

Diverse Genomic Signatures of *Hermetia illucens*: Tools for Comprehensive Analysis of Diversity

Ben Gradus, PhD

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NRGene's Technology: Validated Across Diverse Industries

Vast Genomics Databases and Advanced Algorithmics Trusted by Global Leaders

Relaying on NRGene's Technology

30

Countries

83

Species

138

Customers

300

Projects

Validated Across Diverse Industries



SUNTORY

Mondelēz
International



syngenta



BRIDGESTONE

SAKATA



Hazera
Seeds of Success

WYFFELS
HYBRIDS

calyxt

CRONOS
GROUP

AURORA

kayagene

ipure





We Develop the
Next Generation of Elite
Black Soldier Fly (BSF) Varieties.
Optimizing BSF Production Efficiency.

Holistic Breeding Operations

The 3 Pillars of Elite Variety Development



**Genetically
Diverse Breeding
Population**



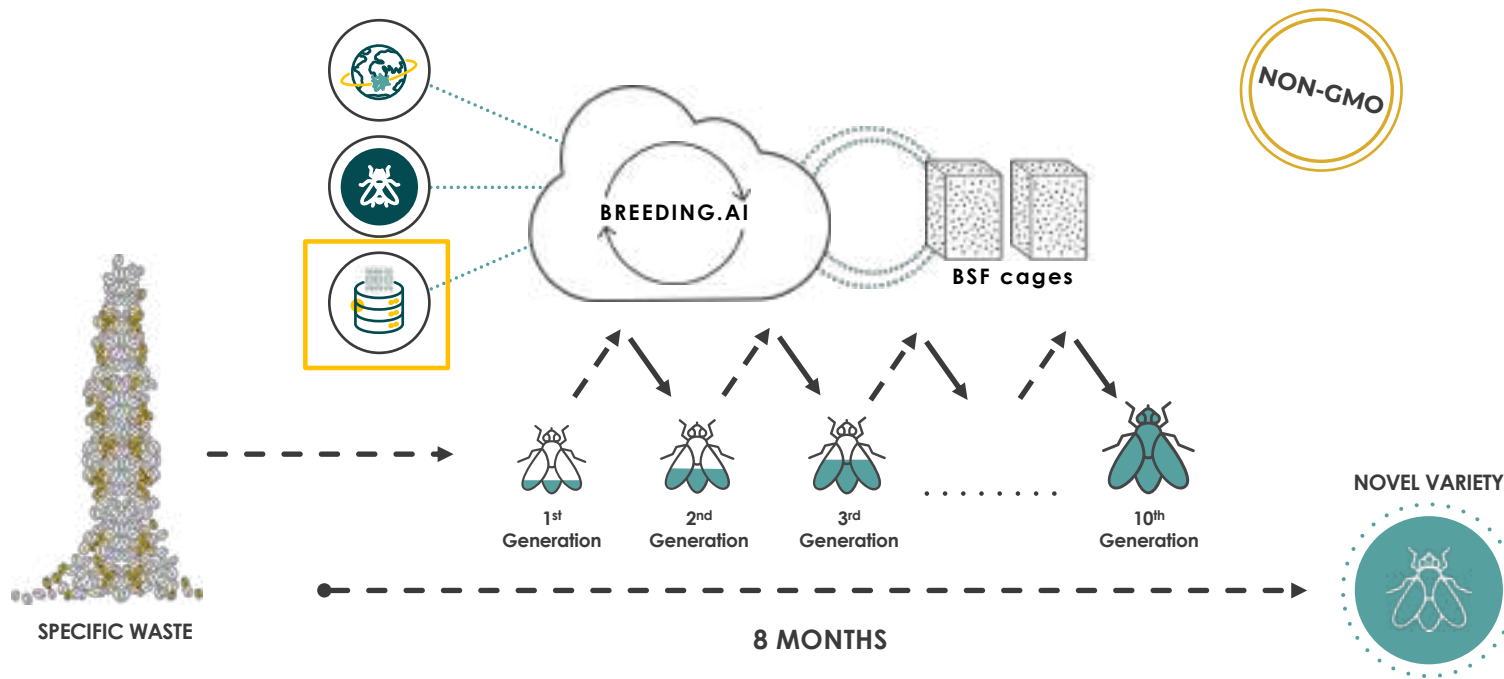
**Data-Driven
Molecular
Breeding Tools**



**Cutting-edge
Phenotyping Tools
and Traits**

Our Technology

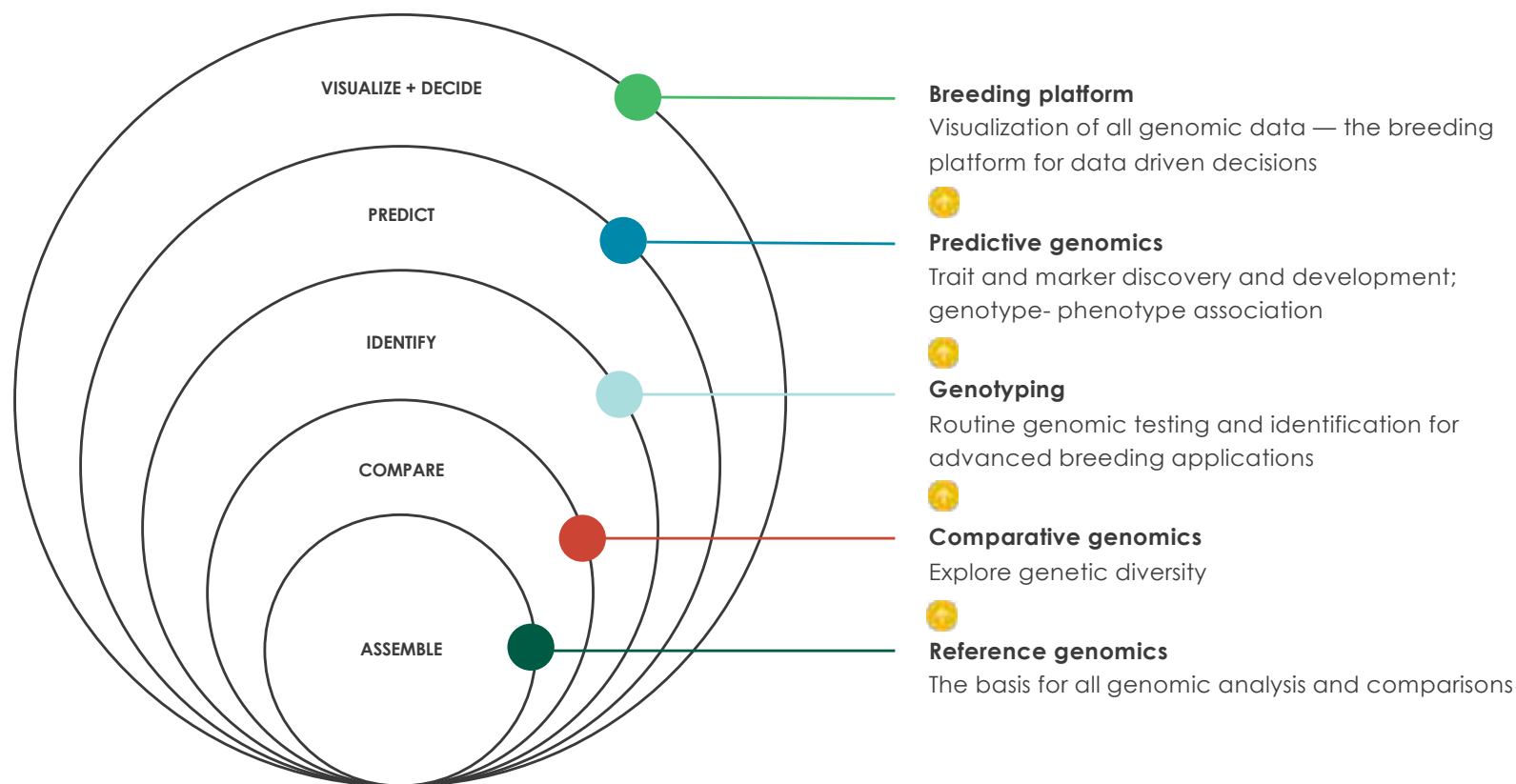
Accelerating Customized BSF Strains Development Through Big Data And AI



We are able to deliver customized, superior BSF strains in just a few month, optimizing customer's production and operational profitability



Holistic Approach for Molecular Breeding





Accurate Assembly and Phasing of BSF Genomes

Comparison of NRGene Pseudochromosome Sizes with Reference Genomes

Chromosome number	Reference Size [bp]	BSF IL male phase A Size Mapped NRGene [bp]	BSF IL male phase A NRGene / Reference Ratio [%]	BSF IL female phase A Size Mapped NRGene [bp]	BSF IL female phase A NRGene / Reference Ratio [%]
1	222,122,703	225,581,929	101.56	223,843,041	100.77
2	191,142,057	196,984,156	103.06	199,251,828	104.24
3	180,357,958	182,518,172	101.2	180,880,899	100.29
4	173,077,783	177,828,890	102.75	175,808,725	101.58
5	116,824,456	119,922,291	102.65	119,940,593	102.67
6	103,444,952	105,552,042	102.04	102,325,760	98.92
7	15,435,017	16,618,321	107.67	14,908,233	96.59
Unmapped99	2,528,864	2,123,143	83.96	69,791	2.76
Total Chr Size (bp)	1,002,404,926	1,025,005,801		1,016,959,079	

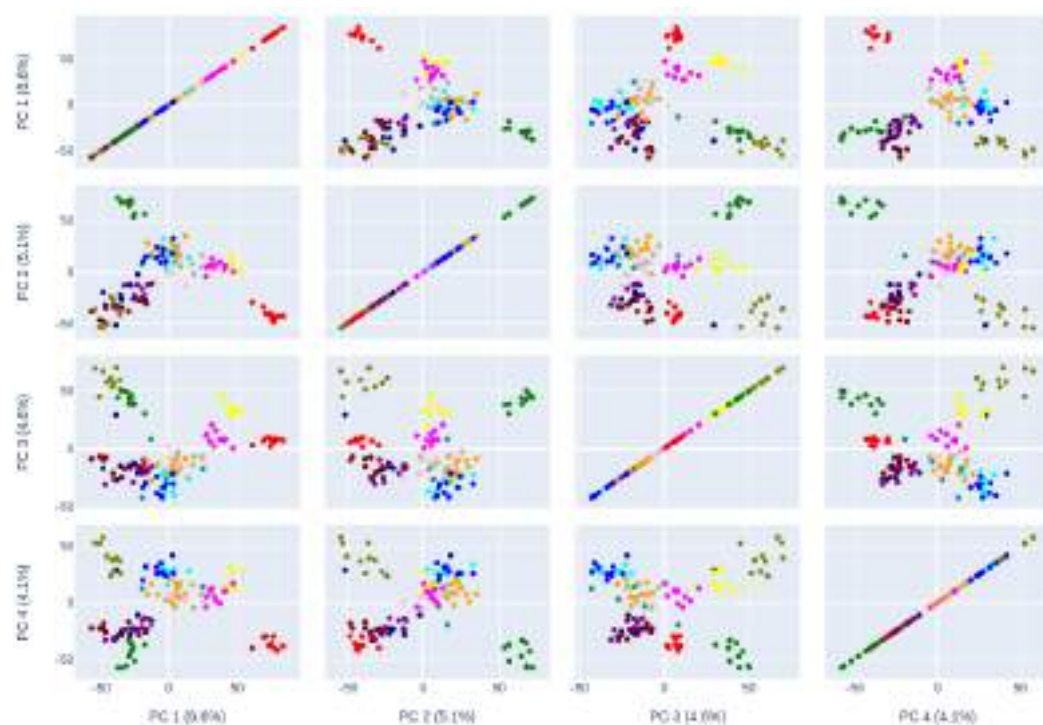
First Description of the Male Y Chromosome





BSF Genetics and Data Analysis

Sampling and sequencing of new population



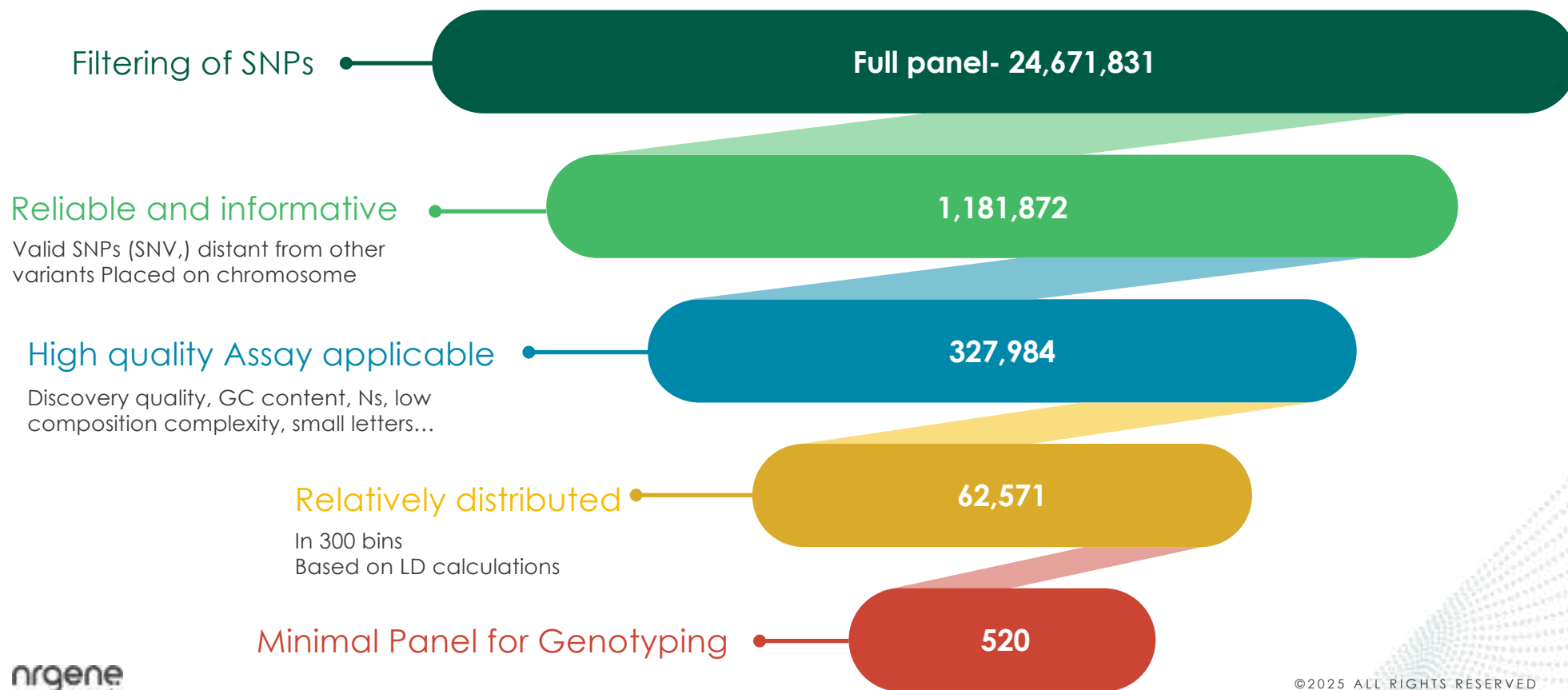
PCA analysis- 16 populations 10 samples per population



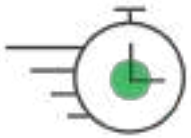


Generating the Genotyping Panel

Sequencing of ~150 Samples from 16 Different Populations (10x Per Sample)



Key Features of Advanced Genotyping Platform



FAST TURNAROUND



LOWER COSTS



HIGHEST QUALITY
genotyping data
accuracy >95%



MAXIMIZED
GENOTYPIC
DATA



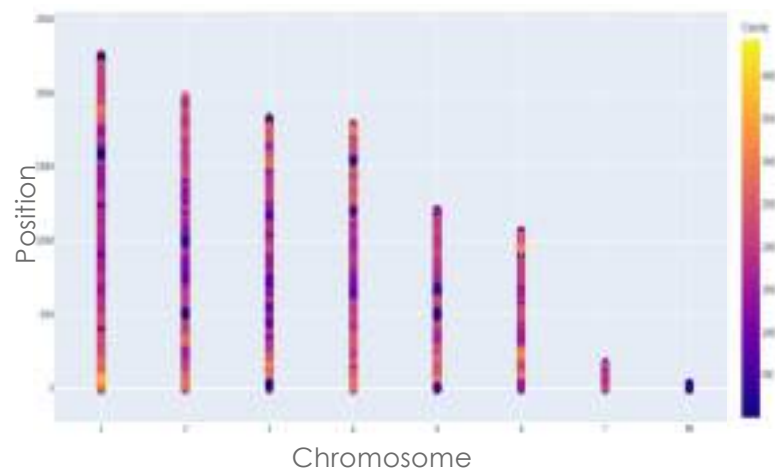
CUSTOMIZED



High Density Compared to Minimal

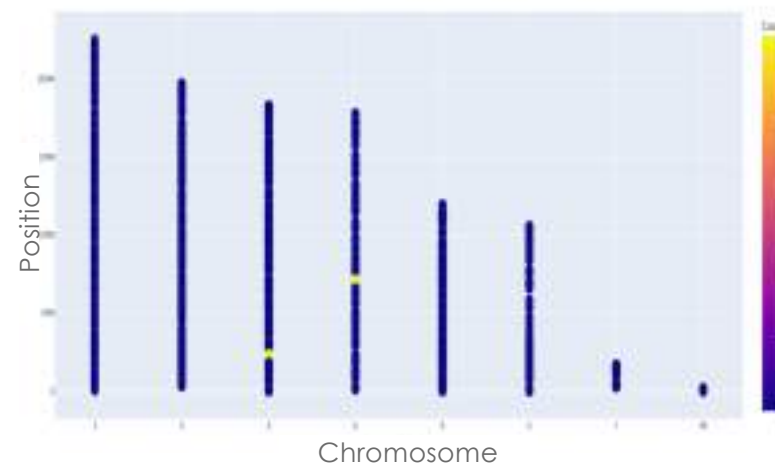
SNP Density on the Chromosomes

62k High-Density Panel



- Trait markers discovery
- GWAS/Genomic selection
- New population genomic analysis

550 Low Density, Minimal Panel

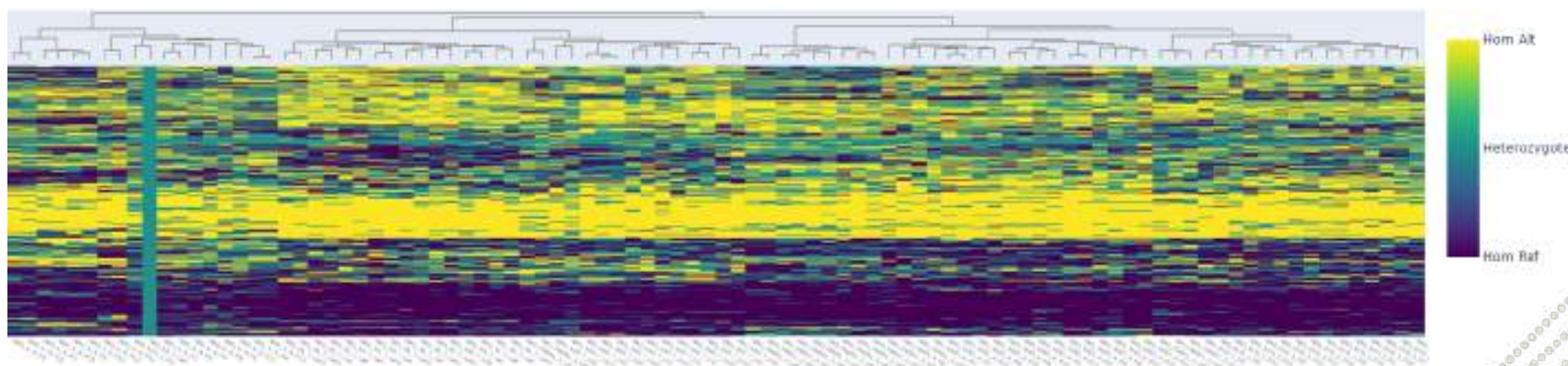


- Genetic drift
- Inbreeding / MAF
- Population merger analysis



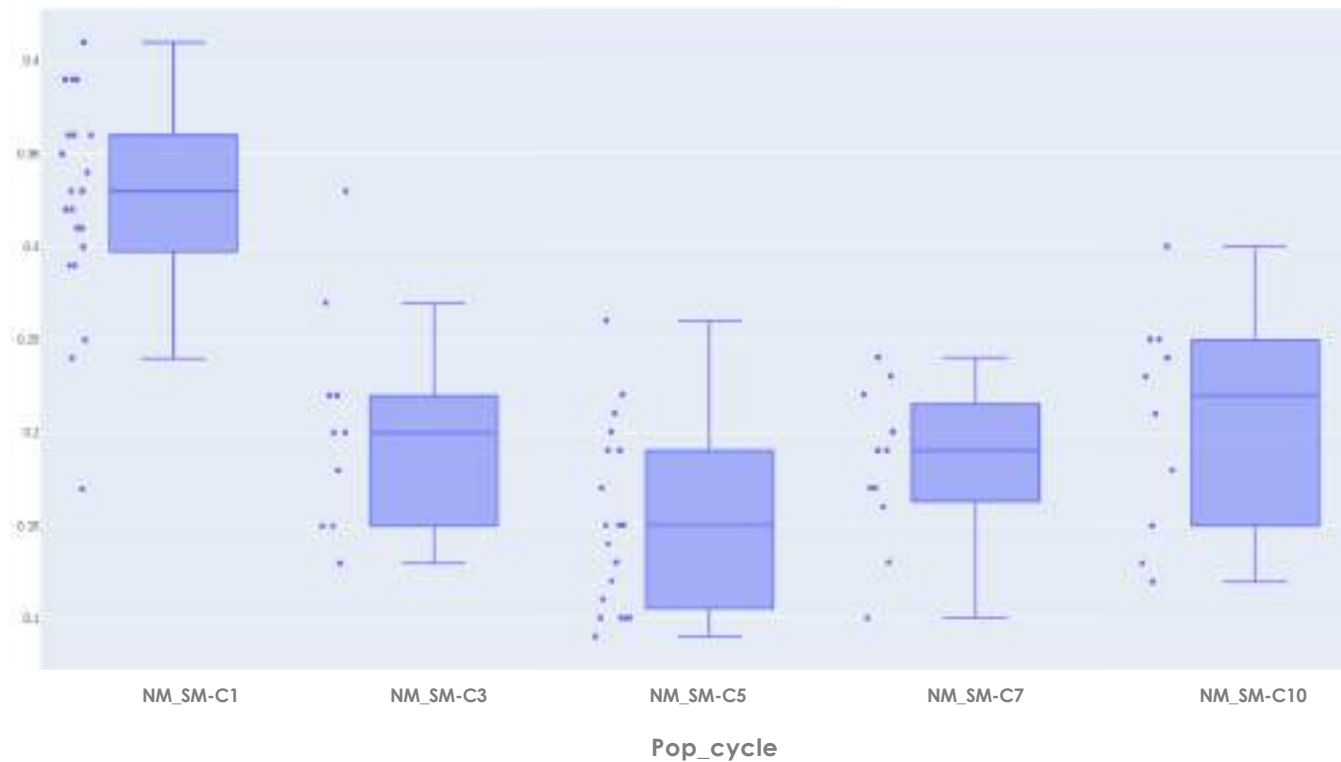
550 Minimal SNP panel

Proprietary Genotyping Platform



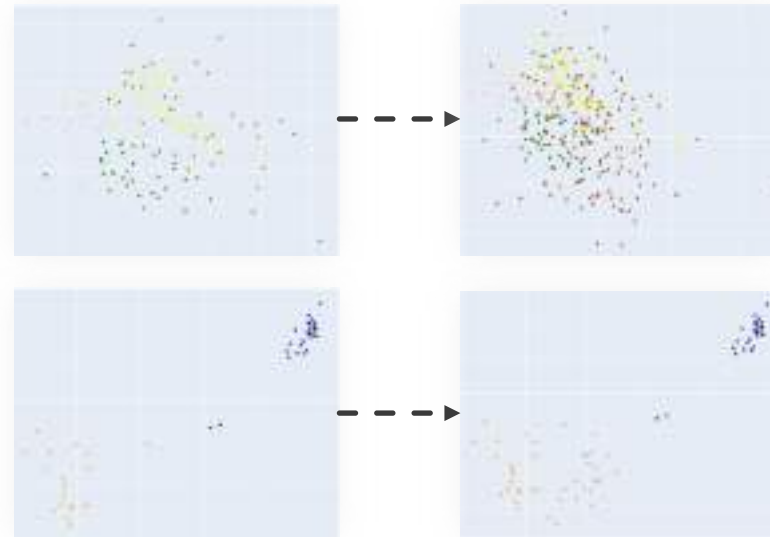
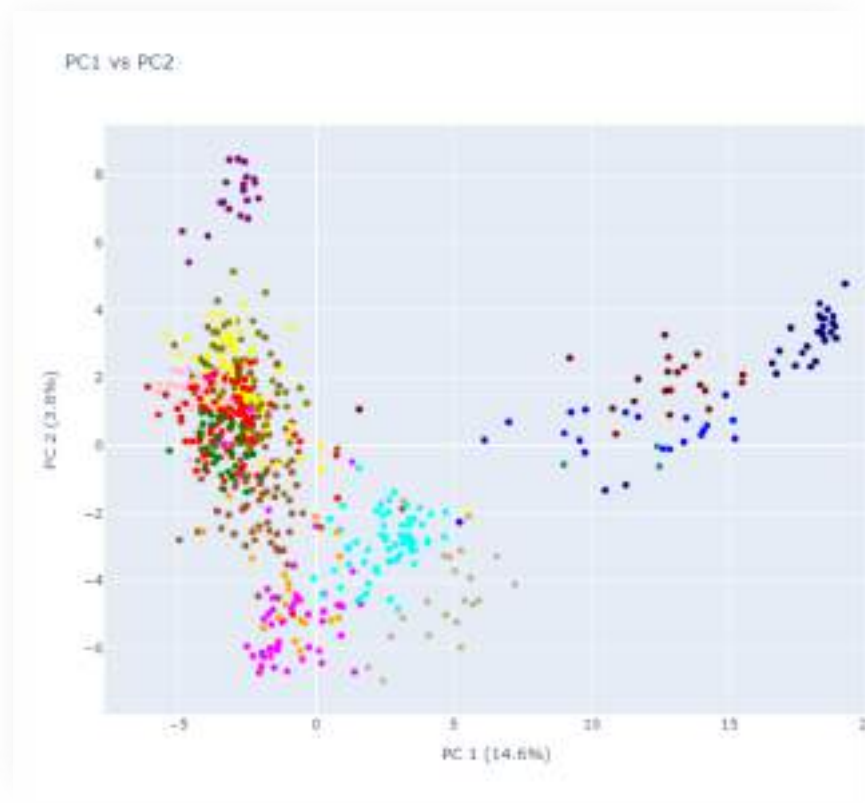
Heterozygosity levels and inbreeding (550 SNPs)

25-50 Samples Per Population/Cycle



Diversity Analysis (550 SNPs)

PCA Analysis - 14 Populations 25-50 Samples Per Population

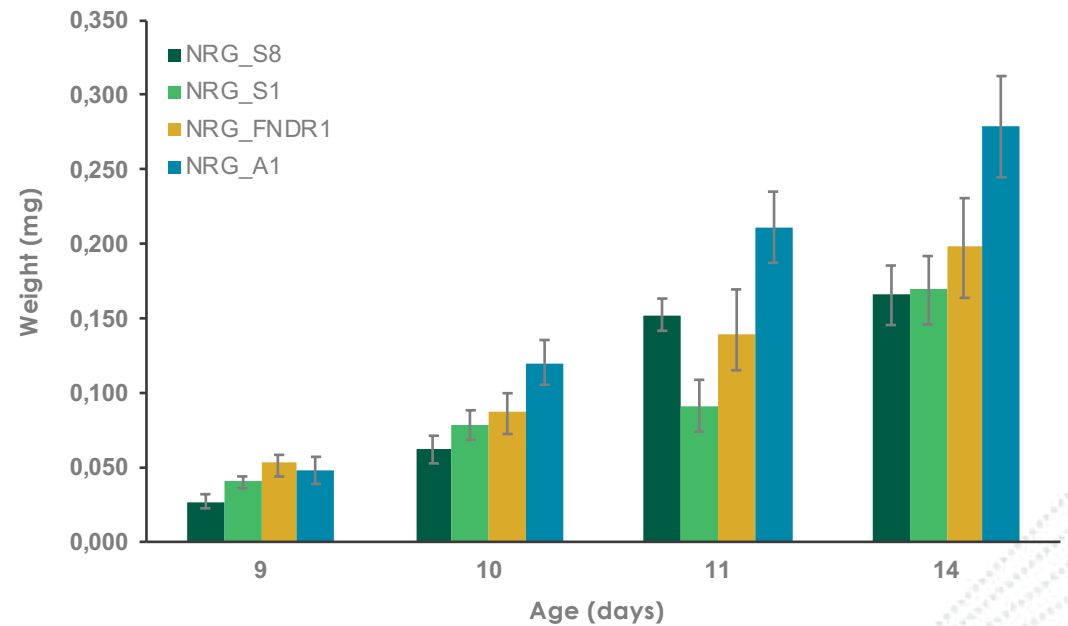


North American Insect Center (NAIC)

Population Performance Experiment

Populations used :

- 🐛 Source populations- NRG_S1 and NRG_S8
- 🐛 Highly diverse mix population- NRG_FNDR1
- 🐛 Selected population (3 cycles)- NRG_A1



Expand Your Genotyping Capabilities: Explore Our Panel Initiative

#	Platform	# Samples	\$ Per Sample (USD)	DNA Extraction	TAT
1	~62.5K SNPS array	20K-100K	25\$-35\$	Included	4-6 weeks
2	~550 SNPS amplicon sequencing	1500-100K	11\$-15\$	Included	2-4 weeks

* Prices may vary and dependent on # of samples

**Not include shipping costs



Summary

- NRGene's breeding platform enables the efficient and cost-effective development of improved varieties
- Completed a phased, high-resolution for both male and female genome assemblies. We identified scaffolds belonging to the male Y chromosome
- Developed a 62K SNP panel, representing genetic diversity across 16 populations
- Efficient genotyping platform - 550 SNPs
- The elite varieties molecular breeding program is advancing



Thank You!

The Israeli BSF consortium



The Bioinformatics team



The BSF team





Thank You!

Talk to Us:

Ben Gradus, PhD

Director of Product, BSF

ben.gradus@nrgene.com



NRGene Ltd.



@NRGeneCanada



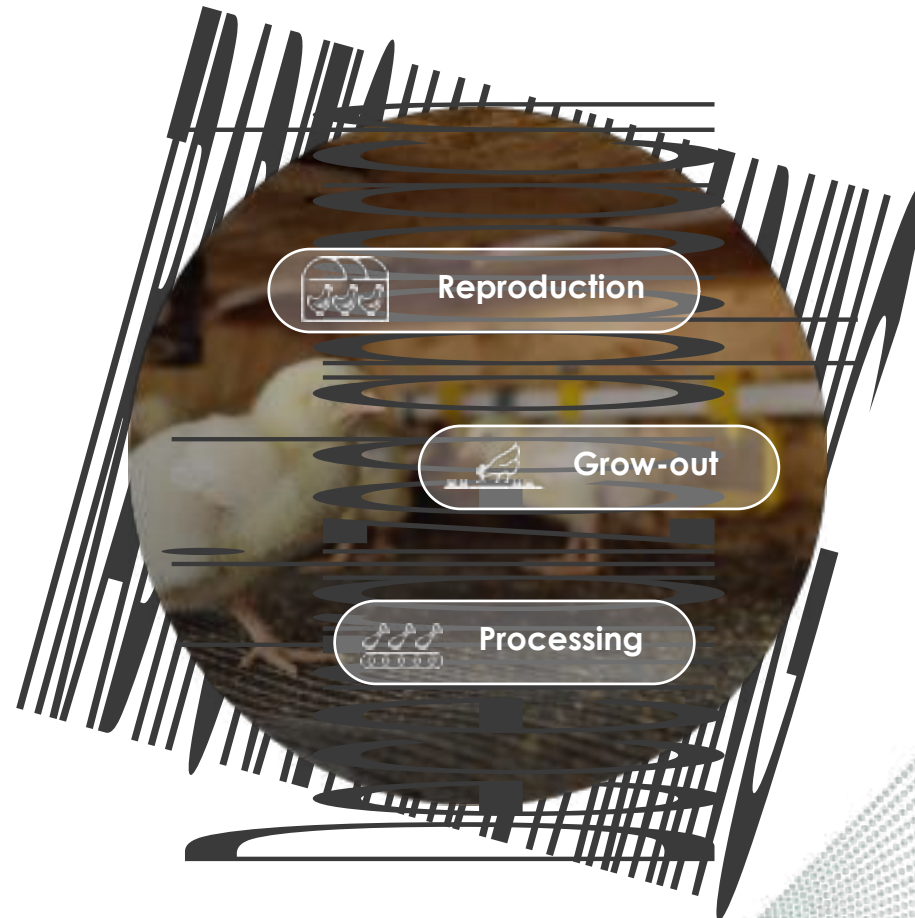
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Centralized to De-centralized Market



Centralized to De-centralized Market



Reproduction



Grow-out



Processing

Optimized reproduction

Efficient grow-out

Diverse and competitive

Genotyping platform needs

CUSTOMIZED

optimized SNP panel tailored specifically to your needs

LOWER COSTS

reduced number of genotyped loci

MAXIMIZED GENOTYPIC DATA

through imputation of SNP loci

HIGHEST QUALITY

genotyping data accuracy >95%

FAST TURNAROUND

4 weeks from sample submission to data delivery

