Flourescent dyes separate embryo-transfer candidates

COLLEGE PARK, Md. — In veterinary science and animal husbandry's race to develop superior breeds of domestic livestock, a little-known dye technique now under study by Maryland Agricultural Experiment Station research scientists could separate prizewinners from ho-hum also-rans.

MAES researchers believe the technique — using fluorescent dye — can help them increase their chances of accurately identifying healthy embryos from those with little chance of developing into a calf.

"Fertilized ova (eggs) can be evaluated microscopically to determine if they are developing embryos, but this method is not consistent on an individual embryo basis," says Dr. Monica Haaland, assistant professor of veterinary science at the University of Maryland and an MAES researcher.

"If our studies are successful with fluorescent dye evaluation, we'll be able to determine more accurately an embryo's potential," she says. "Those identified as 'excellent' by the dye evaluation will have the best chance of being carried full-term through the pregnancy to delivery."

The technique could be of special interest to the dairy and beef cattle industry where embryo transfer is gaining widespread popularity.

And, as embryo freezing becomes more widely available, there will be a need for more accurate methods of evaluation, according to the College Park researcher.

Although the first successful embryo transplant from natural to surrogate mother took place in 1890 in experiments with hares, it wasn't until the early 1970's that the cattle industry began to use the technique to produce increased numbers of offspring from valuable females.

Last year along, more than 20,000 of the transfers were performed on dairy and beef animals in the United States.

The process works like this. A healthy female of superior genetic quality is given fertility drugs to stimulate the production of more than the normal one or two ova.

The female is then paired with a genetically superior male, either through traditional breeding methods or artificial insemination. Usually the latter is chosen because it is more efficient — one controlled ejaculation, theoretically, can fertilize as many as 300 females — and offers little chance of infection or injury to either animal.

Once fertilized, the ova — now developing embryos — are flushed from the true mother and transferred to surrogate mothers who will carry the offspring to term. During the flushing process, as many as 40 embryos have been recovered and 10 is not uncommon, say researchers.

Not only does the process allow one superior female to "mother" a large number of offspring at a time, it allows her to do it more often. Without the burden of carrying a full pregnancy, the superior female can go through the ovulation-breeding-flushing cycle a number of times during the same period she normally would be carrying an offspring in her womb.

Beyond simple production of large numbers of genetically superior animals for dairy or beef markets, the process has other applications, according to MAE's Dr. Haaland.

A cow with superior genes in every other respect may have problems carrying a calf to term. Her uterus may be damaged and unable to carry a fetus. An embryo transfer would allow her to continue to produce extremely valuable offspring.

Although the process sounds virtually foolproof, it isn't: Not all of the estimated 20,000 transfers performed last year resulted in a successful pregnancy. Only 40-60 percent saw delivery of a live calf.

One reason, says Haaland, is the quality of the developing embryo. Her research with fluorescent dyes, she explains, will help veterinary scientists determine an embryo's chances of survival without expending the time necessary to culture embryos.

"If it can be determined through fluorescent dye evaluation that an embryo has a poor chance of being carried to term, there is little reason to perform an embryo transfer," Haaland says.

Future developments could make the dye evaluation technique even more valuable. Already, healthy calves have been born from embryos stored in liquid nitrogen — a state of frozen suspended animation — for as long as a year after the actual fertilization of the embryo. Pregnancy rates, however, from the transfer of "thawed" embryos are less than half those from fresh, unfrozen embryos. A quick and accurate evaluation technique, therefore, would save the industry time and money, according to researchers.

State Grange session convenes Monday

HARRISBURG — Approximately 1500 Grangers from across the state will meet in Altoona next week for the annual State Grange Session from Oct. 26-29.

The major function of the session is for delegates from 565 local Granges in the state to vote on legislative and organizational policy for the upcoming year.

The Pennsylvania State Grange is a rural farm fraternity formed in 1873 for the advancement of agriculture and rural living. The current state membership is 44,000 strong.

Also featured at the convention are contest finals for sewing, needlework, baking, photography and crafts. Granger of the Year, Community Service, Talent and Safety awards will be presented as well.

Governor Richard Thornburgh will address delegates on Oct. 27 at an All-Granger banquet served in the Jaffa Mosque on Broad Street, Altoona. Additional speakers for the session include Secretary of Agriculture Penrose Hallowell, Secretary of Transportation Thomas Larson, Senator Edward Helfrick, chairman of the Senate Agricultural and Rural Affairs committee, and Blair County legislators.

Former Pittsburgh Steeler Rocky Bleier will make a special appearance on Oct. 27 to talk about the upcoming water bonds referendum slated for the Nov. 3 ballot to provide badly needed loan money for water supply systems in Pennsylvania. Bleier serves as honorary chairman for a committee formed to promote the water loan issue, first endorsed by the State Grange.

Most session activities will take place at the Jaffa Mosque; however, contest entries will be on display in the Sheraton of Altoona. These exhibits are open to the public on Oct. 27 and 28.