# Use of RFID in small ruminant dairies: What to do after you figure out where to attach the microchip to the goat

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### Abstract

Technology is advancing in all realms of agriculture and the use of radio-frequency identification (RFID) in livestock presents many new options for management success. The utilization of RFID tags on goat dairies allows for improved production monitoring, breeding management, and culling decisions. Dairy management is greatly improved with RFID information. This talk will detail methods for using RFID in small ruminant dairies and how to interpret and manage information collected.

**Key words:** goat, dairy, RFID, management

### Introduction

The use of RFID technology in cattle dairies has expanded greatly in the last decade. Small ruminant dairies are also using RFID as part of a management program on a more regular basis. While this allows more informed decisions to be made regarding individual animals and the herd overall, there are certain obstacles present that are specific to goats. Dairy goat breeds, behavior, lactation length, and computer software are all areas we need to address when talking about RFID use on dairies.

### Use of RFID Tags in Dairy Goats

On a cattle dairy, the most common method of applying an RFID tag is in the form of a button tag in the ear. One of the major dairy goat breeds, La Manchas, are earless. In addition, this is a dominant trait so any crossbred goat with La Mancha bloodlines will retain the earless or 'elf ear' phenotype for multiple generations. This precludes ear tags in any dairy that utilizes these genetics. Even in herds where La Mancha genetics are not used, the RFID ear buttons are heavy and have a relatively high rate of loss from being traumatically removed. The most successful RFID retention comes with using a hind leg band with a RFID inserted. Milk barns that are designed for either an ear tag reader or a hind leg reader cannot record both types of tags. It is important to discuss this point with producers if possible before the software is assembled in the milk barn, as this decision will have long-lasting management repercussions. The cost of leg bands is significantly higher than ear buttons, and goats with leg band RFIDs are adept at chewing them off. They have a higher rate of loss than cattle with ear buttons. The maintenance cost should be factored into the cost of utilizing a system, since leg bands are $6 to $8 each.

Goat lactation patterns, lactation length, and seasonality are all widely variable and significantly different from dairy to dairy. This makes standardizing any sort of records evaluation problematic. When we discuss dairy cow lactations, we use a 305-day lactation as a standard. However, it is not uncommon to have productive dairy does milking 1000-day-plus lactations. These does will have a seasonal variation in milk flow throughout the year, with spring and summer peaking while fall and winter milk decreases. Unfortunately, many dairy does have such large differences in milk production over time that evaluation cannot follow the typical cow models. Below are a few lactation graphs to emphasize the variation in lactation curves within a herd.
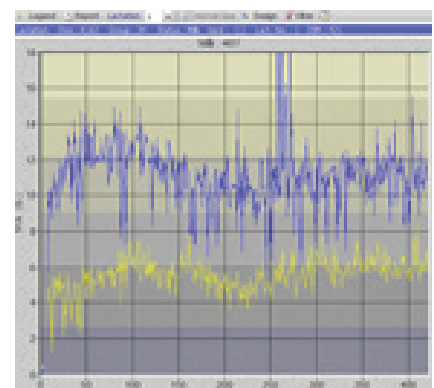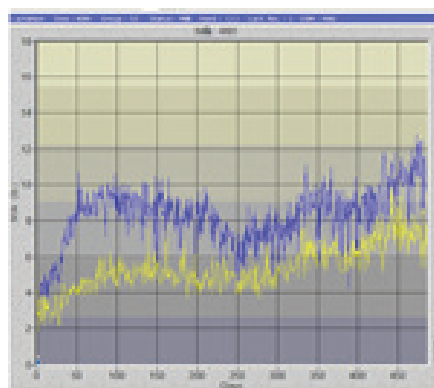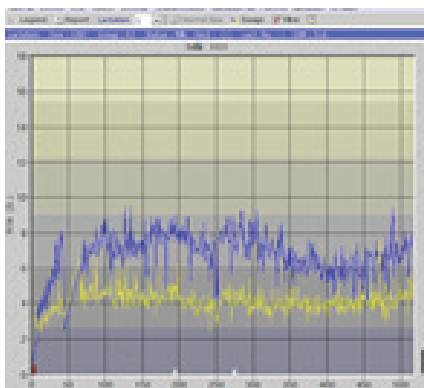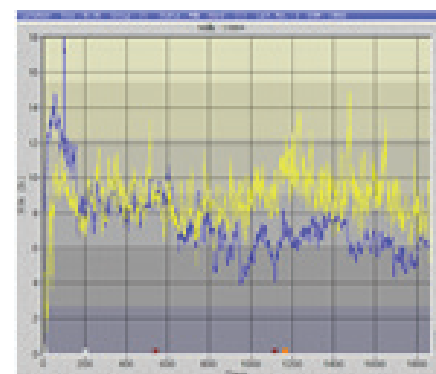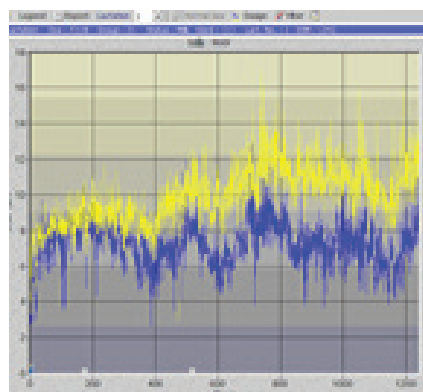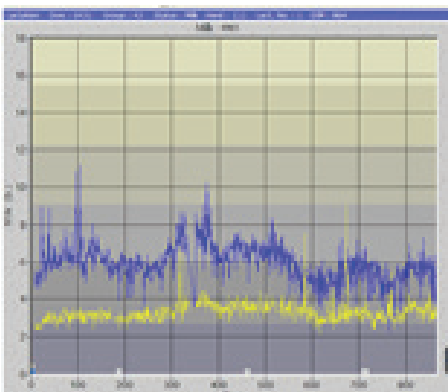
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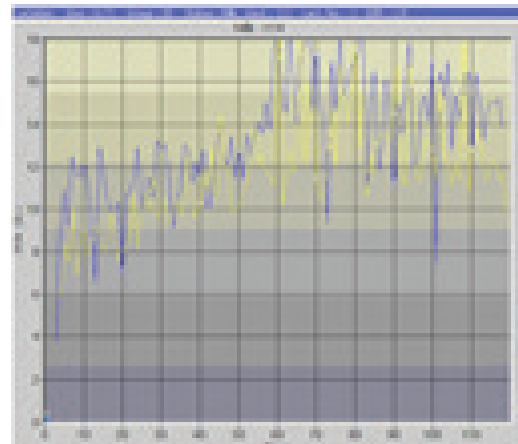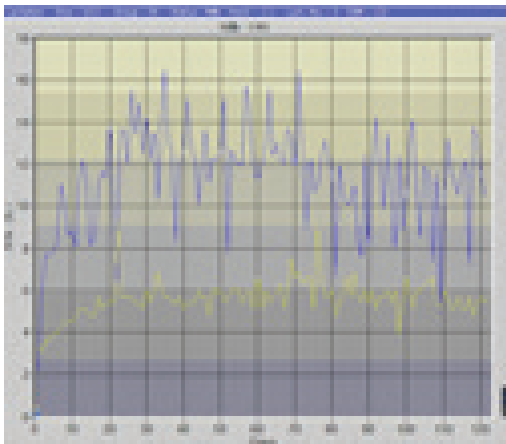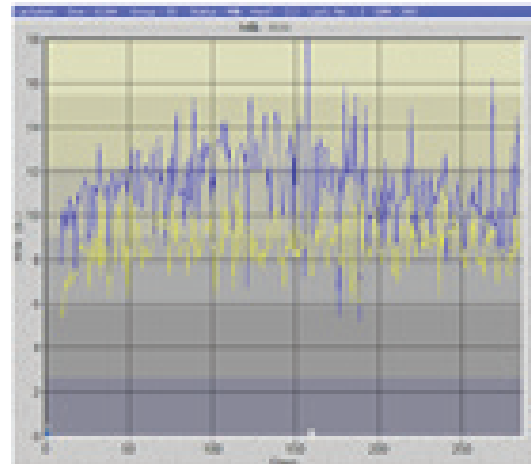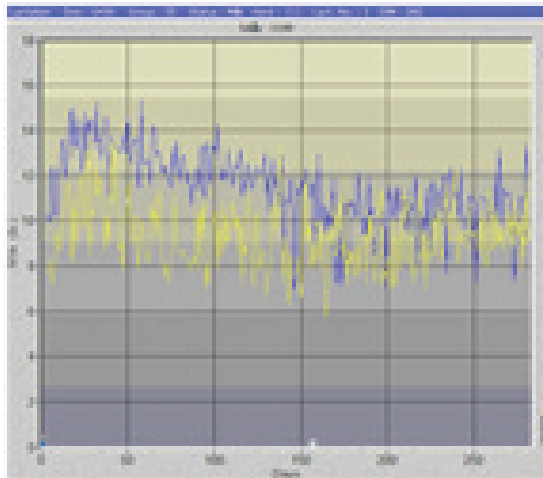
300 DIM:





500 DIM:







Extended Lactations:







These lactation graphs from the same herd are the best way to emphasize the variation in goat milk production over time. The blue line represents milk in pounds and the yellow line is milk-out time. It is very difficult to make management decisions with set parameters in place. Note that the production increases and decreases over time, often on an approximate 200-d cycle. Some does have a peak after freshening while others do not, and some trend downward over time while some does maintain relatively flat production over time. An important parameter that utilizes milk

production data on a goat dairy is to know the 'breakeven production' (the milk production value equals the feed cost) to evaluate when it is no longer profitable to milk a doe. At this milk production, a doe should be dried and pregnant or culled. I like to add 2.5 lb (1.1 kg) to the breakeven production and use this value as the milk weight when breeding should occur, or the doe should be marked to enter a 'Do Not Breed' pen where she can milk down to her breakeven and then be culled. Efficiency of production and management are the keys to profitability in an industry where feed and labor costs are high. For example, most herds are at a breakeven production of 1.5 to 2.5 lb (0.7 to 1.1 kg) milk per day. Feed costs vary across the United States and it is important to know the feed costs for each producer when doing herd analysis. We should not be rebreeding does that are maintaining a flat lactation curve with milk production 2 to 3 times the breakeven production amount. Although there is variation from herd to herd, rebreeding should begin when production reaches 4 to 5 lb (1.8 to 2.3 kg) per day.

Another area on goat dairies that we can manage with RFID is milk-out time. There is a tremendous variation in time to fully milk-out and it is not uncommon to have does who finish in under 5 minutes and also have does who take 15 to 20 minutes to milk out. Sorting the slow milkers into a separate pen can speed up milk barn shifts and improve labor efficiency.

Many herds do not maintain a herd management program even when daily milk weights are available. Diet adjustments, stress responses to things such as weather changes, bedding sanitation, overcrowding, lameness or hoof trimming are all areas where we can quantitate the cost of adjusting management to better accommodate doe stress or welfare. We currently do not have standards like the dairy cow industry where we know the average cost of mastitis, the average cost of lameness, etc. The reality that many dairy producers do not know how to interpret herd milk production data means that it is often ignored or marginalized. We do know that dairy does' lactation length and production is related to genetics, nutrition, management, and environment. When any of these factors are compromised, herd milk production will drop. The use of RFID tags and daily milk weights gives us an invaluable tool to pinpoint which does are losing milk on a dairy. Are they fresh does? First lactation only? Does approaching a year in milk? All does? Geriatric does? By looking at which goats are maintaining, increasing, or losing milk over time we can find trends within a herd to better manage the different groups. Herd-to-herd variation is great enough and the use of RFID is new enough that cross-comparison between herds is difficult. Training producers to look at lactation trends and to generate reports based on days-in-milk DIM and production cutoffs are useful and valuable management tools. As more producers utilize new technologies, the ability to compare herds and develop better standards for good management practices will develop. This will benefit both the animals and the producers alike.