Easitrace II

Cheaper and easier ways of tracing meat using DNA

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Animal Genomics section

http://www.agresearch.co.nz

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Outline

- What we learnt from Easitrace
- Easitrace II
- Tracing mixed product

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easiTrace™

Farm of Origin

Processing

Carcass → Cut → Carton

Market

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Carton Label

Store all carcass tickets with DNA sample attached

Select samples for DNA testing

Compare DNA

DNA sample from meat

Stock Data System

Correct Carcass Ticket identified by DNA

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What we learnt from Easitrace

- Any additional increase in processing costs, even a simple sampling step, is not acceptable to this low margin business
- If DNA tracing is going to be used it must be at no cost to processors

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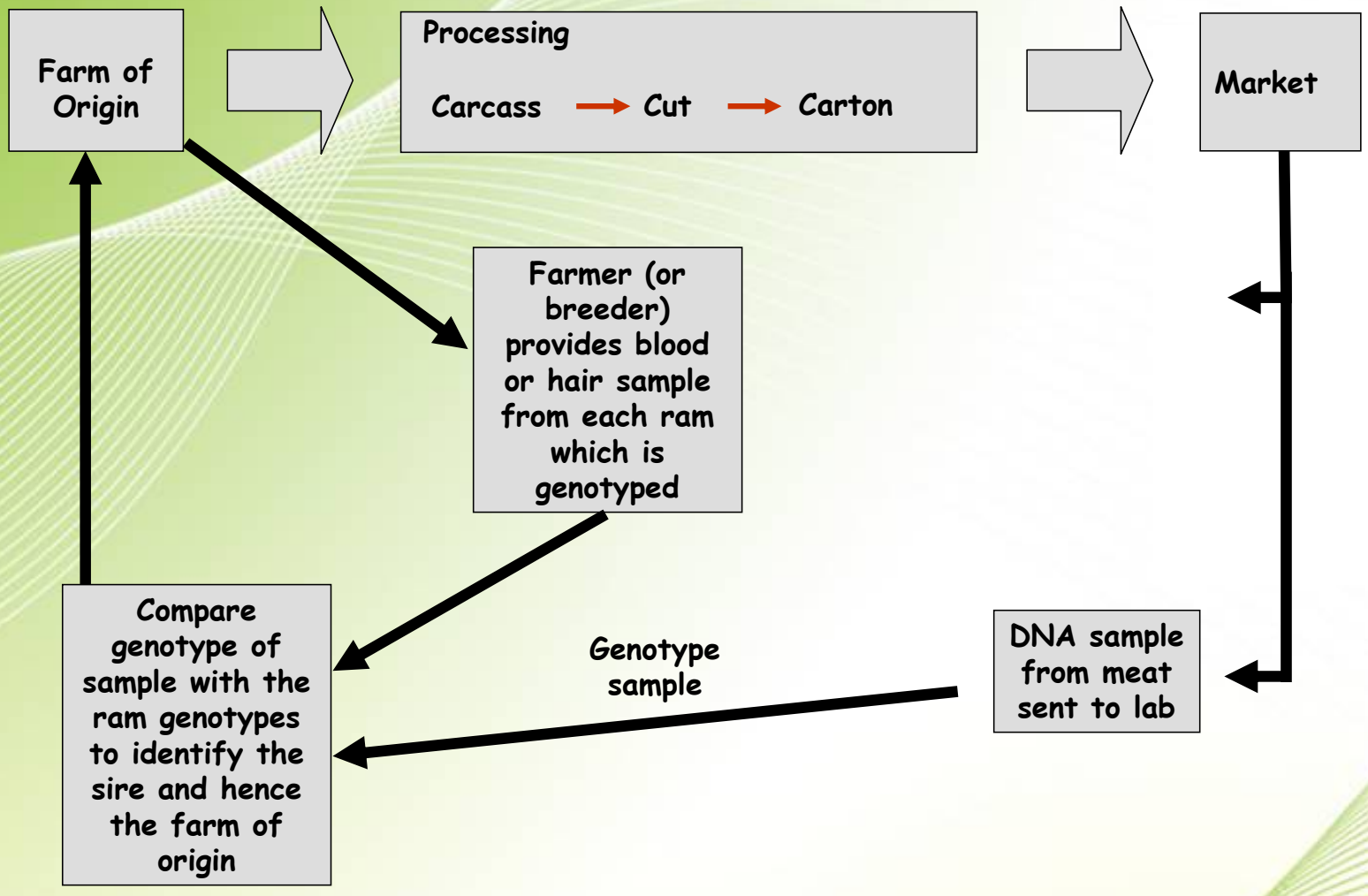
What is Easitrace II



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Easitrace II

- Advantages
  - No sampling by the processor (ie. no cost)
  - Farmer supplies ram sample for genotyping ($15 / ram)
  - Lamb sample from market genotyped and screened against ram genotypes in database ($100/sample)

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Easitrace II

- Advantages continued:
  - Many rams are already genotyped by breeders using DNA parentage (ie. farmers purchasing these rams have nothing to do)
  - Ideally suited to closed groups of farmers supplying a single customer
  - Proves stolen meat came from a particular farm
- System available immediately

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Tracing mixed product

- Any unique but safe easily detected chemical could be added to the product (eg foreign DNA)
  BUT Consumers don't trust food additives
- Does the beef pattie have a unique DNA "signature" for each batch
- Can we tease out the contributing individuals to trace the beef pattie
- Can we add a rare beef animal to act as a trace

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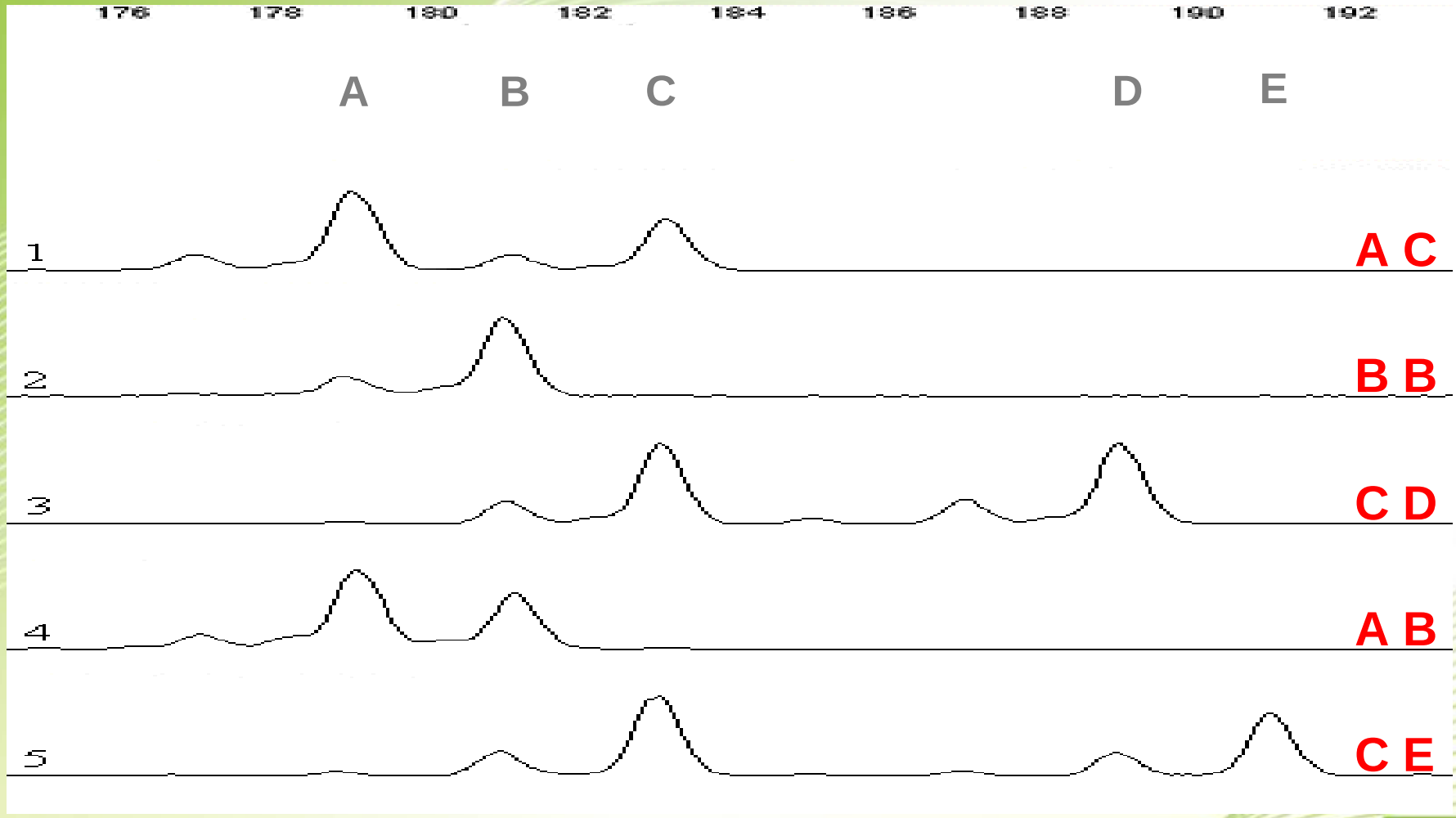
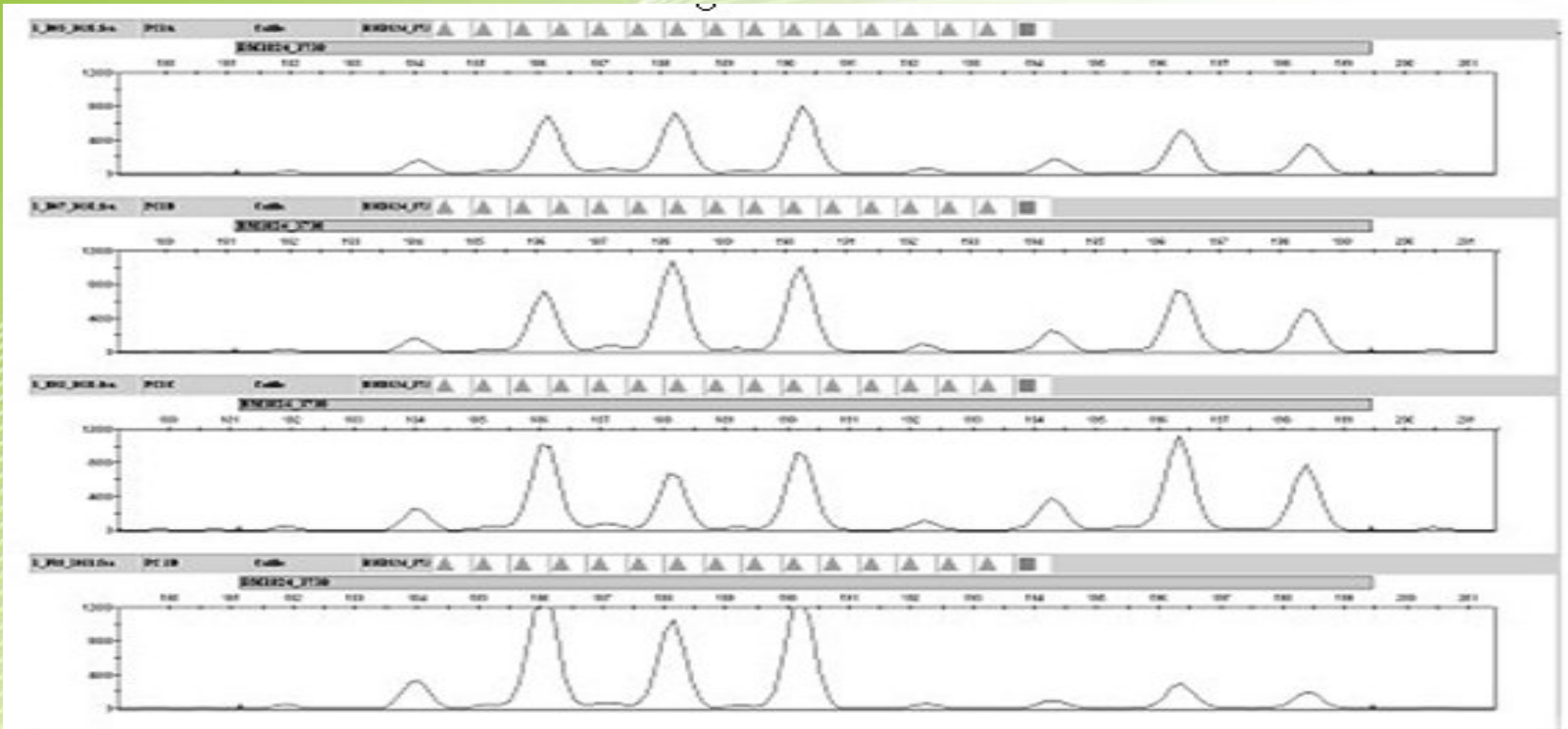
DNA profiles



Mixed DNA profiles



Profiles proved to be very reproducible within batch and made an excellent “signature”

BUT dependent on excellent mixing processes

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Teasing Beef patties apart

- Very small “washed” fragments of patties gave profiles from a single individual
- Individual profiles also obtained from cooked patties
- Providing a sample of the batch is kept either the mixed DNA “signatures” or profiles from individual fragments can be used to verify the source of the returned beef pattie

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Implementation

- All Beef pattie research was done in collaboration with ANZCO Green Island (Food technologist: Melanie Wong)

- **Findings:** Because of very thorough mixing DNA signatures worked well for traceback from Japan. For further confirmation we could also trace individuals
- ANZCO now store 2 patties from each batch so that a traceback can be undertaken if necessary

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Other research completed

- We add meat from a rare animal (Maine Anjou with a double muscling mutation)
- By adding it as freeze-dried powder we need only add the equivalent of 1kg per tonne to detect the mutation

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Research in the pipeline

- NZ has a unique mix of breeds used for beef manufacturing product (Very high Jersey / Friesian content and no *Bos indicus* breeds)
- This will give our hamburgers a unique DNA signature

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Summary

- DNA cannot be separated from its product - a **tamper-proof** label
- A very good audit tool to provide independent verification
- Very low cost systems now developed and available for industry

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