

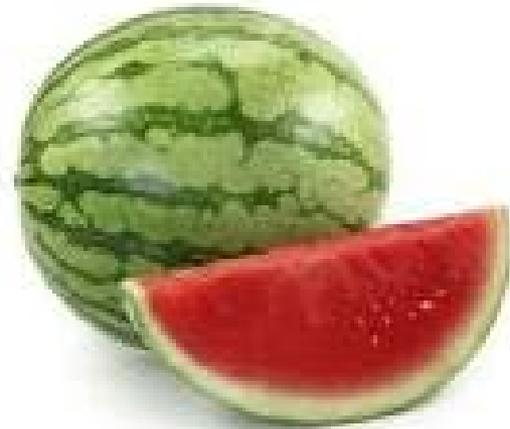
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# Cloning Value in Bovine and Animal Agriculture



# *Leading Cloned Products*

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# Bovine Genetics Cooperative



# Plain City, Ohio Production

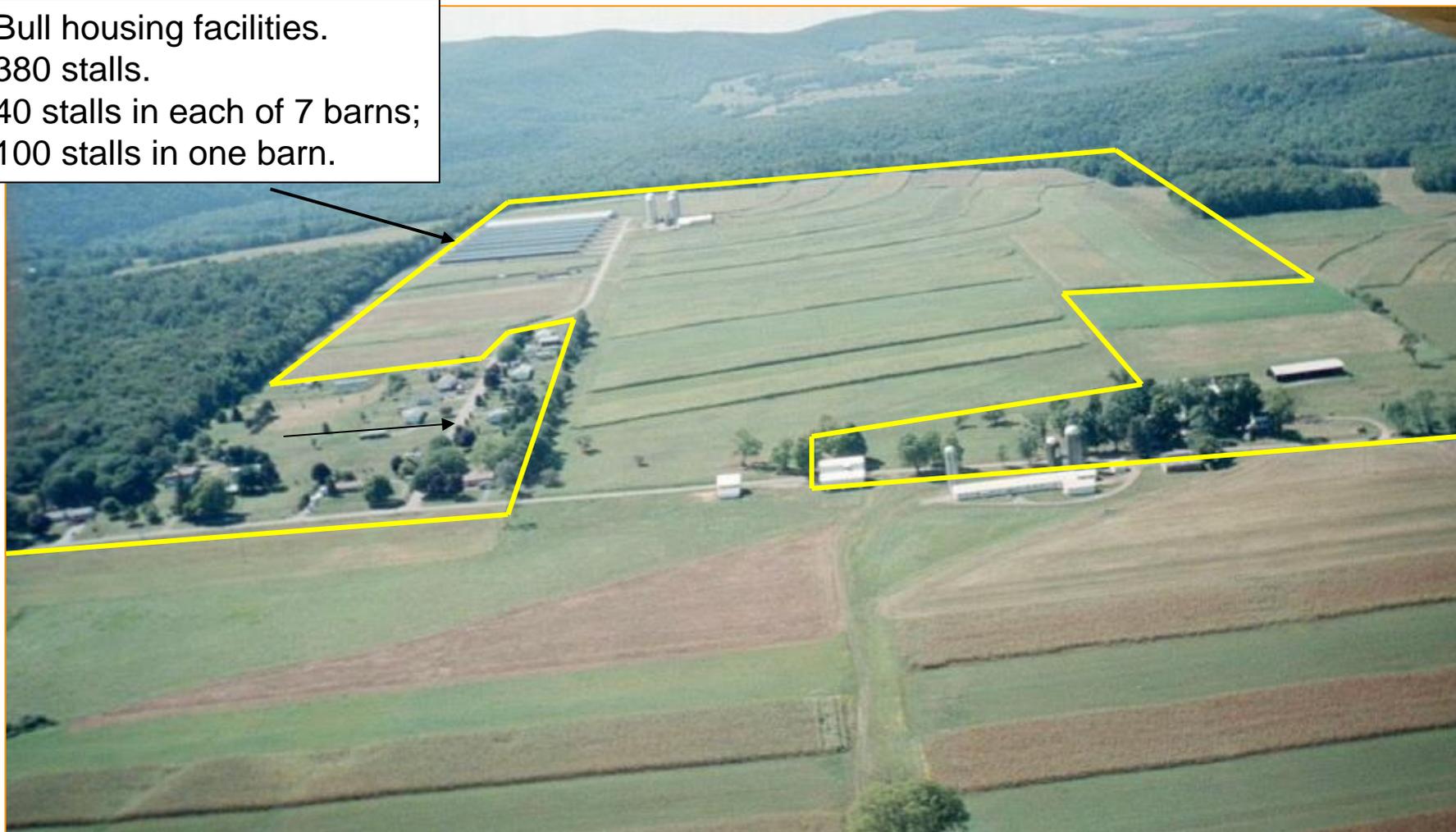


# Unionville Center, Ohio



# Pennsylvania Facility

Bull housing facilities.  
380 stalls.  
40 stalls in each of 7 barns;  
100 stalls in one barn.



# Pennsylvania Farm





**YOUR SUCCESS** *Our Passion.*



# History of Reproductive Technologies

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Assisted reproduction tools coupled with Genomic Selection will accelerate genetic gain 2X – 8X

- AI started in 1950's
- ET started in 1970's
- IVF started in 1990's
- GP/Cloning started in 1990's
- Sex separated Semen 2000's



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# Benefits of Cloning



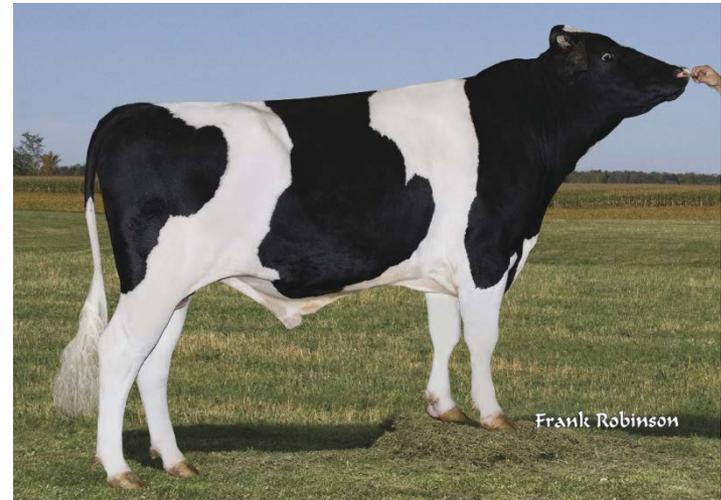
# Allows you to preserve or advance use of superior animals.

**Cloning and Stem Cell Technologies**

**Preservation of elite genetic blood lines.**

The #1 bull in the United States is Dead!!!

Daughters produce \$834 dollars worth of productive product in their lifetime than the average cow.



# #2 Genomic Calf Tested - DEAD



## High Ranking Genomic Young Bulls AUGUST 2014

Bulls with no daughters in their genomic proofs for Production or Type. No requirement for semen status.  
 GTPI® is a servicemark of Holstein Association USA, Inc. © 2014

| Name                        | Requester | NAAB code | Birth Date | GFI | Pro | Fat | Yield  |      |     |     |      |      | Type % |      |     |     |      |
|-----------------------------|-----------|-----------|------------|-----|-----|-----|--------|------|-----|-----|------|------|--------|------|-----|-----|------|
|                             |           |           |            |     |     |     | % Rel. | SCS  | PL  | DPR | PTAT | UDC  | FLC    | Rel. | DCE | DSB | GTPI |
| DE-SU HALOGEN 12342-ET      |           |           | 20140423   | 6.5 | 72  | 88  | 71     | 2.45 | 7.7 | 2.7 | 3.39 | 3.11 | 2.23   | 69   | 4.5 | 4.9 | 2760 |
| PLAIN-KNOLL RDGR MODEST1-ET |           |           | 20140514   | 7   | 75  | 96  | 72     | 2.71 | 9.1 | 3.2 | 2.37 | 2.36 | 1.79   | 71   | 4.2 | 4.5 | 2718 |
| COOKIECUTTER MONT 12063-ET  |           |           | 20140627   | 7.1 | 70  | 105 | 72     | 2.68 | 5.9 | 2   | 3.51 | 3.1  | 2.16   | 70   | 5.2 | 6.2 | 2673 |
| S-S-I PARTYROCK PROFIT-ET   |           |           | 20140101   | 7.2 | 73  | 95  | 70     | 2.6  | 7.2 | 1.9 | 2.72 | 2.48 | 2.73   | 68   | 4.5 | 4.4 | 2662 |
| SSI HEADWAY 8679 K880-ET    |           |           | 20140618   | 6.9 | 73  | 103 | 70     | 2.58 | 5.3 | 1.6 | 3.19 | 2.52 | 3.05   | 68   | 4.6 | 3.7 | 2658 |



# Replicate Environmental Superiority

**Ave. Lactation Brazilian Gir:  
1,590kg/Lac.**

- Allows you to replicate plants and animals that are superior for their environment
  - More efficient utilizes or food and nutrients
  - Carry traits that are preferred.



Valia: 15.151 kg milk in one lactation



# Bovine Animal Improvements

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- Heat tolerance
- Tick resistance
- Disease resistance
- Cattle to fit the local environment
- Healthier foods
  - Milk that is less lactose intolerant
  - High vitamins, minerals, and proteins
  - Higher in calcium
  - Improved cholesterol types



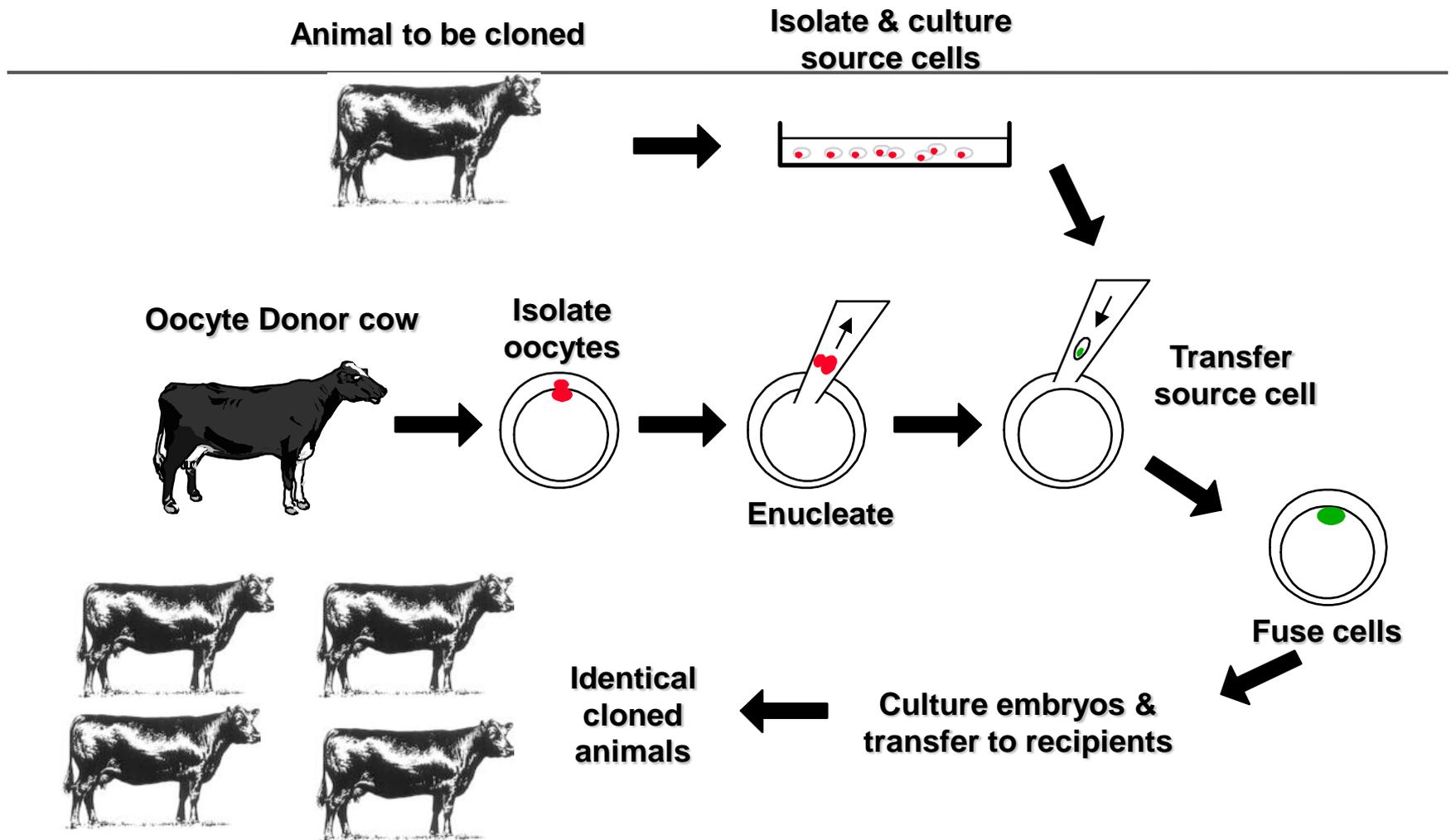
# Vehicle to Improve other Technologies

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- Molecular breeding
- Gene editing
- Many others



# Cloning Process in Cattle is Purely Replication



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# Select Sires Investment



# Why Has Select Sires Not Invested?

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- Classification of Cloning:
- No Definition of Cloning:
  - Is a clone a animal produced from nuclear cloning?
  - Are his offspring considered clones? Regulation?
- Pathway to approval is not clear.
- Rules keep changing.



# Summary

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- Technology is needed to feed the world, reduce pollution and improve environmental stewardship.
- We can improve the quantity, quality, and healthfulness of food through technology.
- We can improve local technologies.



# Summary

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- Categorize technologies properly
- Develop clear and understood path of approval.
- Work together as regulators
  - Reduce cost of testing
  - Strength in numbers
  - Improves trade
- Base governance on science
- Defend science publicly



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Thank you!

