

Can You Select for Mastitis Resistance?

Dr. Donald E. Pritchard
NCSU Extension Dairy Specialist

Dairy producers have been trying for years to breed mastitis resistance into their cows. The focus usually has been on trying to breed for those udder and teat characteristics which provide conformational defenses against pathogens entering the mammary gland via the streak canal. Producers want cows with udders held tightly against the body rather than udders which hang too low to the ground. Also preferred are cows with teats that are not too long or too large in diameter, are not flat on the bottom, are not widely set on the corners of the udder, and that have sphincter muscles which stay tightly closed between milkings. With these desired characteristics in mind, producers have been selecting bulls whose daughters have exhibited the desirable udder and teat physical traits. The drawback to this approach, however, is that it is a slow process. Several years are required to know if genetic progress has been made with the bulls that were selected. Furthermore, the heritabilities of most of the various udder and teat characteristics that result in less mastitis are moderate at best. Thus, researchers have been looking for a faster and more predictable way of breeding mastitis resistance into cows.

Researchers in the field of dairy cattle genetics, just like those working with other species of animals or plants, have turned to looking for specific genes or groups of genes on the various chromosomes that are involved in some way with the characteristic being studied. In the case of mastitis resistance (or susceptibility depending on how you look at the issue), researchers are trying to find genes that are involved in regulating the immune system that fights pathogens which have invaded the udder. If such genes can be identified and then selected for in both the sires and dams of the next generations, then faster progress can be made towards having cows with genetic resistance to mastitis.

At the 2006 annual meetings of the NMC (National Mastitis Council) researchers from the University of Tennessee reported on their work with a specific marker gene that they believe is associated with mastitis susceptibility and several critical neutrophil functions. Neutrophils are a type of cell that migrates into the mammary gland when pathogens enter the udder. Their purpose is to destroy pathogens. Results from preliminary studies with a small number of cows have given the researchers encouragement that they are on the right path. Cows with a specific type of gene were more resistant to an udder challenge with *Streptococcus uberis* than were cows without the gene. While additional research is needed before it will be possible or desirable to incorporate the gene being studied into the genetics of future cow generations, the study reported should give producers hope that one day, perhaps sooner than later, they will be able to select sires and dams with the genetics for mastitis resistance provided by their immune systems, rather than having to rely on selecting just for physical characteristics which help provide some degree of resistance to mastitis.