



Genetics and biotechnology of orchard plants in Lithuania

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Orchard plants in Lithuania

- Apple 41 %
- Blackcurrant 35 %
- Strawberry 8 %
- Red currant 5 %
- Raspberry 3 %
- Pear, plum, sweet and sour cherry other 8%

Orchard plant gene pool at IH-LRCAF

- Over 790 apple cultivars (+8 rootstocks)
- 336 pear cultivars (+5 rootstocks)
- 163 plum cultivars (+2 rootstocks)
- 268 Sweet and sour cherry cultivars (+5 rootstocks)
- 184 currant and gooseberry cultivars
- 113 strawberry cultivars
- 52 raspberry cultivars
- 8 sea-buckthorn cultivars

Orchard plant genetics and biotechnology

Main tasks in Lithuania:

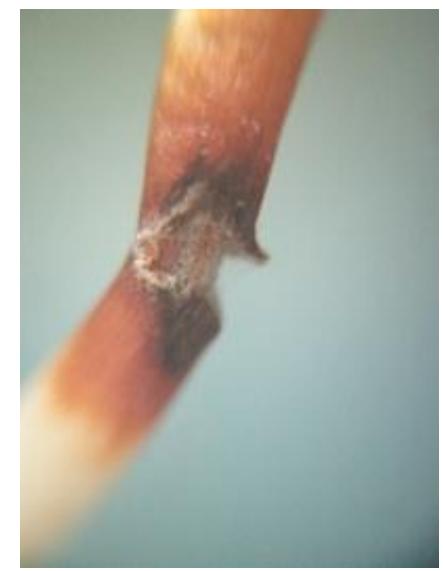
- Resistance to fungal diseases and pests
- Cold resistance
- Identification of donors with valuable traits
- Interspecific hybridization
- Plant regeneration and transformation systems

Apple resistance to scab

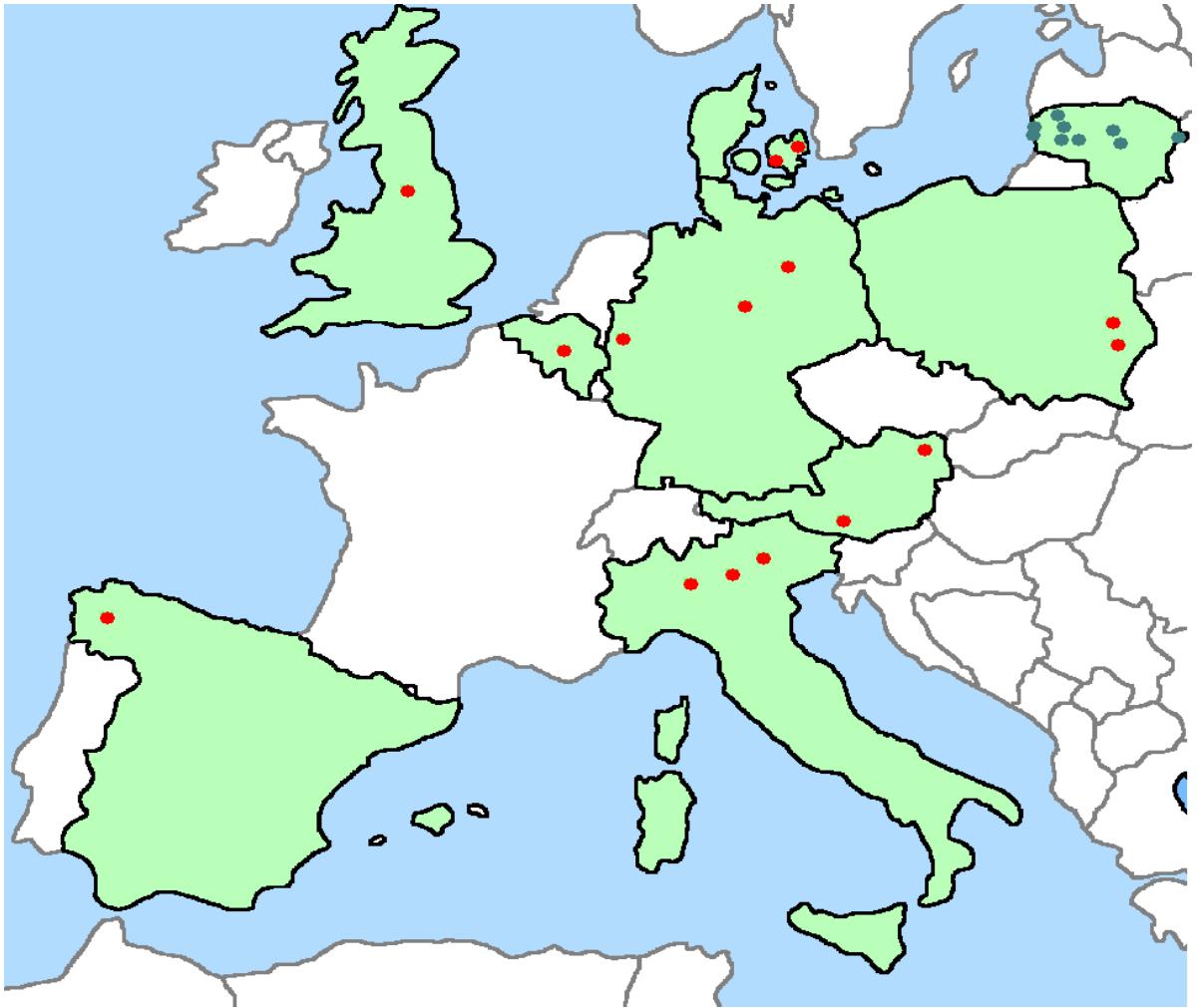
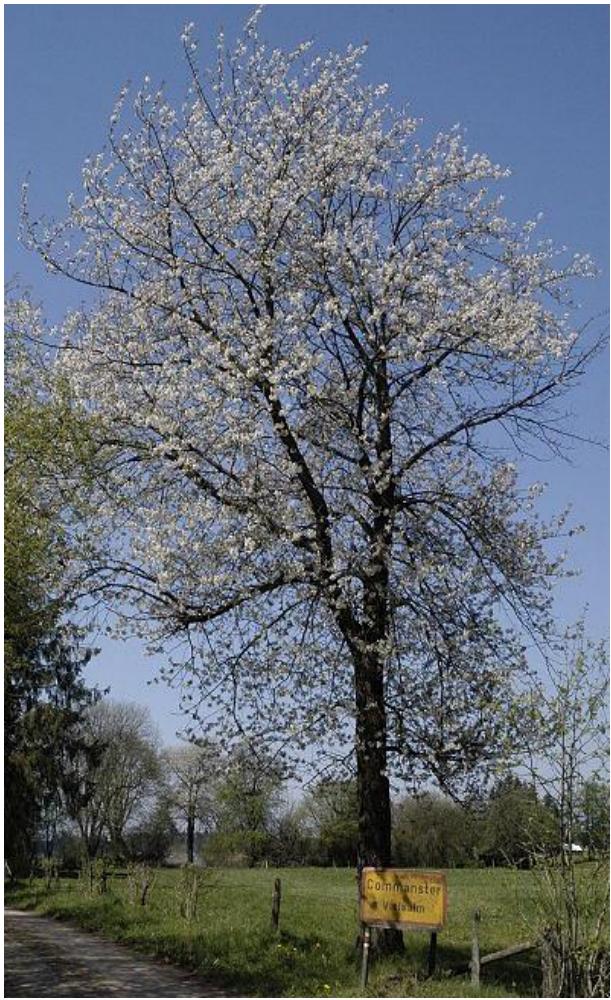


Apple disease resistance research at the IH, LRCAF is aimed at the identification and pyramidisation of resistance genes, mainly for polygenic resistance to fungal diseases and hypersensitive response based resistance to apple scab, in addition to expediting the resistance breeding process.

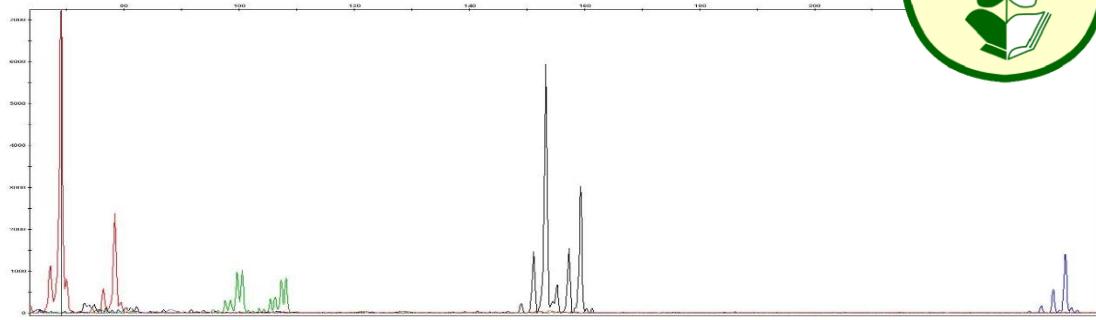
Apple resistance to canker



Genotyping wild sweet cherry

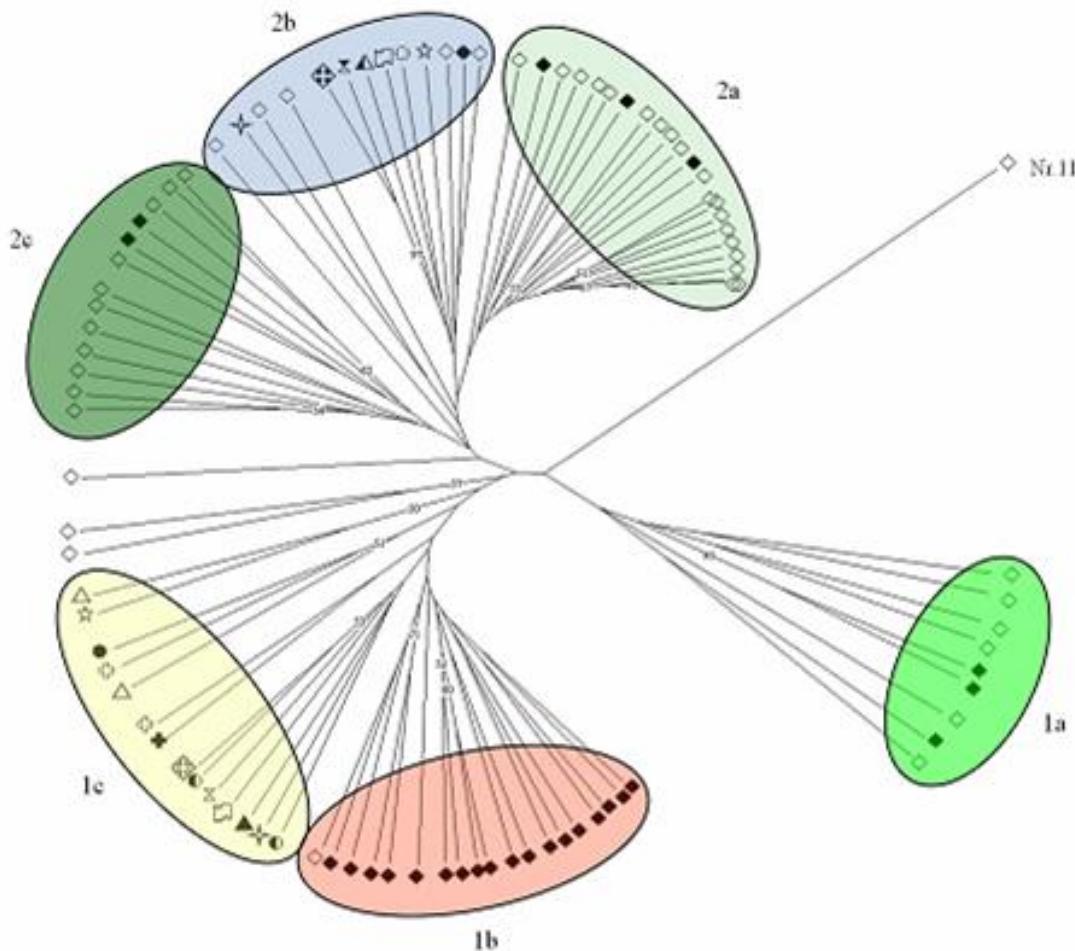


Genotyping wild sweet cherry



Self-incompatibility group	Allele	Cultivar
II	S1S3	‘Žemaičių rožinė’
III	S3S4	Seda’
VI	S3S6	‘Vytėnų rožinė’, ‘Meda’
VII	S3S5	‘Jurgita’
X	S6S9	‘Vytėnų juodoji’
XVIII	S1S9	‘Agila’, ‘Vasarė’, ‘Germa’
XXI	S4S9	‘Žemaičių geltonoji’
XXIII	S3S16	‘Lukė’
XXV	S2S6	‘Jurga’, ‘Anta’
XXXVII*	S6S16	‘Irema BS’
Universalūs donorai I-	S2S9	‘Žemaičių juodoji’
XXXVII	S1S13	‘Hrebnickio1’
grupėms	S12S16	

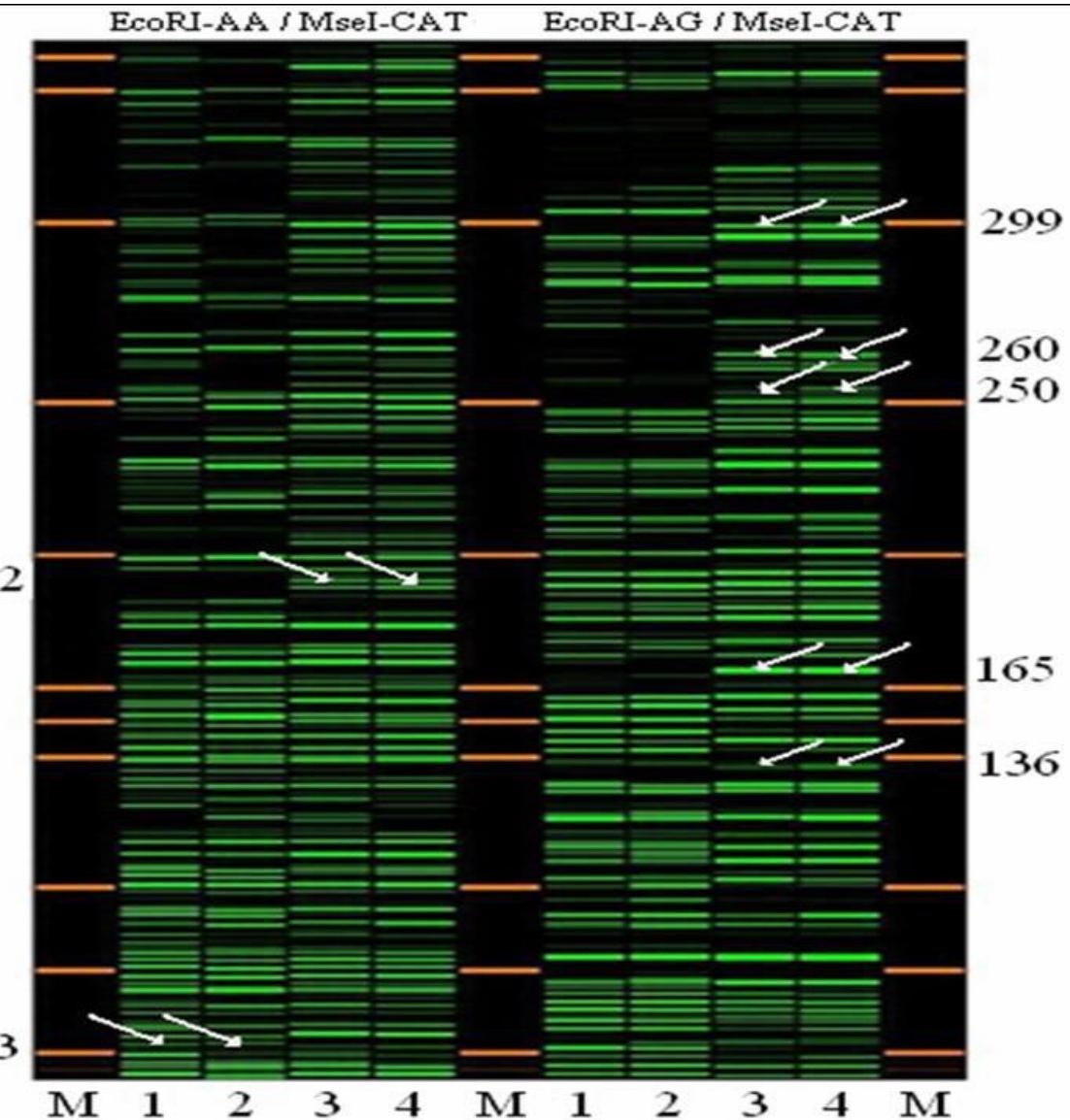
Genotyping wild sweet cherry



Genetic linkage map of wild cherry based on AFLP and SSR markers.

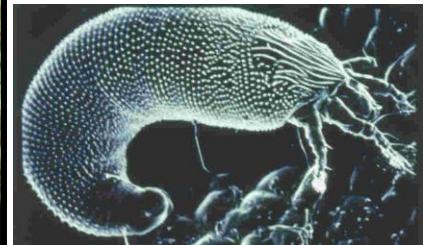
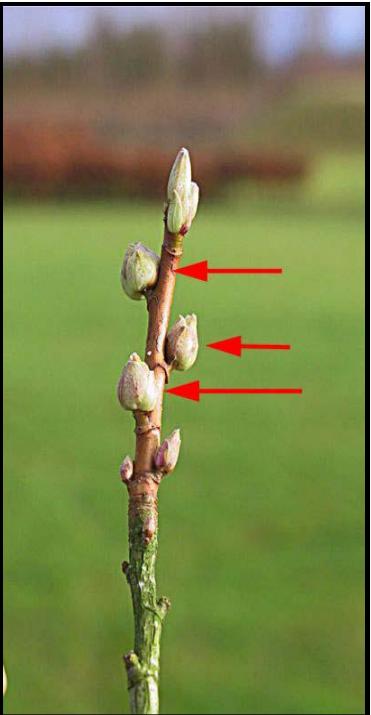
- 1a – Samogitian population (W. Lithuania)
- 1b – middle Lithuanian population
- 1c – European population
- 2a – Samogitian population + m. Lithuanian
- 2b – European population
- 2c – Samogitian population

Sour cherry flower resistance to frosts



Usage of AFLP methods resulted in 5 markers, identified only spring frost resistant cultivars, and 2 markers specific to spring frost susceptible cultivars of sour cherry.

Resistance to gall mite



Up to 7000 per bud



Resistance to gall mite

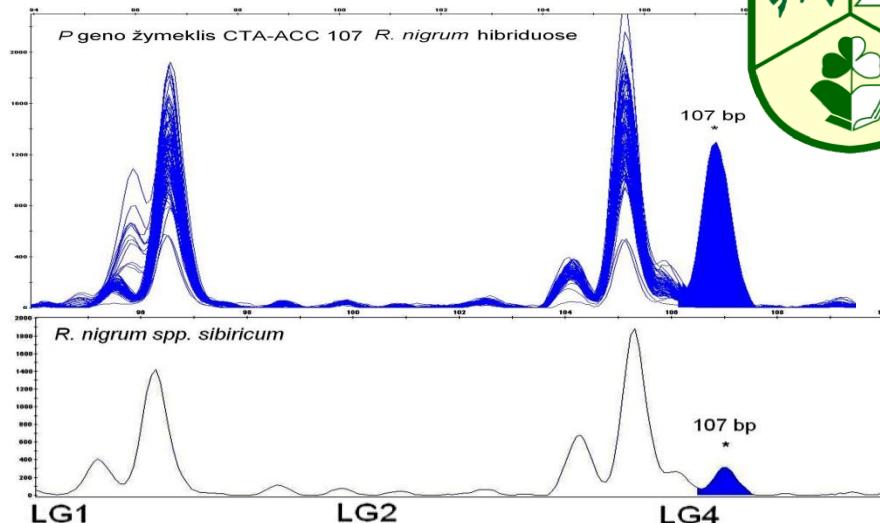


Interspecific *R. americanum*, *R. aureum* *R. Janczewskii*, *R. nigrum*, *R. pauciflorum*, *R. petraeum*, *R. sanguineum*, *R. ussuriense* and *R. uva-crispa* hybrids were created

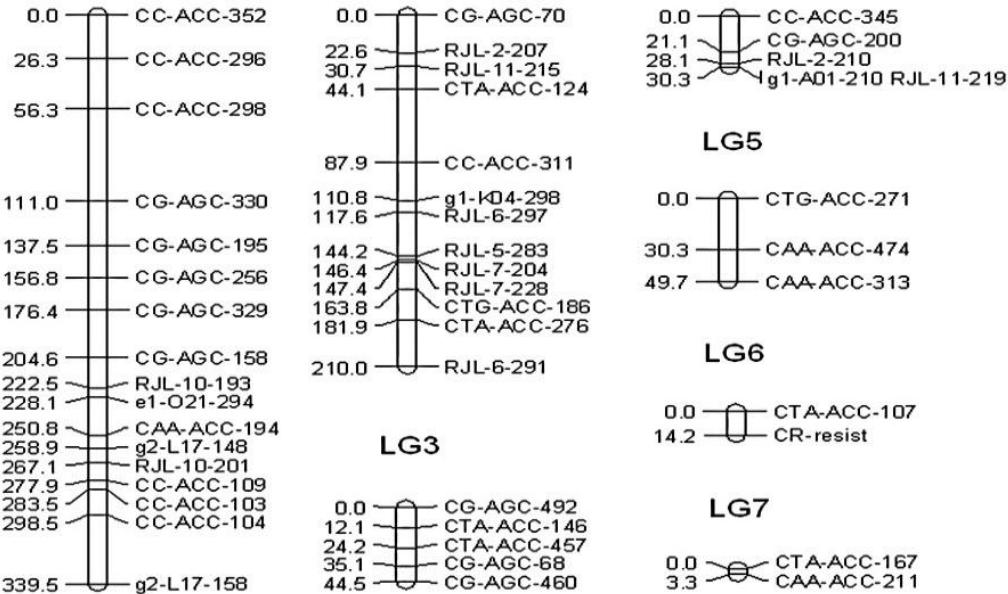




Blackcurrant resistance to gall mite



Nr.	Genotipas * protėviai galėjo turėti P geną	AFLP žymeklis (yra / nėra)	Fenotipas (atsparus / jautrus)
1.	'Baldwin'	-	J
2.	'Ben Lomond'	-	J
3.	'Ben Tirran'	-	J
4.	'Dainiai'*	+	A
5.	'Domino'*	+	A
6.	'Gagatai'*	+	A
7.	'Karin'*	+	A
8.	'Kastyčiai'*	-	J
9.	'Laimiai'*	+	A
10.	'Minaj Smyriov'*	+	A
11.	'Ojebyn'	-	J
12.	'Ritmo'*	+	A
13.	'Rus'*	+	A
14.	'Salviai'*	+	A
15.	'Senjorai'*	-	J
16.	'Smalai'*	-	J
17.	'Svyriniai'*	+	A
18.	'Tauriai'*	-	J
19.	'Titania'	-	J
20.	'Viktor'*	+	A
21.	R. nigrum spp. sibiricum wild form*	+	A

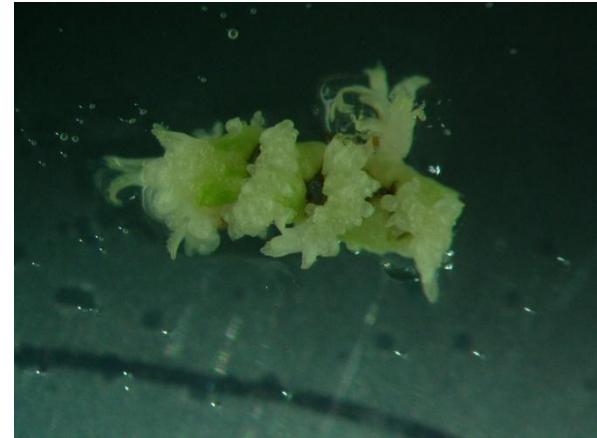


Transformation and regeneration of plants

Regeneration systems for over 80 species were prepared,
Plant transformation systems were optimized.

Dependence of organogenesis on:

- cultivar;
 - composition of nutritional medium;
 - phytohormone quantity and ratio;
 - antibiotics;
 - light and temperature
- was evaluated





THANK YOU FOR YOUR ATTENTION