Livestock Science 179 (2015) 80–85

Contents lists available at ScienceDirect

Livestock Science

journal homepage: www.elsevier.com/locate/livsci

Polled Fleckvieh (Simmental) cattle – Current state of the breeding program

K.-U. Götz [a,*], B. Luntz [a], J. Robeis [a], C. Edel [a], R. Emmerling [a], J. Buitkamp [a], H. Anzenberger [a], J. Duda [b]

[a] Bavarian State Research Center for Agriculture, Institute of Animal Breeding, Prof. Dürrwaechter-Platz 1, D-85586 Grub, Germany
[b] Landeskuratorium der Erzeugerringe für tier. Veredelung in Bayern, Haydnstr. 1, 80336 München, Germany

ARTICLE INFO

Keywords:
Cattle
Polledness
Fleckvieh
Simmental
Breeding program
Coancestry

ABSTRACT

Systematic breeding of polled Fleckvieh (Simmental) cattle in Bavaria dates back until 1974 when the first polled cow was purchased for breeding purposes. Until 1985 three polled bulls and two more polled dams were purchased and from 1984 on the first homozygous bulls were produced via embryo transfer. Until 1990 the polled allele was only common in beef strains of the Fleckvieh breed. At the beginning of the 1990s the first polled alleles were introduced into the dairy herd of the State Research Farm in Grub. This research farm acted as the nucleus for the introgression of the polled allele in the dual-purpose lines of the Fleckvieh breed. Since 2003 polled calves in all herds under milk recording were systematically recorded and the polled phenotype was regularly examined by employees of the Bavarian State Research Institute for Agriculture. At the same time a systematic cooperation with Bavarian herdbook organizations and AI-stations was established. Between 2000 and 2011 in total 193 polled bulls were raised at the Bavarian State Research Institute for Agriculture (LfL), of which 37 entered AI-stations. Currently the dual-purpose population of Fleckvieh comprises 7055 polled cows and 175 polled AI-sires. In 2013 and 2014 approximately 22,000 and 32,000 polled calves were born per year. The analysis of relationships showed that the polled bulls are less related to the horned population and that until now the introgression has caused negligible amounts of additional inbreeding. It is expected that in 2021 the proportion of polled cows in the Fleckvieh dual-purpose population will be at 10.5% of all cows if the progression of polledness continues linearly. However, it can be expected that the progression will accelerate due to the new possibilities offered by genomic preselection of polled AI-bulls. First experiences with genomically preselected polled bulls show a very good acceptance among breeders.

© 2015 Elsevier B.V. All rights reserved.

1. Introduction

Most of the cows in present husbandry systems are kept in free stalls. For the protection of the animals as well as for the herdsmen, cows should be hornless. However, the practice of dehorning causes pain for the animals, additional work for the dairy farmer and raises ethical concerns in the public. This is especially true if dehorning is not accompanied by analgesic treatment of the calf. Polled cattle have long been known, but in multi-purpose breeds polledness was usually not appreciated because polled animal were not well suited for field work.

Recent results have shown that polledness is caused by a single locus which appears to be identical in all polled

* Corresponding author.
E-mail address: kay-uwe.goetz@LfL.bayern.de (K.-U. Götz).

http://dx.doi.org/10.1016/j.livsci.2015.05.019
1871-1413/© 2015 Elsevier B.V. All rights reserved.

bos taurus breeds (Medugorac et al., 2012). However, in most breeds that are used for dairy production polledness occurs only at very low frequencies and in many cases there is no systematic recording of polled animals. This results in a lack of polled AI-bulls and makes selection for polledness even more difficult. This article describes the introgression of the polled mutation into the dual-purpose strain of the Fleckvieh breed and gives an outlook to future developments.

2. Historical background

Polled Fleckvieh has only been reported anecdotically until 1974, when S. Kögel bought a polled cow at a local dairy farm and transferred it to the state research farm in Schwaiganger, where it became the founder of the polled Fleckvieh strain. Kögel's motivation was to create a strain of polled Fleckvieh which was especially suited for suckler cow production and would be able to compete with other polled breeds such as Aberdeen Angus and Galloway. The nucleus was augmented by another cow and the bull Horn, who was detected by chance in individual performance test at the testing station in Grub. Together with two other bulls, Holler and Embargo, these animals introduced the polled allele into the beef strain of the Fleckvieh breed (Luntz and Robeis, 2011). Until 1990 the polled allele had been widely disseminated in the beef strain, but not in the dual purpose strain, because the available polled bulls had very low breeding values for milk yield. Not all sources of the polled allele originated from the Fleckvieh breed. In the 1970s the polled allele was introduced in some animals of the beef strain via Angus semen. However, the important founders of the polled Fleckvieh strains never had more than 3.125% of Angus blood. Today, the proportion of Angus genes is below 0.2% for all polled AI-bulls.

In 1990 the first polled alleles were introduced in the dairy herd of Grub and systematically augmented (Kräußlich and Röhrmoser, 1995) in the following years. In 2003 the polled cows in the herd achieved the same performance level as the horned cows. As a consequence of this demonstration of the genetic potential for milk yield of polled cows a systematic recording of polled calves in herds under milk recording was established in 2003. This led to the detection of additional polled cows which could be mated to top bulls in order to produce progeny suitable for rearing as AI-bulls. In 2004 a formal cooperation between various herdbook-organizations and AI-stations with the aim of producing polled AI-bulls from horned bull-dams was established. Male progeny from this program were raised at the central testing station of Neuhof which provisioned the Bavarian AI-stations with in total 25 polled dual purpose bulls during the last 10 years.

Visual detection of the correct polled status of young animals is hard, because heterozygous and homozygous animals are phenotypically identical. Therefore, selection efficiency can be improved by a genetic test system for the polled status. There had been several attempts by different groups to map the "polled" locus and to identify the causal mutation. Initially, polled was mapped to chromosome 1 in South Devon, Salers and crosses of Hereford and Shorthorn breeds by Georges et al. (1993). Despite this early success it took 19 years until the causal mutations had been identified (Medugorac et al., 2012).

Since 2009 a commercial test is available for some breeds in the United States, including Simmental. In 2010 an indirect genetic test for polledness was developed based on the work of Drögemüller et al. (2005) at Tierärztliche Hochschule Hannover which facilitated the detection of homozygous bulls. Since 2012 a direct gene test is available (Medugorac et al., 2012) which facilitates the testing and selection of (homozygous) polled bulls considerably.

3. Material and methods

3.1. Recording system

Since 2003 the recording of the polled status of calves is performed in collaboration with the Bavarian milk recording organization (LKV). Technicians of the LKV receive information about newborn calves in their PC. If the sire and/or the dam of a calf is polled, the calf is flagged for inspection. The technician asks the farmer if the calf is polled or not and polled calves are reported back to the database. Since it is important to discriminate between polled and scurred animals, the exact horn-status of the calf is determined later on by a specially trained technician. The database contains 31,369 recorded cases from 2003 to 2011.

3.2. Description of polledness

In the Fleckvieh breed animals that do not develop horns are not always genetically polled. Scurred animals develop small horns which are not thoroughly fixed at the scull of the animal. At a younger age the two types of hornless animals are difficult to discriminate. A detailed description of the genetics and inheritance of polledness can be found in Georges et al. (1993). In the official recording scheme and for internal purposes the codes in Table 1 are used. They describe the phenotypic status of animals and the genotype as determined by progeny testing. Since 2010 an indirect gene test, based on microsatellites was available (Distl, unpublished results). The test facilitated discrimination between heterozygous and homozygous animals, but required family information in order to trace linkage information through the pedigree. Additional flags Pp* and PP* for genetically tested animals were introduced as a consequence. Recently, a new test was introduced (Medugorac et al., 2012) and evaluated across different breeds with very good results. Animals tested with the new test will be flagged in the same way as before.

3.3. Introgression program

In modern AI-breeding programs new alleles can only be spread by providing AI-bulls with many progeny. In order to stimulate introgression of the polled allele in the Fleckvieh breed, state farms decided to rear polled male

Download English Version:

https://daneshyari.com/en/article/2447115

Download Persian Version:

https://daneshyari.com/article/2447115

Daneshyari.com