

THE PATHWAY TO IMPROVING THE WELFARE ISSUE AND A POTENTIAL SOLUTION

CURRENT GLOBAL PRACTICE



DAY 21

INCUBATION AND HATCH

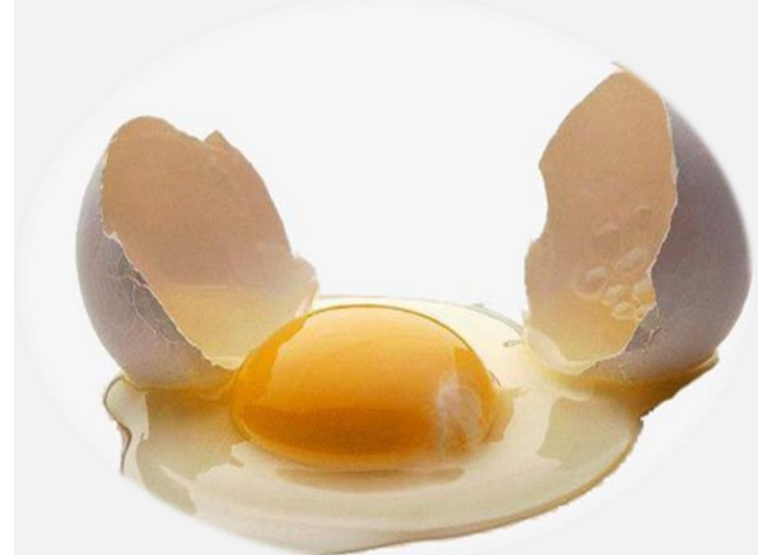
NEW TECHNOLOGY IN EUROPE



DAY 9 +

INCUBATION AND REMOVAL

MARKER SORTING – POINT OF LAY



DAY 0

NO INCUBATION : NO GROWTH

TACKLING THE ISSUE




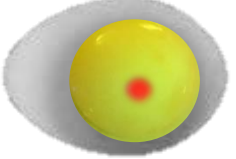
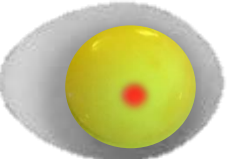

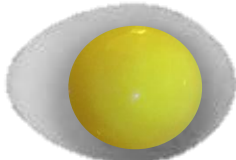

BIG IMPROVEMENTS ACHIEVED

POTENTIAL COMPLETE SOLUTION

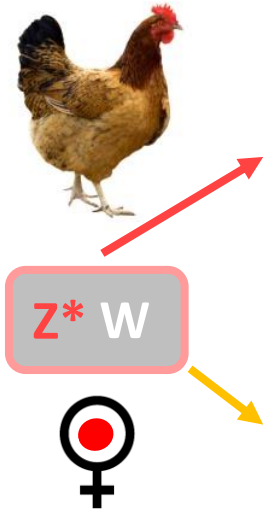
SEGREGATION OF SEX CHROMOSOMES DURING THE FORMATION OF OVUM AND SPERM

Marker on female Z inherited only by male embryos



	 SPERM	 SPERM
 OVUM	 Z^*Z	 Z^*Z
 OVUM	 ZW	 ZW

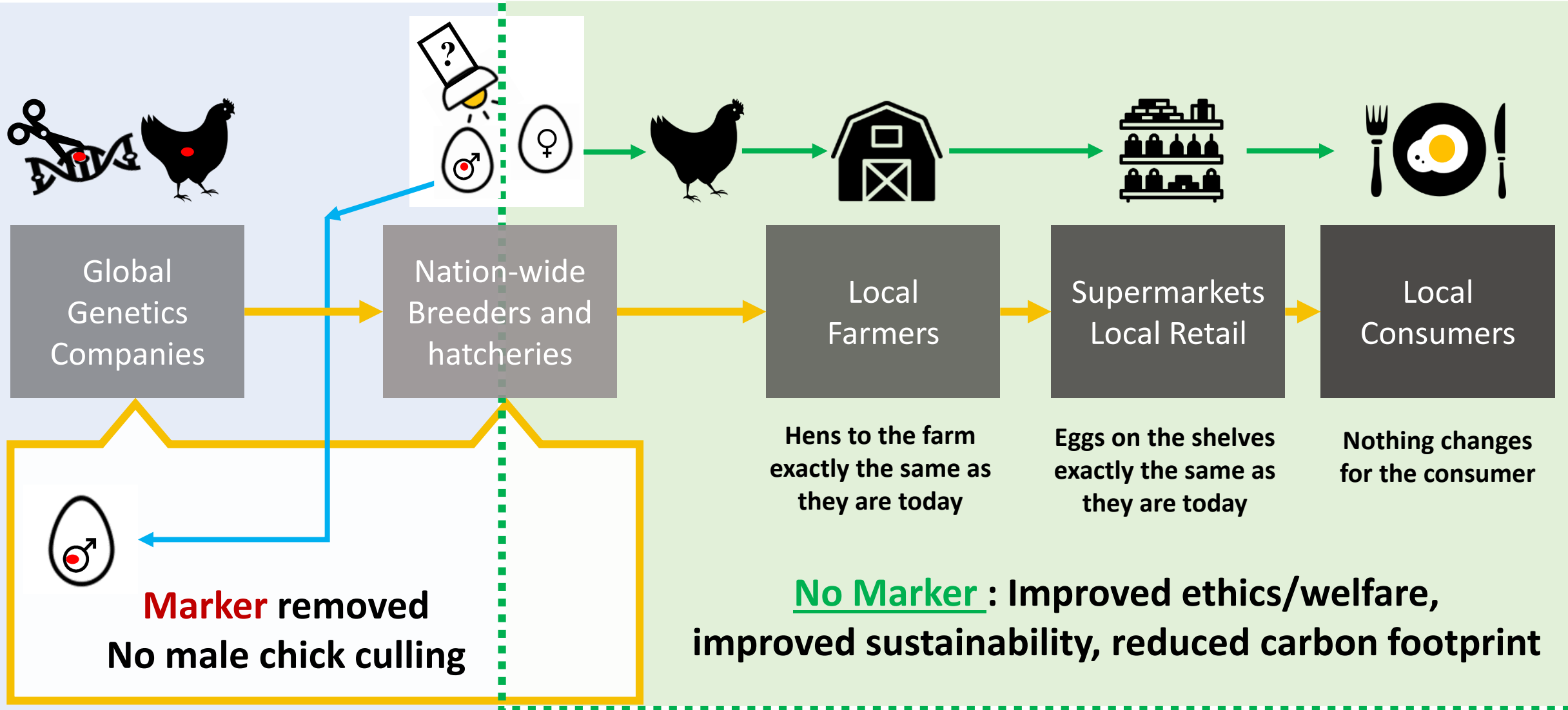
Null-segregation event



Eggs removed at point of lay
No more culling of day old male chicks

Female chicks are "null-segregants"

SEX SORTING – BENEFITTING THE ENTIRE SUPPLY CHAIN



Breakout session B1: Null Segregant

Questions to consider:

1. What are the key considerations from different jurisdictions related to a null segregant system? Do you know of any plant related examples that have been reviewed?
2. Would the null segregant animal be considered a GMO or not?
3. Would the food product from a null segregant animal be considered the food product of gene technology?
4. Would the food product attract a requirement for any safety assessment?
5. Would the food product attract a requirement for equivalence testing?

Breakout session B1: Null Segregant

Questions to consider:

6. Would your regulator encourage a submission of a data for consideration even if the product is not regulated?
7. Would you provide a reply with your considered comments or does your system not allow that (based on legal considerations)?
8. What sort of information would you like to see or are you happy just to allow the developer to chose what to share?
9. Since the parent animal is transgenic (a GMO) what considerations do you have for the housing, containment and traceability (record keeping) for those GM parents?

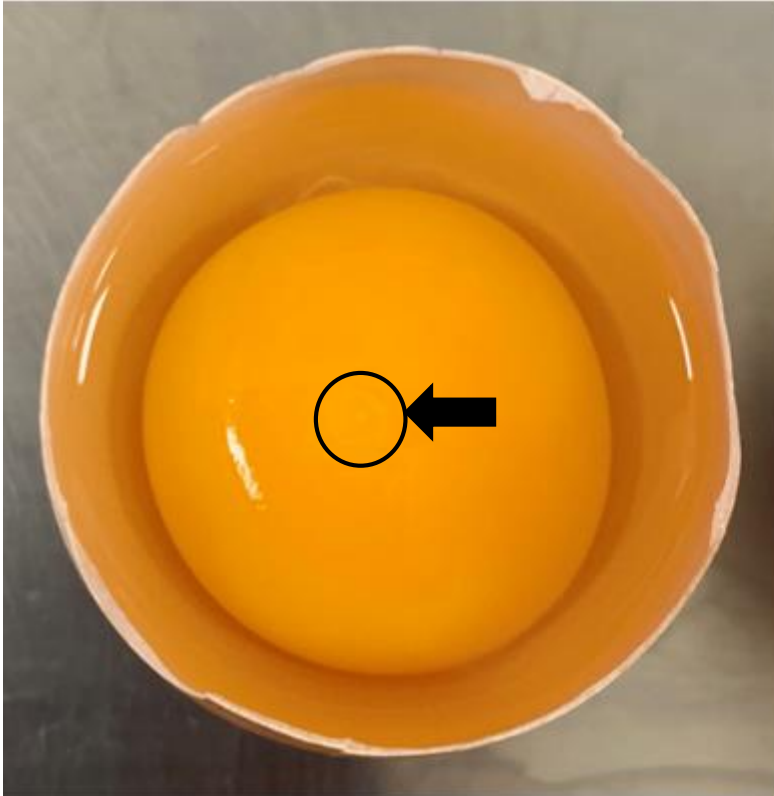
Breakout session B1: Null Segregant

Questions to consider:

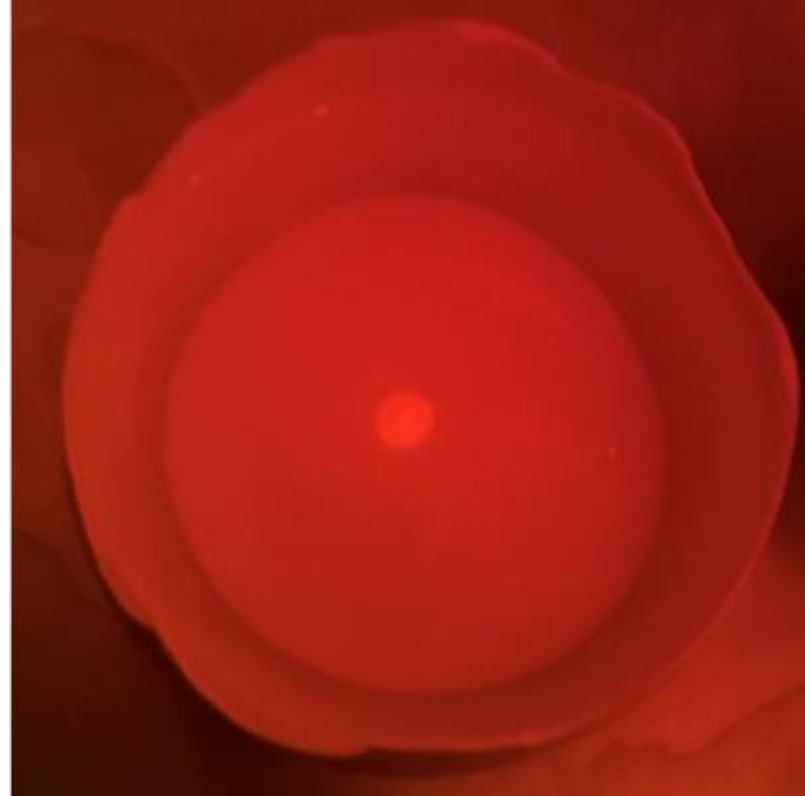
10. Is there any requirement in your jurisdiction for the approval/containment of those GM parents - particularly, for instance, the importation of those animals for another country?
11. Is a unique genetic location for the marker gene critical? The fact is that the whole chromosome is the driver for the null segregation – is it sufficient to show it is on the Z chromosome?
12. What other considerations are there in the relation to the use of this technology for the generation of human food?
13. In the case of null segregation for sex sorting in poultry would the male egg, with a tiny amount of GM material present be allowed into the food chain? How might to be treated to allow that? Could it be used for other purposes, e.g. animal feed?

INSIDE THE POINT-OF-LAY EGG CARRYING THE MARKER

Natural lighting:
Gene Edited Blastoderm



RFP filter:
Gene Edited Blastoderm





•Thank you

