

Genome-wide Association Study for Milk Yield, Fat Yield and Age at First Calving of Dairy Cattle in Thailand

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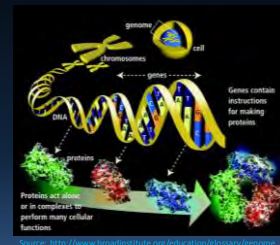
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Genome

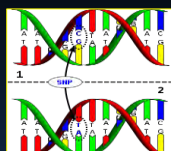
Genome:
complete collection of hereditary information (DNA)

DNA:
material that carries genetic information



Single Nucleotide Polymorphism (SNP)

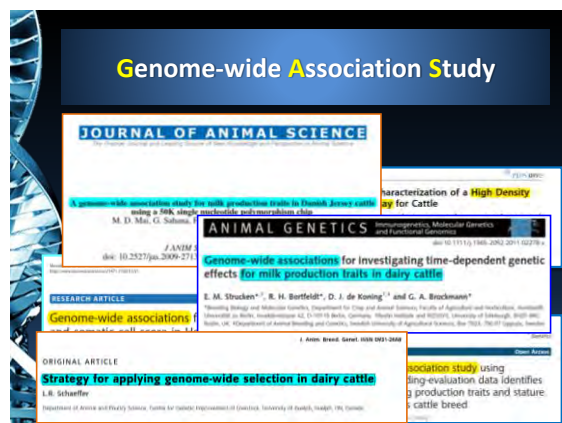
- Single-base differences in DNA among individuals
- Different variants have different associations with phenotypic performance
- ~ 3 billion base pair sites in the bovine genome



ACGTACGTCATGACTTTTACGTAT...

ACGTACGACATGACTTTTACGTAT...

Genome-wide Association Study

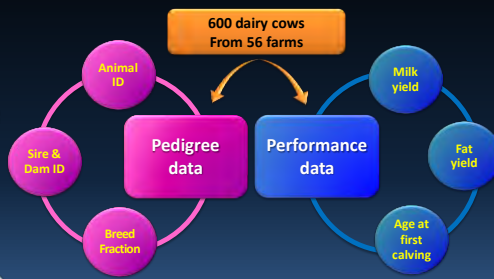


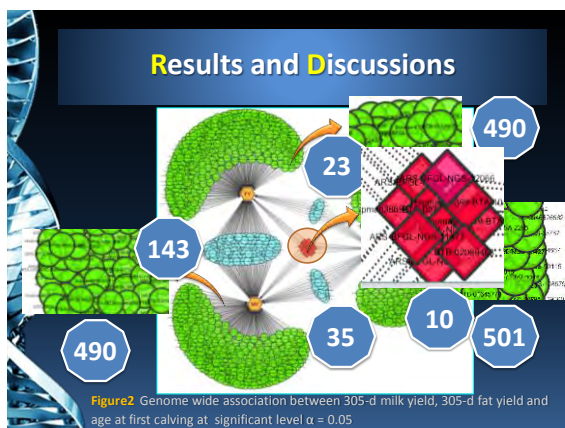
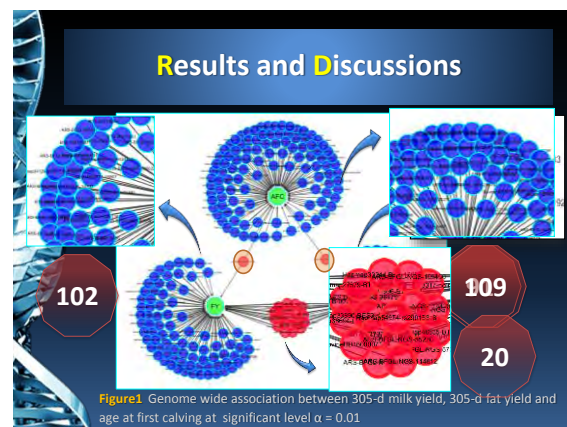
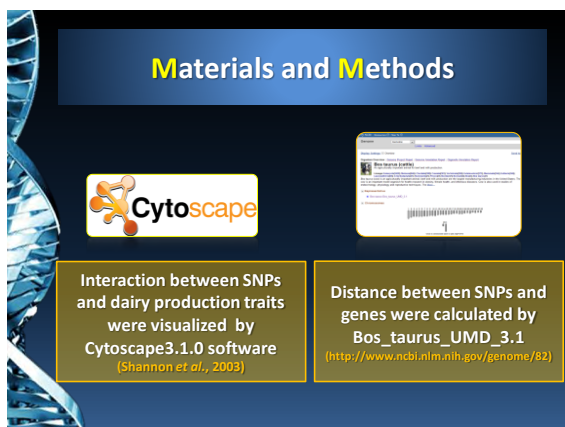
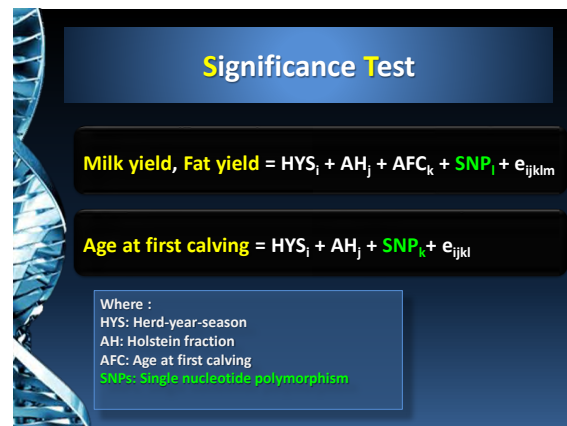
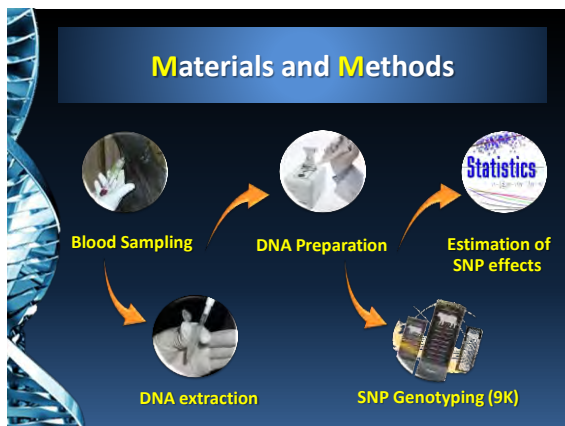
Objective

To investigate the genome-wide association for milk production and age at first calving of dairy cattle in Thailand



Dairy Datasets





Results and Discussions

SNP	Chr	Position (bp)	Nearest gene	
			Name	Distance (bp)
BTB-02069463	1	66017181	RABL3	within
ARS-BFGL-NGS-66558	4	97657010	CHCHD3	44899
Hapmap38694-BTA-76566	6	61591415	LOC613534	180080
BTB-00347427	8	50575791	RORB	299347
Hapmap41399-BTA-101088	11	67803326	AAK1	9482
ARS-BFGL-NGS-12066	15	27291268	LOC100847423	520754
Hapmap47649-BTA-51546	20	13688670	LOC100847883	13956
ARS-BFGL-BAC-34293	20	53571599	CDH18	within
ARS-BFGL-NGS-2464	26	20444634	SLC25A28	21194
ARS-BFGL-NGS-11877	28	34157181	RPS24	225404

Conclusions

- ❖ SNPs that significantly associated with MY, FY and AFC were 102, 109 and 91 SNPs ($P < 0.01$)
- ❖ SNPs that significantly associated with MY, FY and AFC were 490, 501 and 490 ($P < 0.05$)
- ❖ There were 10 genes significantly associated with all studied traits including RABL3, CHCHD3, LOC613534, RORB, AAK1, LOC100847423, LOC100847883, CDH18, SLC25A28 and RPS24 gene ($P < 0.05$)
- ❖ Knowing candidate gene that could be used as a marker to select animal for genetic improvement program

Implication

The SNPs and genes that associated with MY, FY and AFC were specific in each dairy population.

Gene Function



Acknowledgements

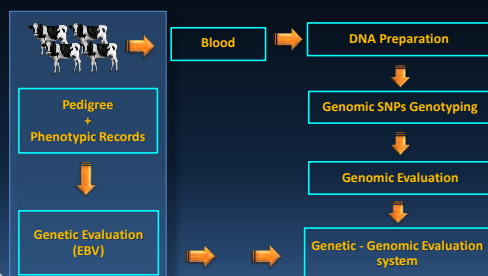
❑ The National Science and Technology Development Agency (NSTDA)

❑ The Dairy Farming Promotion Organization (DPO)

❑ Kasetsart University

❑ The farmers and dairy cooperative in Thailand

Genetic – Genomic Evaluation



Thank You



