



NSIP Fact Sheet NSIP-002-01

Contemporary Groups – 1. Overview

Producers often first hear about the expression "Contemporary Groups" when they look at their NSIP reports and notice an unexpectedly low accuracy for a certain EPD. When they call their breed data coordinator or NSIP personnel, they are told that the animal was not a member of a "Contemporary Group." Whoa! What type of mystical jargon is this? Let's try to clear up this confusion...

What is a Contemporary Group?

Formal Definition: A Contemporary Group is a uniformly managed group of sheep of similar breed composition, age, and sex.

Common Sense (Intuitive) Definition: A Contemporary Group is a group of sheep of the same breed, age, and sex that are reared under the same management conditions, which includes feeding procedures, location, and time of year. In other words, sheep that have had an equal opportunity to perform (i.e. to express their genetic potential).

Why is it Important?

The problem with genetics is that we can't truly *see* genes or genetic worth. In practice, we try to estimate a sheep's genetic value by measuring its performance and comparing that performance to the group average. But nothing is very simple. Performance is determined by the combined effects of genetics *and* the environment. (For example, a genetically superior lamb may not grow well if a drought causes poor feed quality for its milking dam). NSIP tries to extract genetic information from raw performance measurements. This is very complicated. NSIP uses sophisticated mathematical techniques to separate the underlying genetic effects from the changeable environmental effects.

One valid way of standardizing the unpredictable environment is to assign similarly-raised animals to uniform categories or groups. This grouping allows the NSIP computer to estimate genetic effects free of the environmental effects common to each animal in the group. These groups of similarly-treated animals are called "Contemporary Groups."

So how does this work? Intuitively, you can see that it would be unfair to compare the performance of an animal from one group directly against the performance of an animal in a different group. However, it is quite valid to compare an animal's performance against other animals in its own group, or against the group average. This comparison is valid because all animals within a group experience the same environment.

Groups

Notice the persistent use of the word "Group." A group means more than one sheep. You need at least two animals reared together to make a Contemporary Group (preferably more. In practice, most Contemporary Groups contain many animals. Larger groups are better.). This means that a lamb raised by itself is NOT a member of a contemporary group. This also means that a single ewe or ram reared alone *for any reason* is not a member of a contemporary group.

NSIP

6911 South Yosemite, Suite 200
Denver, CO 80112-1414

Phone: (303) 771-5717
Fax: (303) 771-8200

www.nsip.org



This within-group comparison is a valid first step for identifying genetic effects. The NSIP computer calculates this comparison and combines it with the performances of genetically-linked relatives in other contemporary groups to give a reliable estimate of an animal's genetic value.

In contrast, consider a sheep that lives in its own unique environment (i.e. is not a member of a contemporary group) — for example, a single artificially-reared lamb. Indeed, its performance, no matter how good or bad, is very difficult to interpret, because this performance cannot be compared to anything. There is no group-average because there is no group. Thus, it is impossible to separate the effects of this lamb's environment from the underlying effects of its genes. This means, in statistical terms, that this lamb's genetic and environmental effects are totally confounded and are mathematically impossible to separate.

The principle of the "Contemporary Group" is a very important genetic concept — it underpins our ability to mark true genetic progress. Unfortunately, this principle is rather unforgiving. Violations of this principle, even inadvertent, usually result in unusable data, confusing NSIP outputs, and exasperation.

The Practical Problems:

There are two major problems that involve Contemporary Groups:

1. Animals tend to fall out of them, so that an individual sheep may not belong to any contemporary group.
2. Routine sheep management procedures sometimes can split large, mathematically desirable contemporary groups into smaller, fragmented contemporary groups that have less value for genetic evaluation.

Problem #1 is the most critical. For an animal's performance record to be used by NSIP, that sheep must be a member of a legitimate Contemporary Group. If a sheep becomes separated from its contemporary group *for any reason*, the NSIP computer cannot use its performance record. This means that its EPDs will be calculated only from the performance records of that animal's relatives. The Accuracy of an animal's Pedigree EPD is lower than if its own performance record were included in the calculations. Any sheep treated or managed separately is a likely candidate for this problem.

Problem #2 can sometimes routinely occur during the normal management of a flock. An example: you split your lactating ewes into three separate pastures. The lambs in these different pastures are exposed to different feed, parasite load, amount of sunshine, etc. Therefore, these lambs do not have equal opportunities to express their genetic potential. Everything else being equal, you would have three contemporary groups here because you have three sub-flocks. This is a typical situation, and you routinely inform NSIP about it by attaching a one-letter LOCATION CODE to the Management Code for those animals. If you don't use a location code, then the NSIP computer would treat all the lambs alike, as if they were all members of a single contemporary group. This would not be fair to some lambs and could result in misleading evaluations.

How NSIP Identifies Contemporary Groups:

Through birth dates, exposure dates, weigh dates, shearing dates, breed classifications, sex, lambing information, and various codes — Management Codes, Rearing Codes, Location Codes, etc. (Note that Optional Codes are *not* used by NSIP for classifying contemporary groups. Optional Codes are devised by individual producers for their *own* flocks.) You inform NSIP about your flock through these data. Please try to be as accurate as possible. C errors and omissions can come back to haunt everyone.

What the NSIP Computer Does:

When the NSIP computer first scans your flock's data, it automatically checks to see if each animal belongs to a valid contemporary group. If it finds an animal or situation that violates these rules, the computer drops that performance record from its EPD calculations.

All is not lost, however. The NSIP computer will still calculate an EPD value for that animal, but it will be forced to use *only* the performance records of that animal's relatives. It cannot include the actual performance record of that animal in its calculations. This results in a lower accuracy (ACC) values for that EPD. After all, until it has progeny, an animal's own performance gives the most accurate estimate of its potential, and if that performance record cannot be used, then the accuracy (reliability) of its genetic estimate will suffer.

For Further Information:

SID Sheep Production Handbook, Breeding Chapter.



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