A blood test for parentage in deer

Who was the sire, King Dick or Fence Jumper?

by Mike Tate, scientist, Invermay Agricultural Research Centre

This hind suckled three fawns. Only one of them was her own.

Having an accurate knowledge of parentage is vital to the success of any breeding programme.

INVERMAY scientists have developed a blood test for deer which can solve parentage problems. It will be used this year to study cross-suckling in the Invermay herd. The test is also available for use by deer farmers.

Matching the correct parents with fawns is not always easy. The problems usually start in the rut. When replacing breeding stags, there is a period of up to 12 days when the sire is not known because of variations in the gestation length of Red deer.

Uncertainty also occurs if an unwanted stag gets to the hinds during the rut. One good thing about these stag problems is that you always know when they occur. This is not the case during fawning.

At fawning, mix-ups due to cross-suckling or adoption can be difficult to detect and even harder to solve. In the 1987 calving season hind-fawn pairings in the Invermay herd will be checked using the blood test. The aim of this study is to find out if cross-suckling and adoption are important problems on Invermay.

Last year in a pilot study the blood test was applied to 26 of Invermay's first fawners. Three mismatches were suspected in the records — the blood test detected five. One of the suspected cases of mismatching was the hind pictured. It suckled three fawns of which only one was its own.

Mismatches at fawning

Mismatches in fawning records happen when either hinds or farmers make mistakes. Human error is nothing new but why should hinds make mistakes about something as important as their own fawn? An answer may lie in the conditions under which farmed deer fawn.

Observation of a large number of hinds and fawns by researchers on the Island of Rhum, Scotland suggests that cross-suckling is very rare in natural conditions. In contrast, a greater tolerance by ▷

▷ hinds to fawns other than their own has been observed on Invermay. Deer farmers, too, will have made their own observations.

In the wild, deer tend to leave the herd before fawning and seek an isolated fawning site away from their usual home range. Under farming conditions, the restriction of fawning sites and the area available for separation from the herd may affect hind-fawn bonding. Disturbance of herds during fawning may be another important factor leading to cross-suckling and subsequent hind-fawn mismatching.

Fawning observations on Invermay suggest cross-suckling is uncommon in older hinds. However, cross-suckling and mismatching may be high in certain groups. These include first fawners, hinds which lose a fawn, and hinds synchronised for AI or for early fawning. Once this year's blood typing results are analysed some of these ifs, buts and maybes will be resolved.

The blood test

The parentage test is based on inherited protein markers in the blood. The discovery of these markers is a spin-off from research at Invermay into genetic markers for breed types (for example Elk and Red deer) and markers for production traits. The test works in a similar way to parentage tests in cattle and race horses.

By typing both parents of a fawn for a variety of blood markers a simple prediction can be made regarding the type of their fawn. Fawns which differ from this prediction have been mismatched. Animals may be typed any time after three months of age.

The blood test is powerful at identifying mismatches, however too many individuals of the same genetic background in one herd will reduce the power of the test. Problems involving very closely related individuals often cannot be solved. Further basic research into blood markers may increase the power of the test in these areas.

The test detects equally well a mistaken sire or a mistaken dam. Where the dam is in doubt, certain knowledge of the sires used is essential before mismatches can be attributed to cross-suckling.

On the other side of the coin, if one is sure of hind-fawn pairings, then paternity testing can be conducted. Paternity problems are usually of a different type to the problems of hind-calf pairings described above. The question is not how many unobserved mismatches have occurred, but who is the father of a particular fawn. Usually there are only two potential fathers — a main breeding stag and either a replacement stag or a fence jumper. The blood test is good at solving simple problems like these.

Use of the test by deer farmers

The test is available for commercial use and clients will only be charged where the problem is solved. Its main use is seen in sire problems. Here success depends on formulating a simple problem.

For example, did King Dick or Fence Jumper sire this fawn? If these are the only two stags which could have sired the fawn and if the dams, sires and fawn can be bled there is a good chance the test can give an answer.

The answer would be in the form — King Dick could not have sired this fawn, therefore, from your records Fence Jumper must be the father.

For more information contact Randal Rummel, Mike Tate or Peter Dratch at Invermay. We hope that use of the test will remove any uncertainty concerning the parentage of your elite stock. □