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# Cloning Value in Bovine and Animal Agriculture



# ***Leading Cloned Products***

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# Bovine Genetics Cooperative

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# Plain City, Ohio Production



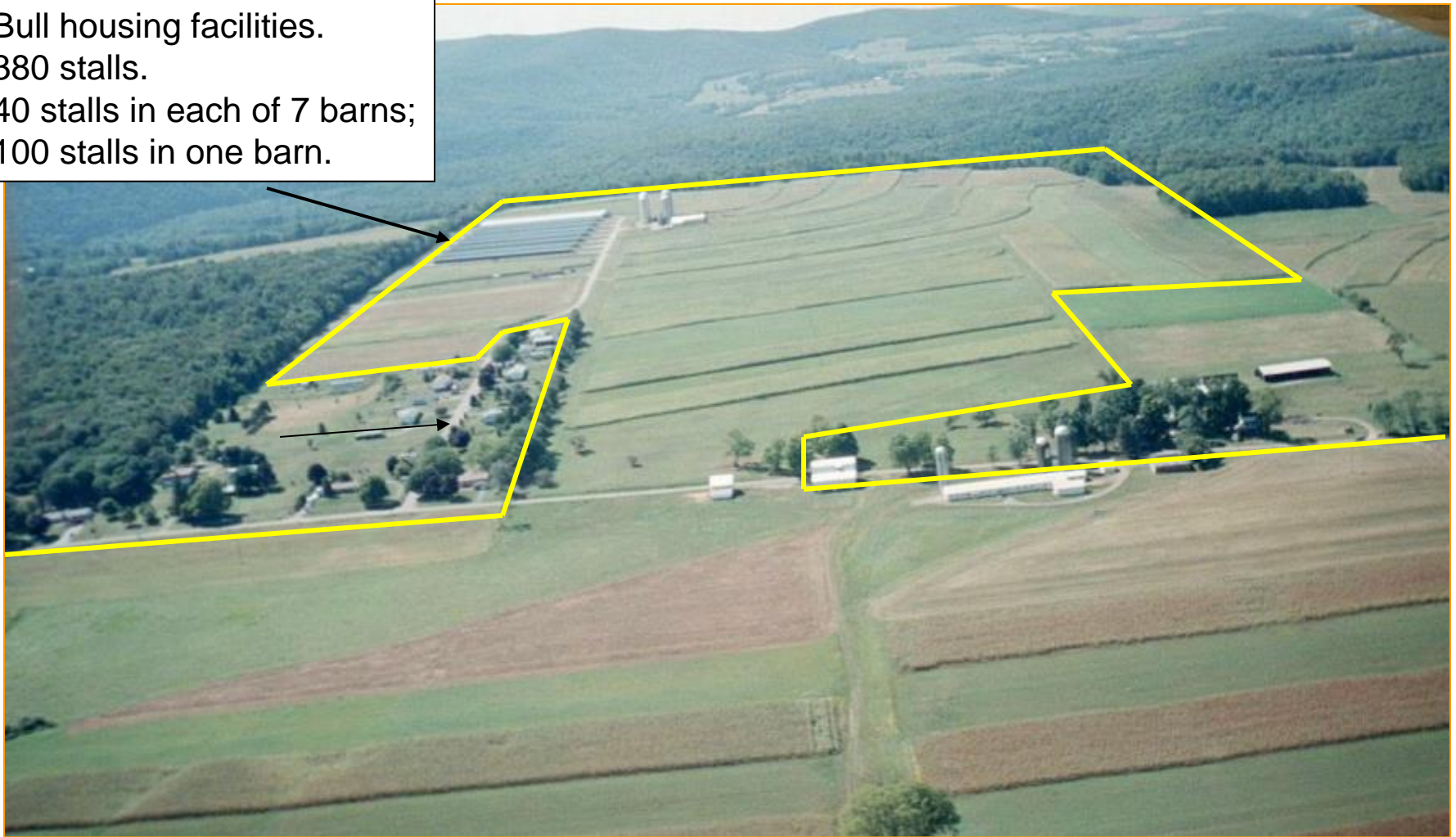


# Unionville Center, Ohio



# 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



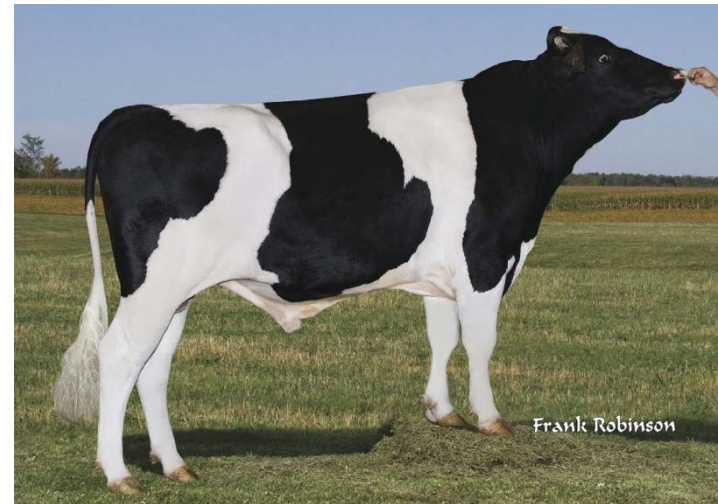
# Allows you to preserve or advance use of superior animals.

**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				DPR	PTAT	UDC	FLC	Type %		
							% Rel.	SCS	PL	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

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**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





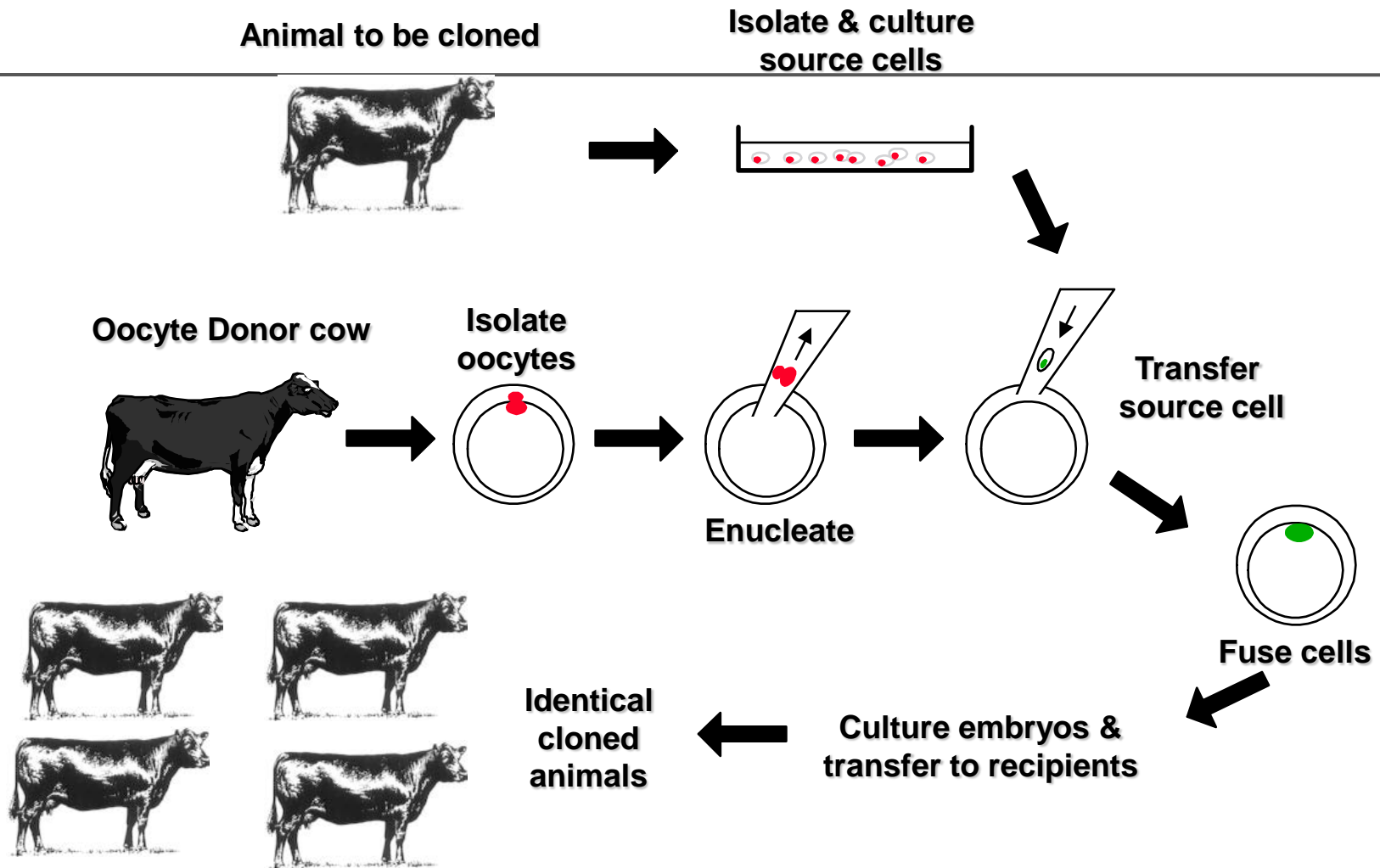
# Vehicle to Improve other Technologies

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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!

