

What AnimalTrace's Genetics Engine Does

A clear map of the science that runs today and what is on the roadmap.

Engineering & investor reference · Confidential



THE SHAPE OF IT

AnimalTrace normalizes raw lab results into governed, versioned genetic facts and turns them into breeding decision-support. Every claim below is graded by what is actually implemented today, so the science survives diligence without overstatement.

● REAL & CORRECT TODAY

- + **Result normalization**
Raw results map to canonical interpretations through inspectable definitions; unknowns fail closed into review queues.
- + **Recessive-risk pairing**
Punnett-square offspring outcomes (affected, carrier, or clear) from released carrier statuses.
- + **Inbreeding coefficient (COI)**
A pedigree-based COI for a proposed pairing, with the common ancestors driving it traced.
- + **Mate recommendation**
Ranks candidates by a balance of safety (recessive risk) and diversity (COI), with hard filters.
- + **Verifiable reports**
TraceReport & TraceSnapshot: released results become immutable, content-hash snapshots anyone can verify.
- + **QC & panel coverage**
Per-submission QC flags and coverage; partial-panel release is a species-configurable policy.

● ON THE ROADMAP

- ~ **Parentage verification**
Genotype-based parentage that confirms or excludes a proposed parent, with a confidence measure.
- ~ **Relationship & identity**
Genotype-based kinship that places pairs in a degree of relationship and flags duplicates and mix-ups.
- ~ **Beyond autosomal recessive**
Broader inheritance models; today's pairing covers the recessive case.
- ~ **Ancestry & admixture**
Governed reference panels are in place; the ancestry analysis layer builds on top of them.
- ~ **Built on the same model**
Each roadmap mode reuses the governed pipeline: capability-gated, released-facts only, reviewed, and versioned.

THE PATH TO RELATIONSHIP & PARENTAGE SCIENCE

The roadmap modes build on the governed foundation that already exists. The scientific design is set, using standard, defensible methods, with production rollout following validation against known cases per species.

1

Genotype-aware

Capture the genotype detail each comparison needs as part of normalization.

2

Parentage

Confirm or exclude a proposed parent, with a likelihood-based confidence measure.

3

Relationship & identity

Place pairs in a degree of relationship, and flag duplicates and sample mix-ups.

4

Same guardrails

Capability-gated, released-facts only, calibrated, versioned, and audited.

BOTTOM LINE

The breeding-genetics engine (recessive risk, inbreeding coefficient, mate recommendation) is real, correct, and rare in this market. Relationship and parentage are on the roadmap, built on the same governed foundation.