Foot conformation of the Australian feral horse-
Brian Hampson, The Australian Brumby Research Unit

We have assessed the foot conformation of over 450 feral horses in Australia and New Zealand and have found a huge range of form and structure from the short wall/square toe foot to the typical Persian slipper of the chronic laminitic foot. The "natural foot" appears to depend on the environment in which the horse inhabits. Our research group has shown that if a horse changes from one environment to another, the foot will also change. Our view is that this change with environment is not an adaptation but merely a consequence of the environment.
This article presents left forefoot conformation data on 100 feral horses from five different very remote environments in outback Australia. The data was obtained by taking digital photographs and loaded radiographs which were subsequently digitally measured to obtain foot parameters. Twenty-two photographic and 18 radiographic dimensions were measured but the list has been reduced to several key measurements for this article.
Full description of the measurement locations and procedures can be found in the scientific literature or obtained by emailing the author at b.hampson1@uq.edu.au

Primary epidermal lamellae density pattern in Australian feral horses-
Brian Hampson, The Australian Brumby Research Unit

While the adaptation of some biological tissues has been well investigated, less is known about the adaptive capabilities of the structures that make up the important inner layer of the hoof wall; the stratum internum. It has not been conclusively established if the suspensory components of the hoof wall are capable of adapting to the challenges of the environment.
We investigated the density distribution pattern of the primary epidermal lamellae (PEL) in the domestic and feral horse fetal foot. Previous studies have found that the domestic foal was born with a PEL pattern representing a blank slate. The PEL were spaced evenly around the perimeter of the foot at birth. As the foot experiences biomechanical forces with locomotion, the PEL distribution changes so that there are more PEL in the areas where there is a greater suspensory force requirement, e.g. the centre of the toe, and less in areas of less requirement, e.g. the quarters.

Australian feral horse fetuses
In the Australian feral horse fetuses the pattern of PEL density showed a gradual reduction from the dorsal to the palmar foot, as was the case in the mature horse foot. The density distribution of the PEL was significantly different between domestic and feral horse fetuses.
The full paper titled: "**Variation in the primary epidermal lamellar density between Australian feral and domestic horse fetal hooves**." will be published in the American Journal of Veterinary Research, 2010. More detailed data and the full version of the related scientific paper can be obtained by emailing the author at b.hampson1@uq.edu.au.

Comparative sole depth and solar loading pattern of feral and domestic

horses- The Australian Brumby Research Unit

The contribution of the solar surface of the hoof capsule as a weight bearing and force dissipating structure has received limited attention and its morphological details are not well defined. The importance of the sole to the mechanical integrity of the equine foot may have been underestimated.
The recent popularity of the wild horse model has challenged traditional farriery practices. The proponents of this model suggest that the study of the wild horse hoof may improve knowledge of the equine hoof. That may benefit hoof management practices. Our research group has tracked feral horses in Australia with GPS technology travelling up to 28 km/day over hard rocky substrate. The ability of these horses to travel long distances over rough terrain with apparently no harmful side effects may be due to unique morphology of the hoof which has responded to this challenging environment.
The link between the role of the sole in load bearing and the sole morphology has not been investigated. The purpose of this study was to determine the load bearing structures of fresh cadaver feral horse feet under various vertical load magnitudes and on different substrate types. Additionally, the sole morphology of feral and Thoroughbred horses was investigated to assess the link between form and function in various substrate environments.
The full text of this study will be published in the American Journal of Veterinary Research, 2010. More detailed data can be obtained by emailing the author at b.hampson1@uq.edu.au.

Hoof moisture and the effect of the environment
- Brian Hampson, The Australian Brumby Research Unit

It has been known for many years that the seemingly dry hoof wall is actually made up of a large percentage of water. As early as 1885 Zschokke accurately measured the water content of the equine hoof outer wall at 29%. Previous research has suggested that the moisture penetration of the outer hoof wall is poor and that the wall is impermeable to external moisture.
Some groups advocate daily foot soaking to hydrate the hoof wall, giving it flexibility, crack resistance and aiding the hoof mechanism. If soaking in water actually promotes these functions, then the outer hoof wall must respond to external hoof moisture. Thus, horses living in a wet boggy environment should have high water content in the outer hoof wall and horses living in a dry environment should have hard dry hooves. Our research team tested this hypothesis in 40 feral horses. We compared the hoof moisture content of the Kaimanawa feral horses of New Zealand to that of the central Australian arid desert brumby. The Kaimanawa Ranges receive an average monthly rainfall of 4 inches plus snow and the substrate is typical wet and boggy ash. The desert brumby, on the other hand, lives in a 5 inch per annum rainfall arid zone and travels on rock and scorching hot sand.
More detailed data and the full version of the related scientific paper can be obtained by emailing the author at b.hampson1@uq.edu.au.

Case Study: Don Panache

Navicular Disease a Lifetime of Lameness?