BREEDING STRAWBERRY FOR ORGANIC PRODUCTION

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OBJECTIVES

General Objectives:

- Identify strawberry cultivars with acceptable eating quality, growth, and yield potential and good shipping quality.
- Develop strawberry cultivars with sufficient level of tolerance or resistance to mites and diseases such as botrytis rots; and
- Identify new cultivar introduction adapted to local conditions.

Specific Objectives

- Evaluate the performance of potential varieties under both conventional and organic production systems.
- Determine fruit quality of potential strawberry varieties
- Maintain a live strawberry germplasm

EXPECTED OUTPUT

- Selection of at least two potential locally-developed varieties with high yield, resistance to major pests and diseases, with good shelf-life, and suitability to organic production system

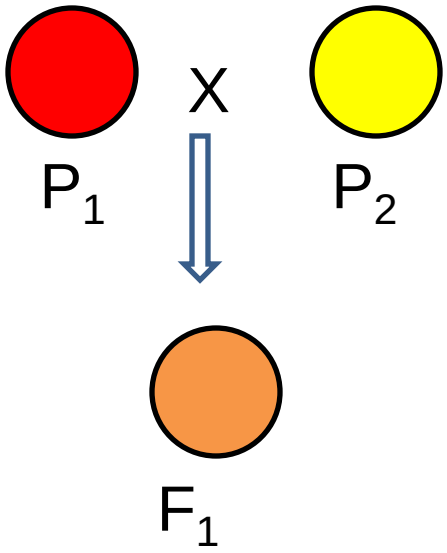
Methodology

- Collections of all available strawberry varieties, including wild types were done
- Collections were continuing up to 2 years ago
- Our collection now include 50 varieties and lines
- Crosses were done as new varieties come in
- More than 200 crosses were done
- Trials were done both on-station and on farmers' field

METHODOLOGY

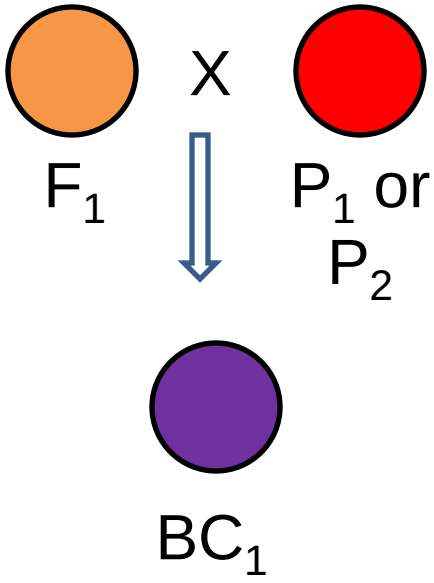
The breeding procedure:

SINGLE CROSS



(germinated & multiplied)

BACKCROSS



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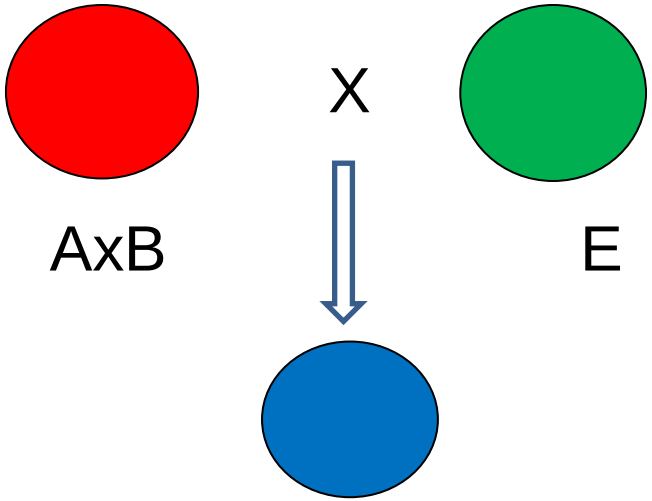
THREE-WAY



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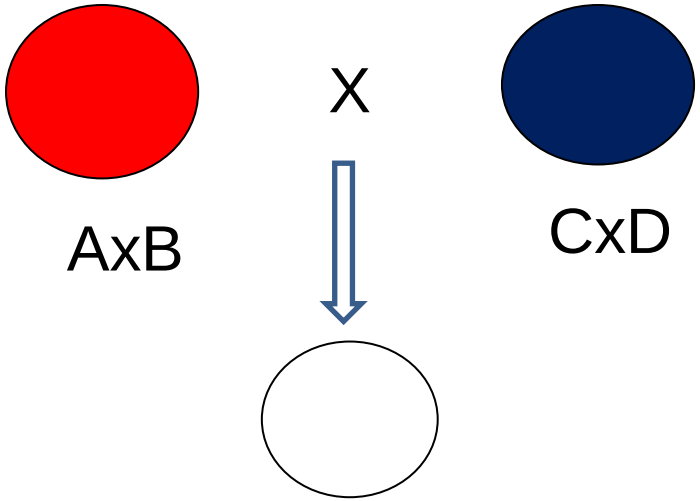
FOUR-WAY CROSSES



(germinated & multiplied)

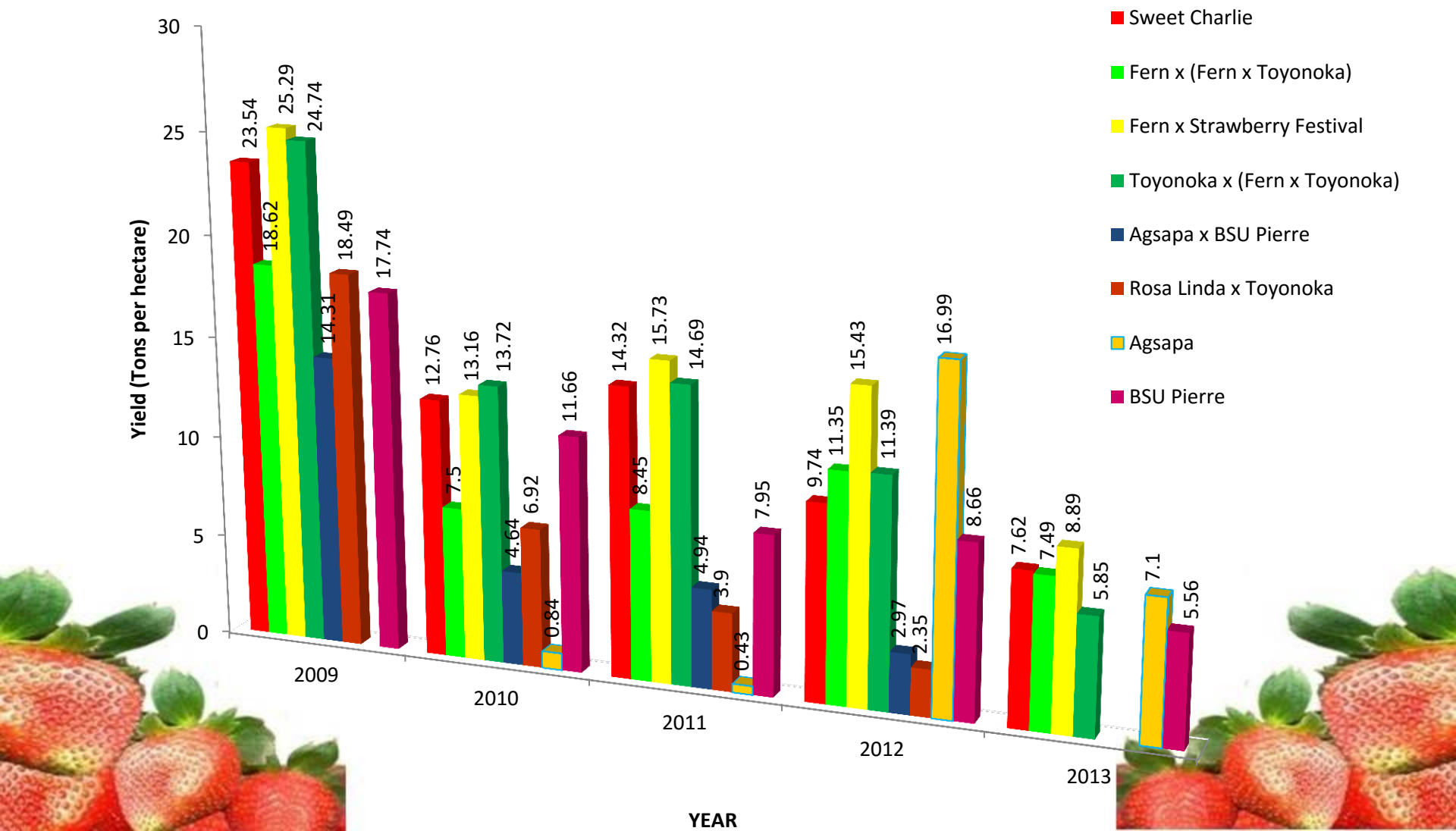
Breeding Procedure…

- A TOTAL OF MORE THAN 200 CROSSES DONE
- After multiplication, preliminary growth and yield observation was done
- The best performing progenies were immediately selected based on fruit quality, natural reaction of plants to thrips, mites and diseases
- Selections were allowed to produce runners that were used for the initial and subsequent yield trials


Results

- The initial crossings and evaluation resulted in the development of two “varieties” which were christened *Agsapa* and *BSU Pierre.*
- They were found to be better preferred by tourist-consumers in a relevant study conducted
- Subsequent crossings resulted in the selection of other superior genotypes

Yield Comparison of the Potential Varieties for 5 years



Mean sugar content (2009-2014); Shelf-life (2013-2015); consumer preference, (2009-2010)

Selections	Sugar Content	Shelf-life	Consumer preference
Sweet Charlie	9.59	5.5	4.0
Fern x (Fern x Toyonoka)	10.04	4.5	4.0
Fern x Strawberry Festival	8.59	4.5	4.5
Toyonoka x (Fern x Toyonoka)	9.34	4.5	4.0
Agsapa x BSU Pierre	9.14	4.0	4.0
Rosalinda x Toyonoka	9.42	3.0	3.0
Agsapa	9.41	4.5	5.0
BSU Pierre	10.39	4.5	4.0

Number of marketable, non-marketable, and total berry yield harvested in $20m^2$ (ave. of 3 years)

SELECTIONS	NUMBER AND WEIGHT OF BERRIES					
	Marketable		Non-marketable		Total	
	No.	Wt.(gm)	No.	Wt.(gm)	No.	Wt.(gm)
Sweet Charlie (check variety)	2766	25601	1289	6534	4055	32135
Strawberry Festival	2689	27751	584	3724	3273	31475
Fern x Strawberry Festival	3910	38707	1503	8678	5413	47385
Toyonoka x (Fern x Toyonoka)	2313	27625	810	5877	3123	33502

Comparison of sugar content of selected potential varieties under non-organic and organic production systems

SELECTIONS	Sugar content (Brix value)	
	Non-organic	Organic
Sweet Charlie	9.59	9.30
Strawberry Festival	9.40	8.50
Fern x Strawberry Festival	8.59	9.00

Observed pests and diseases

Pests/diseases	Non-organic	Organic
Pests	mites, thrips and chrysomelid beetle; lygus bugs, aphids, cutworm, snails, lizards, slugs and birds (martinis)	mites, thrips and white grubs; aphids, cutworm, snail and slugs
Diseases	fruit rot/grey	fruit rot/grey

CONCLUSION

- After more than 7 years of trials, the program has developed at least 6 promising varieties two of which, Fern x Strawberry Festival and Toyonoka x (Fern x Toyonoka), were proven to have consistently performed better than Sweet Charlie, the commonly-planted variety by local farmers.
- Under organic production system, Fern x Strawberry Festival was also the highest yielder. Agsapa also yielded relatively higher compared to the rest. The two appear to be very suitable for organic production.

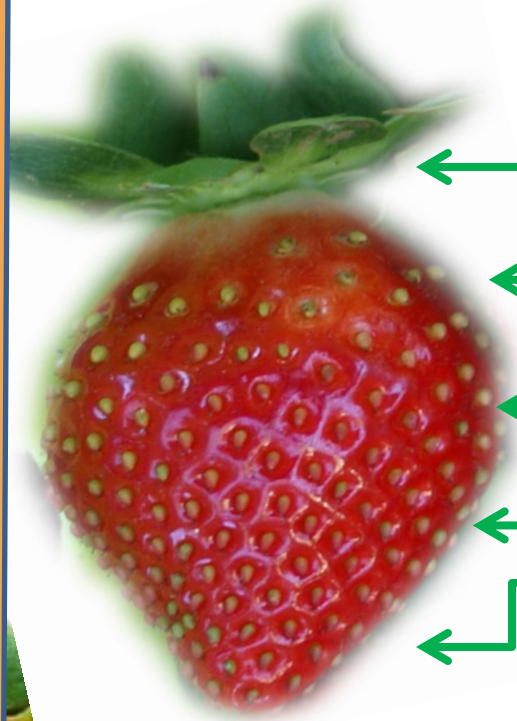

- Fern x Strawberry Festival out-yielded the check variety by about 3.5 tons while Toyonoka x (Fern x Toyonoka) had about one ton more yield than the check. These potential varieties also show satisfactory resistance to mites and thrips as well as common strawberry diseases.

- Four of the potential varieties (Fern x Strawberry Festival, Toyonoka x (Fern x Toyonoka), BSU Pierre and Agsapa) were submitted for NSIC registration last year (Nov, 2015).
- THE POTENTIAL VARIETIES WERE THE FIRST LOCALLY-DEVELOPED STRAWBERRY VARIETIES

Comparison of Sweet Charlie and Fern x Strawberry Festival

Sweet Charlie

Fern x Strawberry Festival



Higher yielding

High yielding

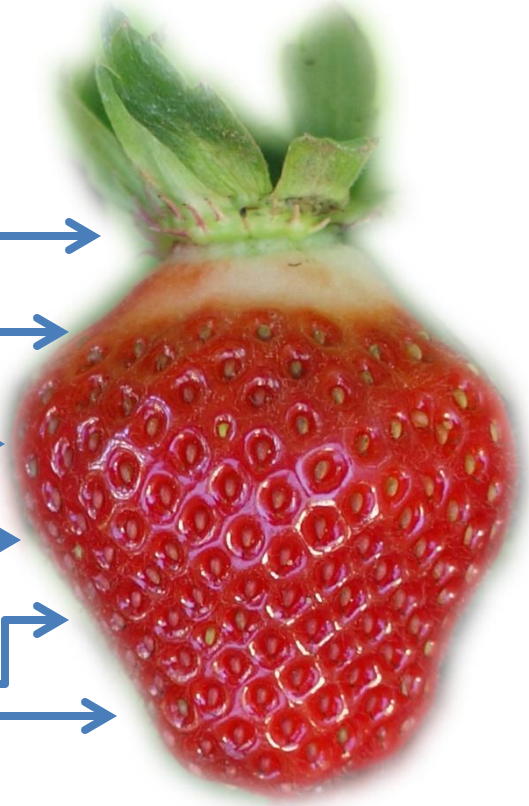
Lesser amount of non-marketable yield

Large and sweet fruit

Good runnering ability

Moderately resistant to mites and fruit rot

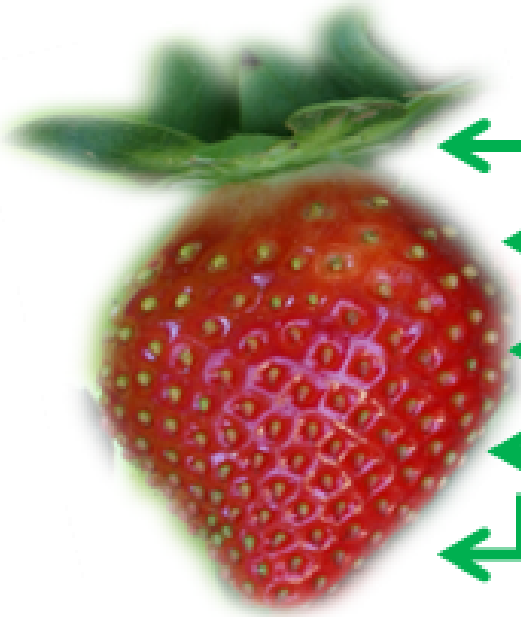
Earlier flowering



Comparison of Sweet Charlie and Agsapa 1

Sweet Charlie

Agsapa 1



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Sample pics of the potential varieties u

Sweet Charlie

Fern x (Fern x Toyonoka)

Fern x Strawberry Festival

Toyonoka x (Fern x Toyonoka)

Agsapa x BSU Pierre

Rosa Linda x Toyonoka

Agsapa (Selva x Toyonoka)

BSU Pierre (Sweet Charlie x Toyonoka)

THANK YOU !!!