other methods of identification. Ear notching, ear tagging and tattooing are identification methods that are frequently employed and most likely have some amount of pain associated with their use. However, this pain is believed to be less than that experienced by hot-iron or freeze-branded animals. Welfare impacts associated with the application of back tags, tail tags, paint marks and leg bands are expected to be low because the techniques are minimally invasive. Literature is also lacking with regards to the welfare impacts of neck chains/collars. Anecdotally we know that neck chains/collars can be a problem if animals catch the chain/collar on something. Electronic identification methods are still new and research is ongoing. Some electronic methods are expected to have welfare impacts similar to their nonelectronic counterparts (e.g., ear tags), while others will need more evaluation (e.g., ruminal bolus).

STATE REGULATIONS

Many states have brand registries, inspection services and regulations related to branding livestock. However, only four states currently require that cattle be hot-iron branded. In all four states the regulations apply to cattle that have been imported from Canada[a] or Mexico[b].

FEDERAL REGULATIONS

Federal regulations addressing branding are located within the Code of Federal Regulations Title 9 Chapter 1.[11] These regulations are directed at disease control, specifically tuberculosis and brucellosis. The USDA requires a hot-iron brand on cattle that are reactors for tuberculosis ("T" brand), exposed to tuberculosis ("S" brand) or are reactors for brucellosis ("B" brand).

However, in regard to livestock identification, the USDA APHIS website states:
"Livestock identification in the United States has been documented in large animal production industries dating back to the late 1800's and early 1900's. Cattle ranchers, to indicate ownership and deter theft, first used hot iron branding. Swine producers for registration and record keeping purposes used ear notches for individual animal identification. These two methods are rapidly losing popularity due to concerns about humane treatment of animals and a decrease in product value."[2]

So, while hot-iron branding currently plays an integral role in disease control it is also recognized as less welfare friendly than other forms of identification.

AROUND THE WORLD

Countries around the world are taking steps to protect the welfare of animals. The National Farm Animal Care Council (NFACC)[c] of Canada has a Code of Practice for the Care and Handling of Farm Animals: Beef Cattle[12] that states the following:

"Section 11. Identification

11.1 General

11.1.1 Permanent identification is an essential aspect of the cattle industry as legal proof of ownership.

11.1.2 The industry encourages the development of the least painful means of identification.

11.1.3 Under some circumstances, hot iron or freeze branding is necessary. It is acknowledged that branding is a brief, painful experience. When branding is required, it should be done quickly, expertly, with the proper equipment, and in accordance with accepted standards. Brands should be an appropriate size to achieve clear identification and cause the least possible pain to the animals.

11.1.4 In consideration of the welfare of the animals, cattle should not be rebranded—particularly as bills of sale are a record of ownership. Governments and industry are encouraged to eliminate any current regulations requiring rebranding.

11.1.5 Wattling, ear splitting, and other unnecessary surgical alterations of cattle for identification or cosmetic purposes are strongly discouraged."

Similarly, New Zealand has developed an animal welfare code for sheep and beef cattle that states: "Sheep and beef cattle are usually identified by earmarking (or notching), by ear tagging or less commonly by permanent identification such as freeze or hot branding. These procedures cause pain and the general principles outlined in the *Animal Welfare (Painful Husbandry Procedures) 2005 Code of Welfare* should be followed.

Minimum Standard No. 13 – Identification

(a) All identification procedures must be applied by a competent operator.

(b) Hot branding must only be used with pain relief.

Recommended Best Practice

(a) If ear marking is performed, as little as possible and no more than 10% of ear tissue should be removed, using an implement that is clean and sharp.

(b) Freeze branding should only be used with pain relief.

(c) Care should be taken when applying an eartag to avoid hitting the cartilage ridges or major blood vessels."[13]

The Australian Department of Agriculture, Fisheries and Forestry is converting its Model Codes of Practice into the Australian Animal Welfare Standards and Guidelines.[14] The Model Code on cattle states:

"5.7 Identification

5.7.1 Ear-tagging, ear-marking, ear-notching, ear-tattooing, udder-tattooing, udder-implanting, freeze-branding, photography and radio frequency identification devices (RFID – e.g. microchips) are the preferred methods of identifying cattle from a welfare viewpoint. In some situations, however fire branding may be the only practical method of permanently identifying cattle. As State/Territories may have differing regulatory requirements for cattle identification, these should be checked. Cheek (face) branding is illegal in some States.

5.7.2 Cattle must not be branded with corrosive chemicals."[15]

SUMMARY

Animal identification is an important management tool for livestock and an integral part of the federal disease control program. Animal welfare should be considered when choosing a method of identification and every effort should be made to use methods that cause less pain and distress for the animal.

FOOTNOTES

[a]Montana http://liv.mt.gov/liv/ah/orders/0801i.pdf, Nevada http://www.leg.state.nv.us/NAC/NAC-571.html#NAC571Sec002, and Oregon http://egov.oregon.gov/ODA/AHID/animal_health/import_cattle.shtml

[b]Idaho http://adm.idaho.gov/adminrules/rules/idapa02/0421.pdf

[c]NFACC is the culmination of over 4 years of discussion amongst diverse groups of stakeholders on the value of a national approach for farm animal care. http://www.nfacc.ca/AboutNFACC.aspx

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[12] The National Farm Animal Care Council of Canada has a Code of Practice for the care and handling of farm animals: beef cattle. Available at: http://www.nfacc.ca/pdf/english/BeefCattle1991.pdf Accessed: July 14, 2010.

[13] New Zealand Animal Welfare (Sheep and Beef Cattle) Code of Welfare 2010. Available at: http://www.biosecurity.govt.nz/files/regs/animal-welfare/req/codes/sheep-beef-cattle/sheep-beef-cattle-code-2010.pdf Accessed: July 14, 2010.

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