



FLIR APPLICATION STORY



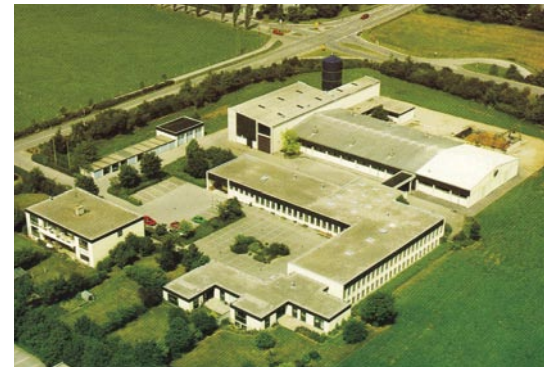
Towards bovine thermography : A FLIR Systems ThermoCAM P65 is used to keep stock bulls in form

Once considered as exotic, infrared thermography is gradually becoming an established and recognized tool in veterinary medicine. Equine (horse) thermography and inspection of zoo animals to detect inflammation or follow up gestation are well-known applications. These animals are indeed valuable assets that are difficult to handle, that need utmost care, and should avoid stress. But infrared thermography can also be used to preserve other valuable animal assets of another kind: livestock breeding. FLIR Systems has sponsored a relevant research project.

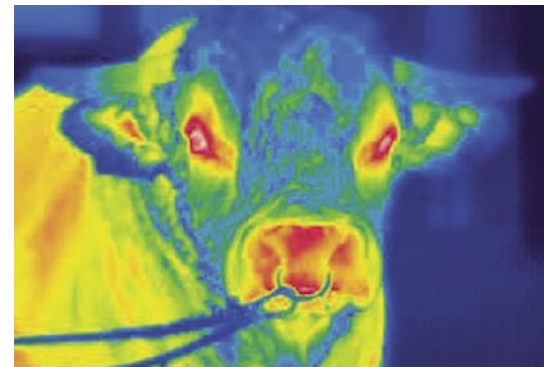
Fleckvieh is the second largest cattle breed in the world. The sturdy breed, well suited for an abundant milk and beef production, originates from the Bavarian pre-alpine region. At present, there are 41 million Fleckvieh animals worldwide. Trading and exporting semen of the best, awarded and highly-priced Fleckvieh bulls is an established business. Against this background, efficient medical inspection of the animals is an important issue.

A study proving the economic plausibility of thermographic inspections of cattle has been presented by Christoph Gschoederer

at the Fachhochschule Weihenstephan, a subsidiary of the Munich University of Applied Sciences and a renowned school for agricultural, food, and, last but not least, brewing science. The survey, which showed convincing results, was conducted at the artificial insemination center and breed station at Grub, in the Munich area. This a modern facility supported by Fleckvieh breeders from the southern Bavarian region and by the raising export figures of its Fleckvieh genetics to large agricultural markets in Eastern Europe, the Americas, and southern Africa.



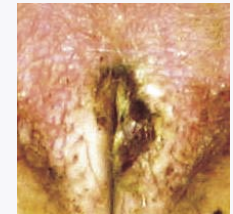
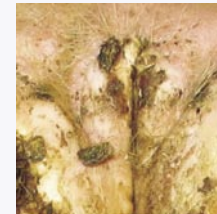
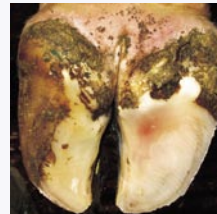
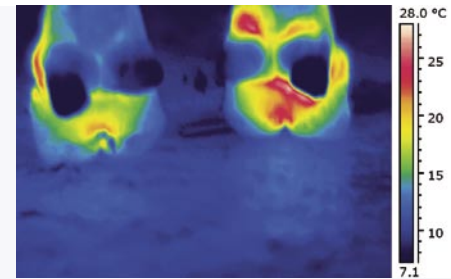
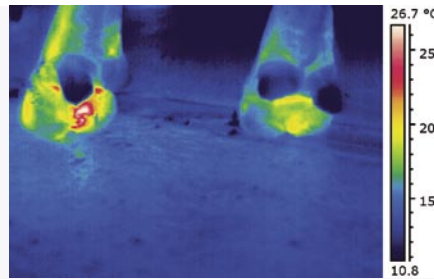
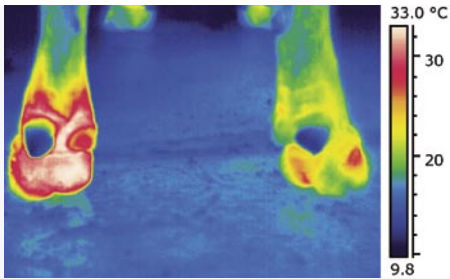
Artificial Insemination Center, Grub, Munich area, Germany



infra-red-bull

FLIR





Bull A

The IR image shows the hind-limbs of a bull. The left leg has a clearly higher surface temperature in the area between the interdigital cleft and between the pastern and the fetlock joint. It clearly displays an inflammatory process. The clinical survey diagnosed a convalescent but still not entirely healed sole ulcer (white line abscess). The right hoof shows a small white lesion and appears to be healthy.

Bull B

Bull B is an excellent example of detection and recovery and its follow up of an infection disease. The detection of the pointed elevated temperature spots between the hooves (in the interdigital cleft of the left limb, enabled to diagnose a nascent digital dermatitis, a major livestock disease which is painful for the animal and negatively impacts economic livestock performance. The disease could be treated immediately.

A thermographic check one month later shows that the higher temperatures have practically vanished and that diagnose and remedy proved to be correct and successful. The right limb is getting affected by digital dermatitis.

On site, it quickly became evident that an infrared camera is able to conduct a wide range of useful examinations of livestock :

- time-saving and safe body temperature measurement
- early detection of inflammations at the animal's extremities
- easy inspection of testicles function
- easy inspection of the udder health
- heat control
- mobile inspection of the young bulls prior to their purchase at the cattle market
- monitoring of waiting bulls in quarantine

The principle of veterinary thermography is clear: infection or injuries activate the animal bodies' natural resistance mechanism. This is marked by a movement of energy throughout the tissue, which is manifested through higher blood flow and reflected in the surface temperature. In addition, edemas can be traced as pathologically cool zones on the body surface. Not only damage to tissue, but also overload on certain joints have an impact on the blood flow, resulting in higher surface temperature.

THERMOGRAPHY FOR PREVENTIVE HOOF CARE

Healthy hooves are an important issue for livestock breeding: just like strong-limbed cows are a prerequisite to a good milk

production, good hooves are vital to enable the stock bulls to complete their major task successfully. In addition, calculations show that bull lameness in a milk cow stable can add up to 300 Euros per case. Preventive action is required to avoid economic losses caused by lameness.

Gschoederer's project was based on a regular inspection of 50 bulls with a FLIR SystemsThermaCAM P65 camera. All animals were healthy. They did not display clinical anomalies or lameness. To observe and interpret the images, the temperature difference is decisive, rather than the absolute temperature itself. Gschoederer has been impressed by the accuracy and imaging capabilities of the infrared camera: "A high-end infrared camera as the ThermaCAM P65 with such a resolution, an accuracy of 0.1 °C, its large screen and its many user options is a pleasure to work with", he said.

Thermography itself does not give an exact diagnose. But its strength lies in its flawless capacity to select animals, in this case bulls or cows with anomalies for further clinical veterinary examination. And here, thermography managed to reach a hit ratio of nearly 100%; clinical checks of the bulls' hooves images gathered by Gschoederer confirmed all anomalies detected with the infrared camera.

VETERINARY INFLAMMATION DIAGNOSTICS WITH INFRARED

The benefits of thermography for inflammation diagnose in veterinary medicine are convincing: infrared cameras allow to measure surfaces contactless, stress-free and safely, to scan and directly compare extremities in one image, to detect syndromes and to compare their subsequent phases.

"We see a great potential for this technology", says Dr. Thomas Grupp, general manager of Bavarian Fleckvieh Genetics, "not only at our insemination center, but also for use in dairy herds, where infrared thermography can be a powerful preventive method against digital dermatitis and other livestock diseases which badly affect production."

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