Commercial Ova Transfer Claimed Possible, Could Revolutionize Dairy, Beef Breeding

By 1980 Americans will demand well over 31 billion pounds of beef. That's more than 130 pounds per person, per year.

These figures mean U.S. cattlemen must increase cow herds by some 20 million head, about 40 percent more than present levels. An ambitious goal, at best.

More production per cow may be the practical substitute for simply adding more cows to herds. This means a need for superior calves that grow to higher slaughter weights at younger ages. Animal scientists have made significant gains on a continuing goal of increasing pounds of beef per cow per year. But time required to breed, test and select cattle for the more efficient traits has always retarded progress.

Artificial breeding has been a boon to both beef and dairy industries for more than 35 years. The process of artificially collecting, freezing and injecting bull semen has met only "half" the challenge of reducing time needed to select superior animals and spread their impact. The cow, the other half of the story, still is able to produce only one calf per year. Actually, national average production is only 3.5 calves in a cow's lifetime.

Now, a great leap has been taken to compress the generations required for the cattle upgrading process. A new practical science called "ova transfer" has now become available to U.S. cattlemen and dairymen.

More specifically, ova transfer is the process of transferring many fertilized eggs from a single superior cow to several ordinary cows. The science could bring rapid advance on the goal of more pounds of beef per cow per year.

First U.S. company with facilities to provide ova transfer services commercially is International Cryo-Biological Services, Inc. (ICBS), of St. Paul, Minn. The company announced its services earlier this month at a Minneapolis symposium on "The State of the Art of Ova Transfer", featuring many top researchers in the field.

Dr. Harry Rajamannan, ICBS president, explains the company's new service this way:

"We are commercially providing cattlemen the service of removing large quantities of fertilized eggs from their selected, superior cows and placing the eggs in other less-perfect cows to be carried through pregnancy to birth. The 'foster' mothers contribute nothing genetically to the calves. They are merely incubators for the superior embryos. The result is several superior animals per year from a single highly-valuable cow. For the first time, genetically superior cows can greatly multiply their influence on blood lines, as bulls have been doing through artificial insemination. The ultimate result will be to increase the average beef or milk production per cow. Ova transfer will prove to be one of the greatest genetic improvement tools ever used by the domestic animal industry," Dr. Rajamannan claims.

For more insight into exactly what ova transfer is, let's follow Dr. M. L. Fahning, head of ICBS research, through a typical case.

The setting is a modest, but intricately outfitted research farm near River Falls, Wisc. Cows involved in this ova transfer include a donor, who will yield fertilized eggs, and several recipient cows, to which eggs will be transferred. All animals involved have synchronized heat cycles so transfers will "take".

Key to the ova transfer process is "superovulation" of the donor. Drugs are used to stimulate release of multiple ova for fertilization by artificial means. Without superovulation, a cow would normally release only one ovum per heat cycle.

Five days have passed from fertilization until transfer time. The donor cow is anesthetized and wheeled into surgery to a special hydraulic-lift operating table. A small incision is made in the abdominal cavity and the reproductive organs exposed. The fertilized eggs are "flushed" from the oviducts into a small dish using a special solution. An experienced ova researcher, Maija Maki-Laurila, examines the collected fluid and locates all fertilized eggs. This time, she retrieves six eggs in the 8 to 32-cell dividing stage.

First of six recipient cows to receive a transfer arrives in the operating room and a small incision is made in her abdomen. Dr. Fahning is handed a small pipette containing the first egg which he inserts in a small puncture in an oviduct. The incision is closed and another recipient arrives for a repeat performance. In about 30 days pregnancies can be diagnosed. Full-term pregnancies should result in six healthy "ful sibs" (brothers or sisters) with genetic traits of the donor cow and bull she was bred to. In only 9 months this superior cow will have produced 2.5 calves more than her average expected lifetime production. Yet her productive life is just beginning.

ICBS is presently researching techniques to freeze eggs for long-term storage, much as semen is frozen today. This would allow cattlemen to "buy eggs" from certain superior animals much as they might purchase superior live animals today. Then, using still another process under research, each egg might be non-surgically 'injected" into the reproductive tract of an average carrier cow to yield a highly valuable animal.

These frozen eggs might someday be flown to underdeveloped countries where the simple implantation process could yield greatly superior animals using their own existing stock as recipients. This would mean rapid upgrading of both beef and dairy to feed the hungry of these depressed areas.