

TITLE:

Ethnoveterinary medicines used for horses in Trinidad and in British Columbia, Canada

ABSTRACT:

This paper investigates the commonalities in ethnoveterinary medicine used for horses between Trinidad (West Indies) and British Columbia (Canada). These research areas are part of a common market in pharmaceuticals and are both involved in the North American racing circuit. There has been very little research conducted on medicinal plants used for horses although their use is widespread. The data on ethnoveterinary medicines used for horses was obtained through key informant interviews with horse owners, trainers, breeders, jockeys, grooms and animal care specialists in two research areas: Trinidad and British Columbia (BC). A participatory validation workshop was held in BC. An extensive literature review and botanical identification of the plants was also done. In all, 20 plants were found to be used in treating racehorses in Trinidad and 97 in BC. Of these the most-evidently effective plants 19 of the plants used in Trinidad and 66 of those used in BC are described and evaluated in this paper. Aloe vera, Curcuma longa and Ricinus communis are used in both research areas. More research is needed in Trinidad to identify plants that respondents claimed were used in the past. Far more studies have been conducted on the temperate and Chinese medicinal plants used in BC and therefore these ethnoveterinary remedies reflect stronger evidence of efficacy.

Data collection ::: Background:

Data collection in Trinidad took place in 2000, with further work conducted in 2003. Data collection in BC was carried out in 2003. The respondents were ethnically and demographically varied. A selection of both sets of ethnoveterinary remedies is evaluated in the discussion section of the paper using a non-experimental validation method. The Trinidad component of this study was derived from a larger research project on ethnoveterinary medicines used in Trinidad and Tobago [4]. This previous study revealed that the main outcome or synergy in folk medicine is that all the knowledge is available to all ethnic groups in a kind of 'melting pot' and that there are no rigid barriers preventing the spread of knowledge between the various ethnic groups. In order to gain access to the study population the authors worked through previously known individuals and from previously existing social networks in building a snowball sample and hence a network of interviewees [8]. The first contact relating to this study was a race-horse owner (#8 top earner for the period 1994 to 2000); she drove the first author to the initial visit to the racetrack and to the broodmare farm where her horses were kept. She also introduced the author to several of the trainers. When respondents in the horse racing industry were contacted subsequently it was discovered that they already knew about the research from the initial contact. Interviews in Trinidad took place from July to September 2000 (CL) and in 2003 (KG). The interviews conducted in Trinidad in 2003 reassessed the initial data (a form of triangulation). The research was facilitated by community-based contacts and occupationally based contacts obtained from newspapers. This networking approach was necessary because there is no sampling frame of persons involved in ethnoveterinary medicine in Trinidad. It produced the desired purposive sample of key respondents.

Four visits were made to the sole racetrack; one of these was on a race day. One visit each was made to three of the six brood mare farms in Trinidad, located in North, East and Central Trinidad. At the racetrack, ten trainers and two assistant trainers were interviewed and one retired trainer was interviewed by phone (this sample is one-tenth of all trainers in Trinidad). The sample frame for choosing the trainers was obtained from the sports pages of the three daily newspapers and from the statistics kept at the University of the West Indies library. All of the interviews were unstructured and open-ended. One of the trainers was also a practising veterinarian. Seven of the ten trainers are recorded in the statistics kept on the "top 25" winners (1994–2000) (#3, #4, #6, #7, #9, #14, #18).

Of all of the trainers interviewed two used no ethnoveterinary medicines, 25% were active users while others reported past use in the 1970s or what they had observed others using. Four grooms were interviewed; they were current users of ethnoveterinary medicines. Six owners/breeders or their representatives were interviewed in 2000, two of them by phone. Four were ranked among the "top 25" in winnings (1994 – 1998) (#1, #7, #8, #12); only one used ethnoveterinary medicines. Three of the six veterinarians consistently working with horses were interviewed, two reported

their knowledge of **ethnoveterinary medicines**, one was also a trainer as indicated above, the other a former jockey.

In 2003, four trainers were interviewed (one by phone). One was selected to confirm the previous data; two were interviewed in 2000, but independently selected in 2003; one was new.

Additionally a groom, a stable lad, an assistant trainer, a jockey and a recently graduated veterinarian were interviewed.

**Ethnoveterinary** data for **British Columbia** was collected over a six-month period in 2003. All available literature about livestock farmers and the secondary literature on **ethnomedicinal plants**, folk medicine and related fields in **British Columbia** was reviewed.

A purposive sample of livestock farmers was necessary to target key informants with the knowledge sought. The sample size was 60. The sample was obtained from membership lists of organic farmers, horse breeders and trainers, horse stables, other specialists in alternative medicine and holistic veterinarians.

Interviewees comprised one naturopath, four horse breeders/trainers, two herbalists, one farmer and one headmistress with horses at her school (for girls). All of the respondents used **herbal medicines for horses**. Two visits were made to each farm or respondent, and to the Hastings racecourse in Vancouver. All of the interviews at the initial stage were open-ended and unstructured. A draft outline of the respondents' **ethnoveterinary remedies** was delivered and discussed at the second visit in order to confirm the information provided at the first interview. Medicinal plant voucher specimens were collected where possible and were identified and deposited in the University of Victoria herbarium (V).

The **plant-based remedies** were evaluated for safety and efficacy with a non-experimental method, prior to including them in the draft outline. Published sources such as journal articles and books and databases on pharmacology and **ethnomedicine** available on the Internet were searched to identify the plants' chemical compounds and clinically tested physiological effects. This data was incorporated with data on the reported folk uses, and their preparation and administration in North America and Europe. For each species or genus the **ethnomedicinal** uses in other countries are given; followed by a summary of chemical constituents, in addition to active compounds if known. This type of **ethnopharmacological** review and evaluation is based on previous work and the use of these methods in a previous research study has been published [4,9-11]. The non-experimental validation of the plants is presented in the discussion section of the paper.

#### Validation workshop :: Background:

Ten participants with experience in traditional human and **ethnoveterinary medicine** took part in a participatory five-day-long workshop at the University of Victoria (BC), in October, 2003. In the workshop the facilitator asked participants very specific questions in a supportive environment about the **medicinal plants** used. Each animal/livestock species was covered in a morning or afternoon session [4,11]. At the horse session the four participants (two horse trainers and two herbalists), introduced themselves and their work and were instructed on the participatory workshop method. The participants discussed the previously produced horse section of the data. There were two editorial assistants/facilitators in attendance. After the discussions, the horse section was edited. In addition, two herbalists in Port Alberni were visited by the **ethnoveterinary** consultant and the researcher (CL) and the edited horse data was discussed with them. One trainer with horses at the Hastings racecourse visited the researcher after the workshop and discussed the workshop-edited horse data with the researcher and the **ethnoveterinary** consultant.

#### Non-experimental validation of **ethnoveterinary remedies** :: Background:

The researcher and the **ethnoveterinary** consultant completed the non-experimental validation of the remedies in advance of the workshop. A low-cost, non-experimental method was used to evaluate the potential efficacy of the **ethnoveterinary remedies** [9-11]. This method consisted of:

- obtaining an accurate botanical identification of the **herbal remedies** reported;
- searching the pharmaceutical/pharmacological literature for the plant's identified chemical constituents in order to determine the known physiological effects of either the crude plant drug, related species, or isolated chemical compounds that the plant is known to contain. This information was then used to assess whether the plant use is based on empirically verifiable principles.

Supporting ethnobotanical data and pharmacological information was matched with the recorded folk use of the plant species [12-18], to determine degrees of confidence about its effectiveness. Four levels of confidence were established:

1. Minimal level: If no information supports the use it indicates that the plant may be inactive.
2. Low level: A plant (or closely related species of the same genus), which is used in distinct areas in the treatment of similar illnesses (humans or preferably animals), attains the lowest level of validity, if no further phytochemical or pharmacological information validates the popular use. Use in other areas increases the likelihood that the plant is efficacious.
3. Mid level: If in addition to the ethnobotanical data, available phytochemical or pharmacological information is consistent with the use, this indicates a higher level of confidence that the plant may exert a physiological action on the patient.
4. High level: If both ethnobotanical and pharmacological data are consistent with the folk use of the plant, its use is classed in the highest level of validity and is considered efficacious.

Plants used for diarrhoea :: Ethnoveterinary remedies used in Trinidad :: Results:

Guava (*Psidium guajava*) leaves, young fruits and/or buds were boiled and mixed with mash or bran or a combination of both and given to the horse to eat by three respondents after orthodox treatments had been tried. One respondent used young green fruit of the banana (*Musa* sp.) including skins once for one horse. The banana fruit was boiled, crushed and mixed with the mash and this was given to the horse to eat. Another respondent used carrots (*Daucus carota*) (eight kg). One respondent reported a one-time use of stale cow dung, which was pushed down the horse's throat in order to obtain beneficial bacteria. This practice of using cow dung was confirmed by another respondent.

Plants used for tendonitis :: Ethnoveterinary remedies used in Trinidad :: Results:

Medicinal plants for tendonitis were preferred by those who believe that horses don't have much circulation from the knee down; therefore ice is seen to be of no value for swelling. One respondent claimed that treatment was based on the stage of injury. He believed that the herbal remedies were more effective in the first stages of injury and stressed that rest was the most important factor for the recovery process.

Tendon and ligament problems were described as the second biggest affliction after respiratory problems. Horses with sprained tendons or ligaments have joints of rchette (*Nopalea cochenillifera*) applied directly to the injured area. The mucilage obtained from inside the rchette joints may be mixed with flour and or Epsom salts. Two respondents practiced tendon splitting, or splitting of the affected suspensory ligament and the flexor tendon into the normal tissue above and below the lesion. Respondents do this to increase circulation to the affected area and thus enhance the healing process. Castor bean leaves (*Ricinus communis*) were quickly passed over a flame, and wrapped around the clay already placed on the injured tendon, which was then left to heal. Joints of rchette (*Nopalea cochenillifera*) were split open, mixed with aloe (*Aloe vera*) or clay, and packed on to the tendon. This poultice was said to help with the healing process and to keep "heat" from the damaged tissue or injured joint out of the tendon. Alternatively, leaves of wonder of world (*Kalanchoe pinnata*) were used to remove the "heat" from the injured leg. Wonder of world is claimed to have antiinflammatory properties. The rest of the treatment consists of rest and those trainers who believe that using ice has value use an ice pack to completely cover the leg.

Three interviewees blister flexor tendons or suspensory ligaments to help the healing process. The method consists of rubbing the tendon with iodine or mercuric iodine on a toothbrush for three days. This practice is stopped for three days and then another cycle is started. After the raw scab comes off, aloe (*Aloe vera*) is applied to help the tissues and skin heal. Blistering agents' remove the hairs from the injured part, there is localised swelling, the skin sloughs off and subcutaneous necrosis can also occur. Blistering necessitates rest since a long healing period is required. Horses were not blistered above the knee. The iodine is said to act as a counter irritant, which brings blood to damaged part, and the increased circulation enhances the healing process. Bucked shins were described as an injury in the forelimb of young horses after exercise and were also blistered. There is periostitis of the plantar surface of the third metacarpal (or metatarsal) bone. Horses with tendon injuries were also taken to the sea for exercise to take the weight off the legs. Alternatively the injured leg is placed in brine from salted pig tails; both practices were said to harden the tendon. This remedy is thought to be over 30 years old. Aloe (*Aloe vera*) was also used for soreness in horses' joints, the gel is made into a paste, applied and then the joint is bandaged.

Poultices were made with river clay or white clay. Some buy the clay already prepared while others do their own preparation. Other poultices were made with a combination of clay, washing soap (hard bar) and glycerine and Epsom salts. The clay keeps the horses legs cool. Poultices were sometimes made with a combination of aloes, rachette, glycerine and Epsom salts, and were said to have a "drawing" effect.

Young castor bean leaves (*Ricinus communis*) or two to three young almond leaves were warmed and the veins were crushed (n.b. Trinidad almond is *Terminalia catappa*, this plant was identified from the literature). These leaves were put on minor injuries and bandaged. It is said that oil runs out of *Ricinus communis* leaves and cools the "heat" or swelling in the leg. Horses with bad tendon injuries were treated with rachette and aloes. This particular treatment is called "sweating it down." The plants were grated and packed on the leg. In terms of dosages all respondents used sufficient plant material to cover the area being treated. The leg is then wrapped with a football sock that has had the toe cut off. The sock is then tied at the bottom. The plants were thus packed inside the sock. The sock is then wrapped with a bandage to keep it in place. An alternative treatment is to put aloes on first, then wrap a heated bois canôt (*Cecropia peltata*) leaf on the leg, which is then bandaged with cotton. This practice is repeated for a few months. Trainers also rub a decoction of bay leaves (*Pimenta racemosa*), indigo blue and a scent like lavender (owner preference for scent) on their horses' sore muscles and quarters.

Plants used for grooming :: Ethnoveterinary remedies used in Trinidad :: Results:  
Wiz is the horse racing term for a ball of dried plant material used for grooming. A wiz may be made up of wild carailli leaves (*Momordica charantia*) elephant or guinea grass (*Panicum maximum*) or wild senna leaves (*Senna alata*). A bundle of this dry grass (the plant tops) was beaten on a wall and stripped thin. It was then rolled into a ball and placed in the sun to dry. A wiz was best if left to age. This matted bundle was then rubbed on the horses' skin and was said to make the skin shiny. A wiz was used only on a clean horse. A bundle of branch tips of black sage (*Cordia curassavica*) (also called shining bush in the horse racing industry) was used before horses race to make the horse's coat shiny, as a coat cleaner and to remove the superficial dust. The dust from the horse's skin turns the bunch of leaves brown. A wet horse may be rubbed with wild carailli or wild senna leaves to cool them. Coconut oil (*Cocos nucifera*) was also used to make the coat shine. One respondent used carailli to treat rashes. The carailli vine was boiled and the water was then used to sponge the horse.

Plants used for hoof problems and other injuries :: Ethnoveterinary remedies used in Trinidad :: Results:  
Wonder of the world (*Kalanchoe pinnata*), young banana leaves (*Musa species*), or castor bean leaves (*Ricinus communis*) were rolled with a bottle to burst the plant veins. The leaves were then passed quickly over a flame to warm them. Soft candle (whale fat) and Epsom salts were pasted on and the leaves were then placed on top. The whole thing was then wrapped with vet wrap or Elastoplast®. Alternatively turmeric root (*Curcuma longa*) was pounded and used. The entire foot was then placed in a bag or bandaged for three or four days and "sweated" for as long as it took to draw the inflammation out. This practice was used to draw infections out of injuries such as bruises from stones below the hoof. For cuts, aloes (*Aloe vera*) was bandaged on for two to three days.

Plants used as anthelmintics :: Ethnoveterinary remedies used in Trinidad :: Results:  
Worm grass (*Chenopodium ambrosioides*) was used as an anthelmintic, but less so than in the past. The very infrequently used leucaena (*Leucaena leucocephala*) was said to make hairs from the horses' tail drop off.

Plants used for enhanced performance :: Ethnoveterinary remedies used in Trinidad :: Results:  
Horse's hind quarters were occasionally rubbed with cow itch (*Mucuna pruriens*), this was said to help them come out of the boxes faster, since the plant acts as an irritant. Bay leaf (*Pimenta racemosa*) was used to bathe horses on race day, this was said to carry heat into body, which makes them run faster to get away from the sun's heat. Two plants called speedweed (*Oxalis corniculata* and *Desmodium sp.*) were used to enhance performance. The plants were fed to horses with the rest of their feed, not given specifically before a race.

Plants used for anhydrosis :: Ethnoveterinary remedies used in Trinidad :: Results:



If the horse did not seem to be sweating, or was dry coated, *Aloe vera* or two *bois canôt* leaves (*Cecropia peltata*) or grated *rachette* (*Nopalea cochenillifera*) was mixed with water and administered as a drench. *Pepper leaves* (*Capsicum annuum*, *Capsicum frutescens*) may also be used. It was thought that this "heats" the horse which makes it drink more water. These practices were said to "cool down" the horse's system and bring out the "heat", the animal sweats a few hours later. In previous times horses were taken to the river to stand up in the water for an hour after the race. *Rachette* (*Nopalea cochenillifera*) joints were pounded up, put in water, and given to horses to drink, they "sweat it out" and this helps them reduce their temperature. Horses were also bathed with *bay leaves* (*Pimenta racemosa*) to make them feel cool. A decoction of one or two cups of *bay leaves* was added to a half bucket of water, this liquid was then used to sponge the horse. Alternatively they were sponged with bay rum. Bay rum is a mixture of bay oil extracted from leaves of *Pimenta racemosa*, alcohol and water.

Plants used for retained placenta :: Ethnoveterinary remedies used in Trinidad :: Results: Horses with retained placenta were seen to have a black discharge three days post partum. These horses were given a 7.5 cm piece of *aloes* (*Aloe vera*) each day for three days, and then purged with *castor oil* (*Ricinus communis*). One respondent used *linseed oil mixed with aloe vera gel* twice weekly. About half of a large leaf of *Aloe vera* was used. Another respondent used pounded *turmeric rhizome* (*Curcuma longa*). *Turmeric* was said to flush out the uterus. Horses were also given *molasses water* to drink, this was said to "clean them out." Horses were also given a combination of *glycerine*, *Epsom salts* and *rachette* (*Nopalea cochenillifera*) to treat inflammation.

Plants used for digestive problems :: Ethnoveterinary remedies used in Trinidad :: Results: *Aloes* (*Aloe vera*) was boiled for five minutes and mixed with *linseed oil*. This was syringed down the horse's throat; some spit it out. *Aloes* was used for most internal problems and it was said to ease digestive problems. Subsequent to the administration of the *Aloe vera* the horse was given a purge with *castor oil* (*Ricinus communis*). *Aloe leaves* were also peeled and blended with water; this mixture was then combined with honey, and given orally with a syringe. A decoction of *carailli* (*Momordica charantia*) vine was given orally as a digestive aid.

Plants used for bleeders – exercise induced pulmonary haemorrhage (EIPH) :: Ethnoveterinary remedies used in Trinidad :: Results: Horses that collect blood in their lungs during or after a race were called "bleeders" (exercise induced pulmonary haemorrhage). To treat bleeders, *honey* and *aloes* were given orally. Sometimes the *white of an egg* was included. Additionally, *pureed lemon juice* was syringed into the horse's nostrils, this was said to curb bleeding by acting as an astringent. *Watercress* (*Nasturtium officinale*) was put in horses' food to "increase their blood count." *Vervine* (*Stachytarpheta jamaicensis*) and *kudzu* (*Pueraria phaseoloides*) plant tops were fed as high protein feeds.

Plants used for urinary problems :: Ethnoveterinary remedies used in Trinidad :: Results: A decoction of *bois canôt* (*Cecropia peltata*) leaves was given as the drinking water. One respondent remembered seeing a veterinarian use the *long stem of a pawpaw leaf* (*Carica papaya*) as a catheter to clear a urinary blockage. To stimulate diuresis a decoction of the *dry leaves of bois canôt* (*Cecropia peltata*) was prepared in a bucket; a cup of this liquid in then put in the horses' drinking water. This was thought to assist in "cleaning out the bladder" of the horse.

Plants used for respiratory conditions :: Ethnoveterinary remedies used in Trinidad :: Results: For bad head colds, horses were sweated or syringed with a cough medicine made of *honey*, *garlic*, and *onion* and boiled *bois canôt leaves* (*Cecropia peltata*). To "sweat" the horse, heated bricks from a dirt oven were put into a bucket with *Vicks*, *peppermint oil* or *Foyles Balsam™*. The horse's head was put in the bag, and the horse forced to inhale the steam.

Plants used for abscesses and wounds :: Ethnoveterinary remedies used in BC :: Results: *Slippery elm* (*Ulmus rubra*, *U. fulva*) inner bark powder was placed on a *plantain leaf* (*Plantago major*), with the addition of *kelp* or powdered *myrrh* (*Commiphora molmol*) (without the resin). Hot *castor oil* (*Ricinus communis*) packs were also used for abscesses. An external treatment for abscesses consisted of a wash of *comfrey tea* (*Symphytum officinalis*). This tea could include an infusion of *Oregon grape* (*Mahonia aquifolium*).

A complementary internal treatment included equal parts of powdered Echinacea (*Echinacea angustifolia* or *Echinacea purpurea* or *Echinacea pallida*), (leaves and flowers) and elecampane (*Inula helenium*) (leaves and flowers), either mixed once a day with the food, or administered as a tea was added to the water for several weeks after completion of the external abscess treatment. Tea tree (*Melaleuca alternifolia*) oil was used as a disinfectant (undiluted). Compresses were made of powdered aerial parts of: betony (*Stachys officinalis*), figwort (*Scrophularia nodosa*) and motherwort (*Leonurus cardiaca*). Comfrey (*Symphytum officinalis*) root was added. Equal amounts of the herbs were made into a paste with water, applied onto a gauze pad and placed onto the wound. Myrrh gum (*Commiphora myrrha*) was used for wounds. Woundwort (*Prunella vulgaris*) aerial parts were ground into a paste with calendula (*Calendula officinalis*) flowers. Three parts slippery elm (*Ulmus fulva*) bark powder was mixed with hot water and one part myrrh powder (*Commiphora myrrha*) and was given for pain. To stop the bleeding from a large cut or tear kitchen flour was applied, the wound was bandaged tightly then the horse was taken to the veterinarian. One or two leaves of comfrey were crushed and applied to cracks on the hoof and then bandaged. Undiluted tea tree oil was put directly on abscesses of the hoof and wrapped, or a pure commercial Aloe vera product was used.

Plants used for anxiety :: Ethnoveterinary remedies used in BC :: Results:

Plants fed to alleviate anxiety in horses included leaves of magnolia (*Magnolia acuminata*) and (fresh or dried) flowers of passion flower (*Passiflora incarnata*). Alternatively, lavender tea (*Lavandula* sp.) or tincture was given in one bucket of water or placed on the feed. For nervousness and restlessness a handful of flowers of chamomile (*Matricaria recutita*, *Matricaria chamomilla*) or the content of a chamomile tea bag was added to the main meal. One or 2 tbsp valerian (*Valeriana officinalis*) ground root was given to a horse that froze in stressful situations. One tsp of combined equal amounts of powdered valerian, hops (*Humulus lupulus*) and skullcap (*Scutellaria lateriflora*) was put into the feed, twice a day. Valerian use was stopped 48 hours before a race so that it would not be present in the blood at race time.

Plants used for arthritis and sore joints :: Ethnoveterinary remedies used in BC :: Results:

Powders of the following plants were added to the feed: turmeric (*Curcuma longa*); aerial parts of horsetail (*Equisetum arvense*) (silica content); aerial parts of baical skullcap (*Scutellaria baicalensis*) (inflammation, sedative) and lavender (*Lavandula* sp.) flowers. A tea made of licorice root (*Glycyrrhiza glabra*) (synergistic effect). Prickly ash bark/toothache tree (*Zanthoxylum americanum*) was reported to flush lactic acid and toxins from muscles. Milk thistle (*Silybum marianum*) seed and burdock root (*Arctium lappa*) were also used. Animals either self-medicated with white willow (*Salix alba*) or they were given white willow (*Salix* sp.) bark or meadowsweet (*Filipendula ulmaria*), aerial parts or root, for inflammation and pain. A combination of devil's claw (*Harpagophytum procumbens*) decoction and a demulcent such as marshmallow (*Althea officinalis*) (aerial parts), was put on the food.

Plants used for exercise induced pulmonary haemorrhage (EIPH) :: Ethnoveterinary remedies used in BC :: Results:

One breeder used a commercial herbal product containing lungwort (*Pulmonaria officinalis*) compounds, bioflavonoids and vitamin K for EIPH. That breeder also used alfalfa hay [or soaked alfalfa pellets] in a 1 : 4 ratio with the regular hay. Furosemide, a diuretic often used in the treatment of EIPH, was thought to dehydrate the horse. To reduce this effect, a tea was given with 1 part each of the following: licorice (*Glycyrrhiza glabra*) root, aerial parts of mullein (*Verbascum thapsus*) or mallow (*Althea* sp.), and comfrey (*Symphytum officinalis*) root.

Plants used for endoparasites :: Ethnoveterinary remedies used in BC :: Results:

Horses were dewormed four times a year with aerial parts of the following powdered herbs added to the feed daily for one week: Elecampane (*Inula helenium*), or wormwood (*Artemisia* sp.), cut finely or ground. Alternatively wormwood was given in equal combination with elecampane (*Inula helenium*) and thyme (*Thymus* sp.).

Occasional-use dewormers were french thyme (*Thymus* sp.), given 2 tbsp a day for week (1/2 the dose for a pony). Or one bucket of grated red carrot (*Daucus carota*) added to feed on a daily basis to reduce pinworms. To expel tapeworms 2–3 cups of chopped pumpkin flesh and seed (*Cucurbita pepo*) was added to the feed.

Plants used for eye problems, eye infections :: Ethnoveterinary remedies used in BC :: Results:

An infusion with saline solution was made with equal parts of the following: eyebright (*Euphrasia officinalis*) fresh or dry leaves, calendula (*Calendula officinalis*) flowers, and comfrey (*Symphytum officinalis*) leaves. The infusion was strained carefully and used as an eyewash. The infusion was weakened as the condition improved. Eyebright (*Euphrasia officinalis*) (1 tbsp/day) was added to the food, with water, for under a week. Two tea bags of chamomile (*Matricaria chamomilla*) or 2 heaping tsp of fresh or dried chamomile herbs was steeped with 1 cup of hot water and strained before the liquid was used as an eyewash.

Plants used as a heart tonic :: Ethnoveterinary remedies used in BC :: Results:  
2 tbsp a day of hyssop (*Hyssopus officinalis*) paste was given in feed or 20 – 30 ml tincture was given in the drinking water to increase blood pressure. Berries, leaves or flowers of hawthorn (*Crataegus oxyacantha*) were said to be cardiogenic. Meadowsweet (*Filipendula ulmaria*) reportedly thinned the blood and removed pain. A paste was made of 2 tbsp dandelions (*Taraxacum officinale*) or milk thistle (*Silybum marianum*) and given in the feed to decrease blood pressure.

Plants used for hormone imbalances :: Ethnoveterinary remedies used in BC :: Results:  
For hormone imbalances a tea was made with one of the herbs given below or 1 tsp of the ground herb was put directly on the food. Leaves of strawberry (*Fragaria virginiana*), flowers of linden (*Tilia europea*) (safe for pregnant animals), flowers of evening primrose (*Oenothera biennis*) or flowers of chamomile (*Matricaria recutita* syn. *Matricaria chamomilla*) were used. Berries of agnus castus or chaste tree (*Vitex agnus-castus*) were utilised for severe cases. Chaste tree was said to stop production of testosterone (used as an herbal gelding). Leaves of lady's mantle (*Alchemilla vulgaris*) and aerial parts of passion flower (*Passiflora incarnata*) were also used. A tea of crampbark (*Viburnum opulus*) was given if the animal had cramps (cramps that the respondent thought were hormonally-linked).

Plants used during pregnancy :: Ethnoveterinary remedies used in BC :: Results:  
Dried leaves of red raspberry (*Rubus idaeus*) (1/4 cup) were mixed with one cup of water and put on top of the grain. This mixture was syringed into the horses' mouths if they did not eat it. It was used for the last month and a half of pregnancy.

Plants used for respiratory problems (snots) :: Ethnoveterinary remedies used in BC :: Results:  
Elecampane (*Inula helenium*) was mixed with crampbark, powdered or chopped root of liquorice and thyme (*Thymus* sp.) and was used for stable cough. Alternatively blended cloves of garlic (*Allium sativum*) were added to the feed. Crampbark powder (*Viburnum opulus*) was added to the feed of wind-broken horses.

One cup each of the following plants were blended and used as a hot mash in feed or as a tea for snots: elecampane (*Inula helium*), licorice (*Glycyrrhiza glabra*), thyme (*Thymus* sp.) (1/4 cup) and mullein. Cloves of garlic and fenugreek seeds (*Trigonella foenum-graecum*) were also added. In addition, pure garlic powder and mullein (*Verbascum thapsus*) were fed with grain (once or twice a day) until the horse's nose stopped running. Equal parts of white willow (*Salix alba*) bark and/or leaf; and dried aerial parts of each of the following were mixed together into a paste and given to feverish horses: feverfew (*Tanacetum parthenium*), meadowsweet (*Filipendula ulmaria*) and yarrow (*Achillea millefolium*).

Plants used for sore muscles, sprains, joint pain or reaction of horses to selenium shot in the chest :: Ethnoveterinary remedies used in BC :: Results:  
One heaping tsp of cayenne pepper (*Capsicum* sp.) was mixed with enough olive oil to make a paste which was then rubbed on the affected part. A purchased 1:5 cayenne tincture was substituted for the paste (if available).

Plants used for skin problems :: Ethnoveterinary remedies used in BC :: Results:  
An infusion of 1.5 tsp aerial parts of shepherd's purse (*Capsella bursa-pastoris*) steeped in 1.5 cups of water, was strained and used as a wash. Chickweed (*Stellaria media*) rinse or salve was applied to the affected area twice daily. Powdered sulphur was added to calendula (*Calendula officinalis*) infused oil and used for front fetlock irritation. External applications used for hypersensitivity reactions due to fly bites and other causes of skin irritation consisted of dried, crushed plantain (*Plantago major*) leaves and witchhazel (*Hamamelis virginiana*) added to rubbing alcohol and applied topically. A sting from a nettle plant (*Urtica dioica*) was soothed with fresh

crushed shepherd's purse (*Capsella bursa-pastoris*) and/or yellow dock (*Rumex crispus*) leaves applied topically. An internal treatment consisted of a tea of dried baical skullcap (*Scutellaria baicalensis*) given in the feed.

One application of old car oil, or fish or cod liver oil was used topically to treat ringworm. The crushed root of calendula (*Calendula officinalis*) was then applied as a poultice to stimulate hair follicle growth three days later. Alternatively fluoride toothpaste was put on the affected areas and brushed off the following morning; this treatment was repeated until the problem resolved. Plants used for summer itch and sunburn included dried nettles (*Urtica dioica*) added to the feed.

Calendula lotion or Aloe vera was used for grass rash and sunburn. Lastly, an infusion of aerial parts of shepherd's purse (*Capsella bursa-pastoris*) was used to wash the affected area.

Plants used to treat various intestinal conditions ::: Ethnoveterinary remedies used in BC :::

Results:

For digestive problems one bottle of Guinness® (beer) was administered orally or mixed in with the feed. Ginger (*Zingiber officinalis*) (powdered, liquid or crystallized) or chopped leaves of peppermint (*Mentha piperita*) was also administered orally or mixed in with food or water. Horses were allowed to self-medicate with organic dandelions (*Taraxacum officinale*).

Plants used for colic ::: Ethnoveterinary remedies used in BC ::: Results:

Chamomile (*Matricaria recutita*) and peppermint (*Mentha piperita*) were used for stomach acid. White willow bark (*Salix* sp.) was used to repair the stomach lining. Slippery elm bark powder (*Ulmus fulva*) was used for over-acidity, diarrhoea and gastroenteritis. Bedstraw (*Galium* sp.) was used for grass colic – 1 handful of crumpled aerial parts in the feed. Skullcap (*Scutellaria lateriflora*) was given for pain. Licorice root (*Glycyrrhiza glabra*) was used for its synergistic action. For acute colic a crampbark (*Viburnum opulus*) paste was administered orally as a first aid measure before calling the veterinarian. Or a 1:1 mixture of skullcap and slippery elm bark powder and (1:4) licorice was given. Aerial parts of skullcap (*Scutellaria lateriflora*) were put in the feed for two to three days after the colic occurred to revive gut flora. One tbsp (15 ml) nutritional yeast was added to the feed everyday for prevention of colic.

Plants used to treat stress ::: Ethnoveterinary remedies used in BC ::: Results:

The following herbs were used preventively before stressful situations: aerial parts of dry or fresh betony (*Stachys officinalis*); powdered hops strobiles (*Humulus lupulus*), was added to the feed daily or made into a tea; or powdered aerial parts of marshmallow (*Althea officinalis*). Powdered licorice root (*Glycyrrhiza glabra*), was given daily in advance of stressful situations. Slippery elm (*Ulmus fulva*) bark powder was given to soothe the gut. Chamomile (*Matricaria recutita*) flowers were recommended for high-strung horses. Fresh or dry leaves of wild blackberry (trailing wild blackberry, *Rubus ursinus*), were fed ad lib. The following were used as teas or as powders in the feed with chicory (*Cichorium intybus*), slippery elm bark powder and crampbark as the main ingredients. They were used separately or in combination. If used separately, 1 tbsp of each ingredient was used with yoghurt as a paste base. In combination, 1 tbsp of each herb was steeped in boiling water and 1 cup of the tea given to the horse in the drinking water or put in the feed: crampbark (*Viburnum opulus*) for stomach ache; slippery elm bark powder (*Ulmus fulva*) for over-acidity, diarrhoea and gastroenteritis; hops buds (*Humulus lupulus*) act as a sedative; chamomile (*Matricaria recutita*) and peppermint to soothe stomach acid; less peppermint (*Mentha piperita*) is used in a blend than if given alone; chicory (*Cichorium intybus*); white willow bark (*Salix* sp.) rebuilds stomach lining; skullcap (*Scutellaria lateriflora*) for pain and a nerve tonic; licorice root (*Glycyrrhiza glabra*) synergistic action.

Plants used as a tonic after races ::: Ethnoveterinary remedies used in BC ::: Results:

Red sage (*Salvia officinalis*) tea (1 tbsp of leaves per cup of boiling water) was cooled and put into their mash. Bran mash with 1 cup brewed coffee was used after the race and at least two days before the next one. Astragalus membranaceous was used to help recovery from a long illness; 1 tsp to 1 tbsp was added to the feed. Lavender (*Lavandula angustifolia*) was hung upside down in the stable where the horse could not reach it; the smell was soothing.

Plants used for urinary problems including edema ("stocked-up") ::: Ethnoveterinary remedies used in BC ::: Results:



Ten buchu leaves (*Barosma betulina* or *Barosma crenulata*), or uva-ursi leaves (*Arctostaphylos uva-ursi*), were fed to horses after races as a kidney tonic. For minor bladder infections powdered uva-ursi aerial parts and chopped or powdered leaves of dandelions (*Taraxacum officinale*), were mixed and fed every day until the horse's legs were no longer swollen, or the horse was no longer straining to urinate (usually one to three days). Either fresh or dried parsley (*Petroselinum crispum*) was added to the feed once a day or more often until the urine cleared up. Dandelion aerial parts were fed ad lib.

#### Review of the ethnomedicinal literature ::: Results:

The review below (Table 3) describes a selection of the clinical trials and experimental studies using ethnopharmacologically accepted models that have verified the traditional and therefore ethnoveterinary use of the plants described in the results section. In the few cases in which clinical trials have not yet been carried out, the range of therapeutically important and relevant biological properties of the plant is provided. Recent research has indicated that *Betonica* and *Stachys* may be separate genera or subgenera and this should be taken into consideration when reviewing the pharmacological literature on betony [19].

#### Discussion and conclusion:

There have been very few studies conducted on the use of herbs for horses. In one study on exercise induced pulmonary haemorrhage (EIPH) researchers evaluated two Chinese herbal formulas used in the USA to reduce EIPH (Yunnan Paiyao and Single Immortal). They used a randomized cross-over design with an exercise test in five Thoroughbred horses [140]. They found a statistically significant increase in time-to-fatigue after the treatment with Single Immortal, but no other result. The herbs used to treat EIPH in British Columbia are not found in the typical Chinese lung healing formula. Trinidad has a small Chinese population (> 1%) and no Chinese herbs (herbs used in a manner consistent with the principles of Chinese traditional medicine) were recorded [4].

The Santa Rosa track has a turf course that is not used as frequently as the sand course. In the wet season the sand course is described as "sloppy". These track conditions may have led the respondents in Trinidad to describe tendon problems as the second biggest problem after lung problems. There are some links between historically Amerindian treatments and EVM used for horses in Trinidad. For example clay was used by Native American groups to treat broken bones in horses and humans [141]. Like the Trinidad respondents, Native Americans used blistering agents as horse stimulants [142]. Lastly Amerindians (Pawnee Omaha and Ponca) fed the pounded bulbs of *Oxalis stricta* and *Oxalis violacea* to horses to make them fleet [143]. Participants in Trinidad were more reluctant to give specific dosages than their counterparts in BC. Several of the participants in Trinidad claimed that they previously used ethnoveterinary remedies but declined to specify what they had used in the past. The use of cow itch on race day is considered an offence by the Trinidad and Tobago Racing Authority; however there was no indication that the un-revealed plants mentioned above were also in this illicit category. Participants in BC also had an "illicit" plant: coffee was being used as a tonic after races – however a withdrawal period was observed.

Many of the plants being used for horses in BC were purchased as already formulated products. This fact reflects the different statuses of medicinal plant use in the two research areas. In Canada, there are several associations of alternative health practitioners and many certifying bodies. Canada also has a new Natural Health Products policy that regulates what is sold over the counter. It is difficult to compare the expenditure on horses in Trinidad and BC since statistics for Trinidad horses do not exist. However it is likely that more money is spent on medicinal products for horses in BC. A 1998 Canadian National Horse Industry Study showed that the total annual expenditure on grooming and health products was \$90,000 or \$105/horse/year [144]. Herbal medicine also has greater status in Canada because the plants of European-origin have been evaluated by the German Commission E or by Chinese scientists. Trinidad, in contrast, has one regional association of herbal practitioners – the Caribbean Association of Researchers and Herbal Practitioners (CARAPA), which was formed in 1998. This grouping consists largely of scientists, other professionals and only a few of the most prominent herbalists. Very few clinical trials have been conducted on plants that are native to the Caribbean. Most labelled and standardized products are foreign in origin. Rather than being available for purchase the Trinidad remedies listed in this paper were self-prepared by the users.

The largest category of plants used for horses in BC was for wounds and abscesses. The next largest category was for anxiety and nervousness. The third largest group was used for hormone imbalances. This last category of treatment was not described in Trinidad. More research has been carried out on the temperate and Chinese plants used in BC and there is a greater commercial production of the plants being used for horses there. Therefore the BC ethnoveterinary remedies have stronger evidence of efficacy than those in Trinidad. This may also explain why there are more equine ethnoveterinary remedies that are used with greater confidence in BC than in Trinidad and Tobago. The tropical plants Aloe vera and Curcuma longa, two extensively researched plants, were being used in both areas. The ethnoveterinary use of Ricinus communis is similar to the ethnomedicinal use described in early British herbals [4]. These herbals later became global standard texts especially in those areas (like Trinidad and Canada) with a British colonial heritage. Some of the ethnoveterinary remedies used in Trinidad such as firing and blistering are no longer recommended in orthodox veterinary medicine, but these and some of the other ethnoveterinary remedies still used in Trinidad can be found in older Veterinary textbooks [145,146] and their use in Trinidad may originate from those sources.