BLOOM FRESH™

BREEDING A HEALTHIER AND TASTIER FUTURE

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Focusing on Sweet Globe™

The aim is to produce more consistent quality fruit (Project within BLOOM FRESH™)





Focusing on Sweet Globe™

Effect of cane thickness

Direct correlation with cane thickness and fruit quality

Aim is to prune canes/spurs 10mm or thicker

Canes below 8mm produce weak green shoots, weak quality fruit and drier stems at storage evaluation

What are we doing?

Technical information days, Grower pruning days and videos

Next challenge is to determine green shoot diameter at different phenological stages





Analysis of interaction between the cane vigour (diameter) and cytokinin application on the morphological characteristics of inflorescences.

MAIN RESULTS 2021-2022

Factor	Treatments	Inflorescence weight (g)	Rachis diameter 1st shoulder (mm)	Rachis diameter 4th shoulder (mm)	Ovary weight (g)
Cane (A Effect)	**>10 mm**	18,60	6,27 b	5,02 b	0,0028
	<8 mm	17,09	5,75 a	4,44 a	0,0029
	p value	*n.s*	*0,0208*	*0,0143*	*n.s*
CK (B Effect)	**1 ppm**	17,35	6,06	4,71	0,0027
	4 ppm	18,34	5,96	4,76	0,0030
	p value	*n.s*	*n.s*	*n.s*	*n.s*
AxB	***p value***	*n.s*	*n.s*	*n.s*	*n.s*

Values labelled with different letters are statistically different. ns, not significant for the LSD Fisher's test ($p \leq 0.05$)

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	Cane >10 mm	Cane < 8 mm
HARVEST (21-02)		
45 DAYS AT 0°C		

SWEET GLOBE™

45 DAYS AT 0°C + **3 DAYS AT 20 °C**

Cane >10 mm





Cane < 8 mm





CONCLUSIONS | SWEET GLOBE™

- Pruning canes with diameter > 10 mm produced rachis significantly thicker than rachis produced on pruning canes with diameter less than 8 mm.

- After storage (45 days at 0°C and/or 45 days at 0°C +3 days at 20°C) the value of rachis browning index of bunches produced from canes >10 mm diameter was significantly lower than the browning index of rachis produced from canes <8mm.

Pruning cane (below 8 mm)

Weak pruning cane (below 8mm)							
Bunch					Brix		
Bunches	Green shoot length (mm)	Diameter of shoot (mm)	Berries per bunch	Berry size avg (mm)	Top	Middle	Bottom
Bunch 1	410	4,75	58	17	16	16,3	15,8
Bunch 2	770	4,8	68	18	20,4	19,4	17,6
Bunch 3	620	6,31	59	17	18,3	18	17,1
Bunch 4	420	5,12	64	18	16,6	15,6	14,1
Average	555	5	62	18	18	17	16
Min	410	4,75	58	17	16	15,6	14,1
Max	770	6,31	68	18	20,4	19,4	17,6
Defects				Storage week 4	85	Weight	
Defects				Storage week 5	211	Weight	
Defects				Storage week 6	1140	Weight	
Total Defects				Weight total	1436	31.9%	

Pruning cane (above 10 mm)

Strong pruning cane(Above 10mm)							
Bunch					Brix		
Bunches	Green shoot length (mm)	Diameter of shoot (mm)	Berries per bunch	Berry size avg (mm)	Top	Middle	Bottom
Bunch 1	920	8,9	41	21	18,2	17,9	17,2
Bunch 2	740	8,5	58	22	19,4	18,6	18,4
Bunch 3	810	9,1	65	21	19	18,5	18,2
Bunch 4	810	8,7	81	22	18,4	18,1	17,9
Average	820	8,8	61,25	21,5	18,8	18,275	17,93
Min	740	8,5	41	21	18,2	17,9	17,2
Max	920	9,1	81	22	19,4	18,6	18,4
Defects				Storage week 4	34	Weight	
Defects				Storage week 5	78	Weight	
Defects				Storage week 6	242	Weight	
Total Defects				Weight total	354	7.9%	

Thin vs thick pruning canes trial summarized

Sweet Globe™ trial averages

	Cane below 8 mm	Cane above 10 mm
Green shoot diameter (mm)	5.0	8.8
Green shoot length, average (mm)	555	820
Berry size, average (mm)	18	21.5
Berries per bunch	62	61
Sugar (Brix) average	17.0	18.3
Highest Brix in bunch	20.4	19.4
Lowest Brix in bunch	14.1	17.2
Defect weight, week 6 (g)	1140	242

Conclusion Sweet Globe™ Trial canes pruned with 10mm vs below 8mm

1. Stronger shoots:

Green shoots diameter rose from 5.0mm to 8.8mm and average length from 555mm to 820mm

2. Bigger berry diameter:

Bigger berry size with same berry count number per bunch, 18mm vs 21.5mm in diameter (10-15% yield increase)

3. Better brix distribution:

Brix distribution 2 brix variation vs 6 brix variation

4. Better quality fruit:

Storage after 6 weeks – 8% unsound vs 32% unsound

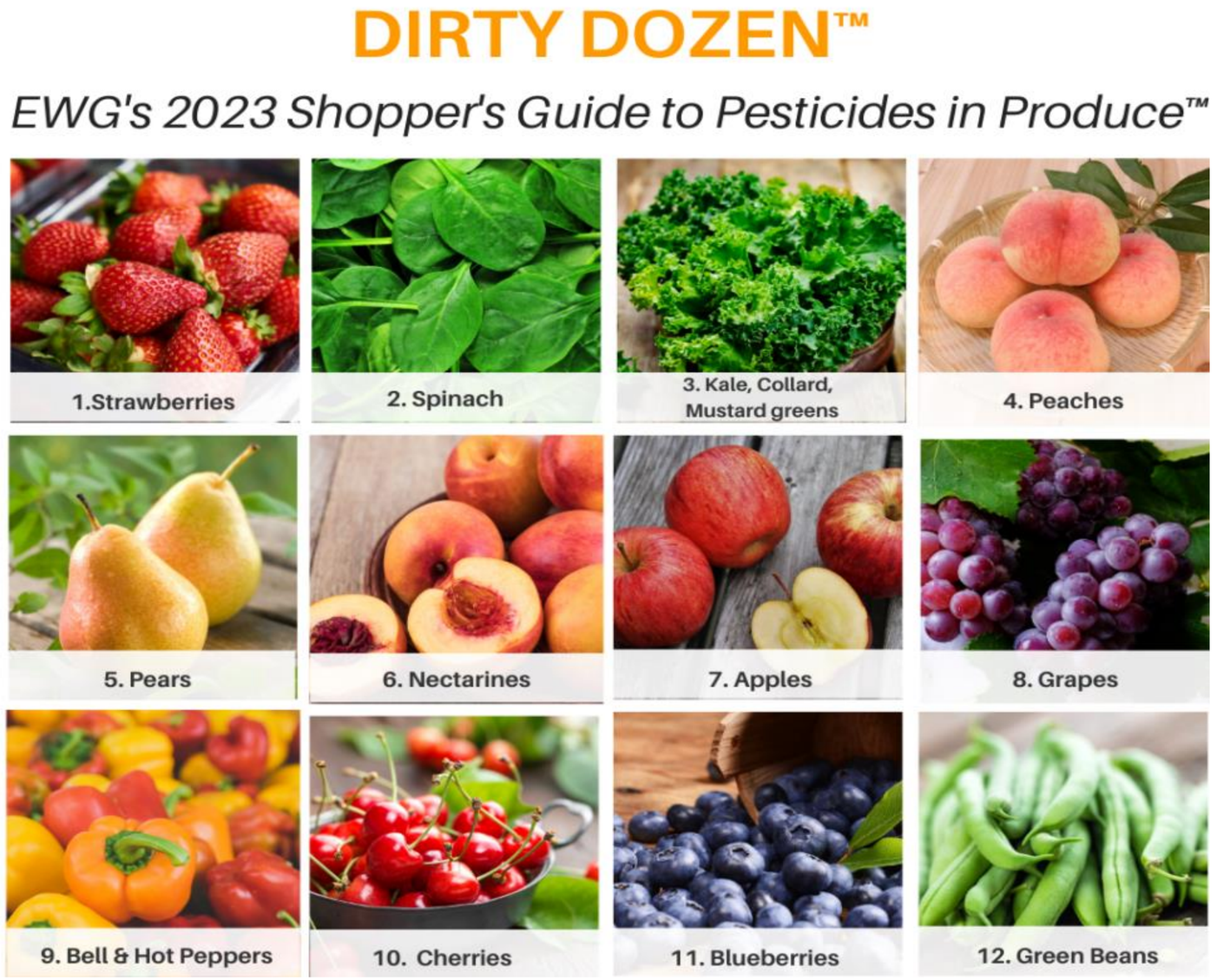
Pruning canes >10mm is vital for producing better quality fruit.

Disease Resistant Varieties

In a world where sustainability is a given, **table grapes are still one of the crops that need a substantial number of phytosanitary applications**

Key Impacts

- Environmental Impact
- Health Approach
- Cost of Production
- Legal Consequences

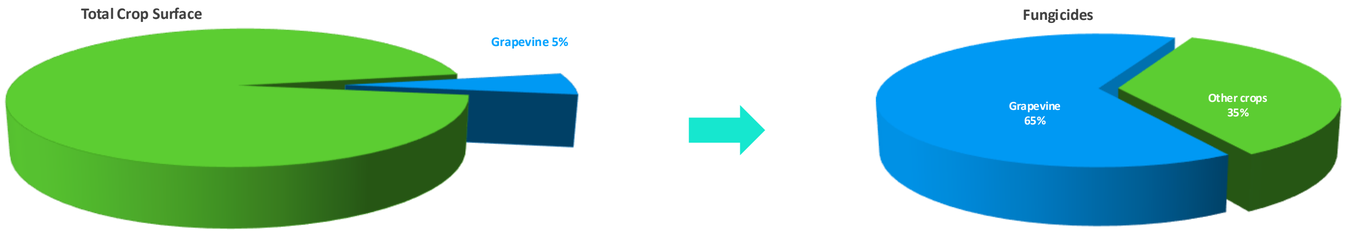


Source: EWG's 2023 Shopper's Guide to Pesticides in ProduceTM

DISEASE RESISTANCE: FIRST STEP TO MORE SUSTAINABLE TABLE GRAPES

DID YOU KNOW?

Grapevine (wine + table grapes) represents **5% of total crops** surface in **Europe**, however, uses **65% of the total fungicides** used in agriculture.

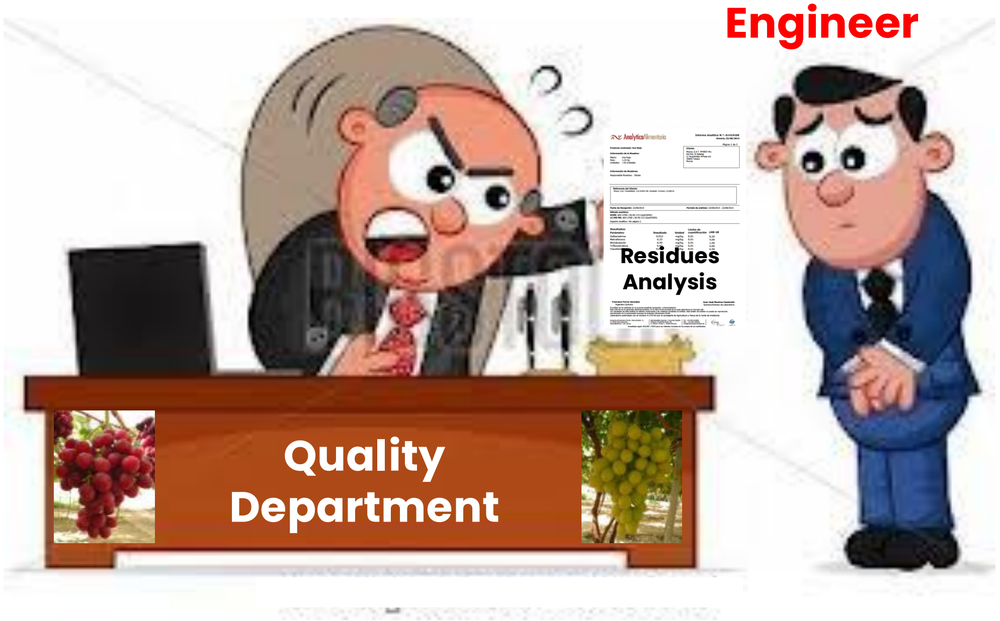


- Supply chain wants more products without phytosanitary residues

- More restrictive **laws** on products and phytosanitary residues

- Some supermarkets are more restrictive than the laws

Analysis of phytosanitary residues



Disease Resistance

A game changer for advancing sustainability

BLOOM is converting **natural disease tolerance and resistance** (mainly powdery mildew and downy mildew) **table grape varieties in the new paradigm,** resulting in much reduced agrochemicals inputs and residues in the human body



Reduce
costs of production

- Important Losses due to Fungus
- Mitigate Agrochemicals Applications



Improve
human health

- Quality grape
- Clean eating > less phytosanitary residues



Reduce
environmental impact

- Natural disease resistance
- Less soil phytosanitary residues
- Reduce water waste inputs

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Powdery Mildew







Downy Mildew







The American and Asian species, that co-evolved with the mildews, developed molecular mechanisms to survive against those pathogens

Resistance to powdery and downy mildew but with bad quality grapes for wine or table grapes



V. rotundifolia



V. rupestris



V. Berlandieri



V. riparia



V. amurensis



V. piasezkii



V. Romanetii

Whereas the *Vitis vinifera* varieties are very sensitive to powdery and downy mildew but are very good for wine and table grapes.



Wine varieties



Table grape varieties





Seedless varieties

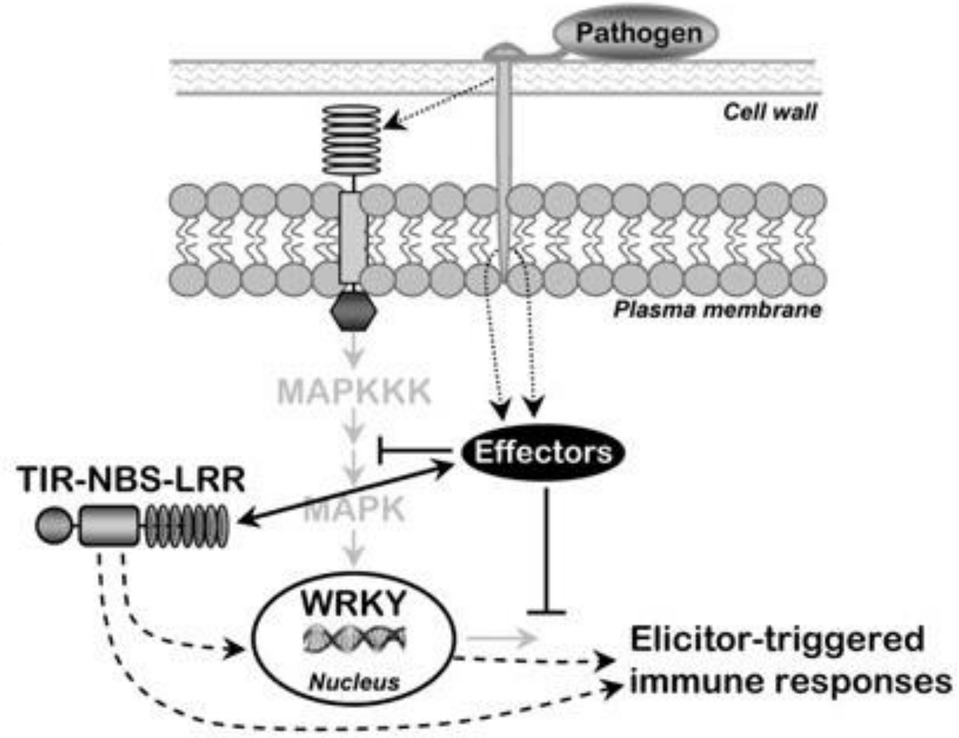




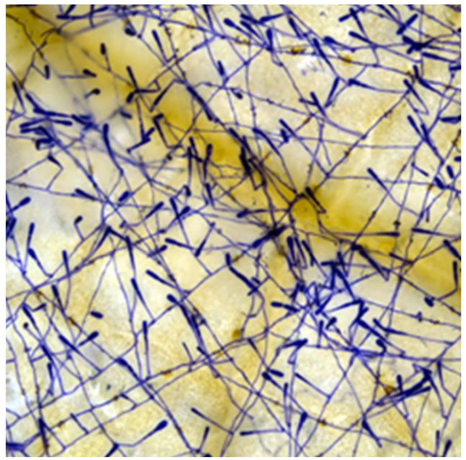
Resistant varieties

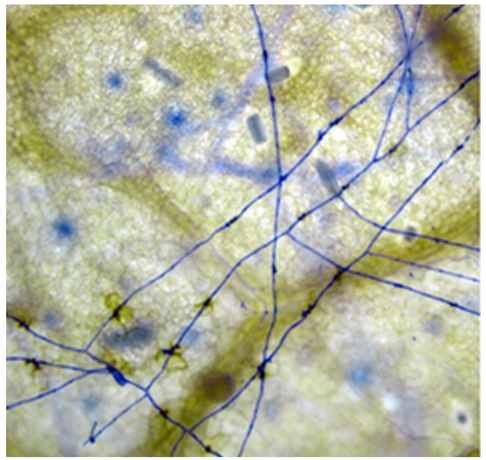
Different defense mechanisms developed against powdery mildew and downy mildew

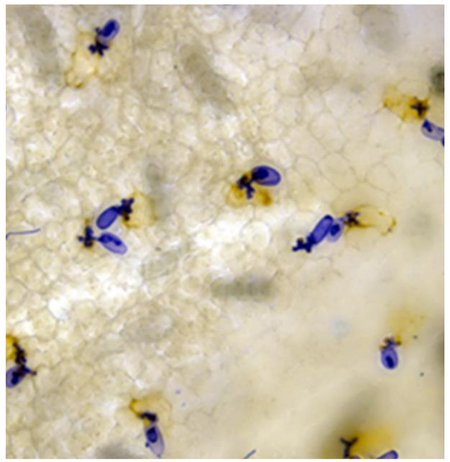
ETI defense (Effector-Triggered Immunity)



Hypersensitive response → Programmed cell death



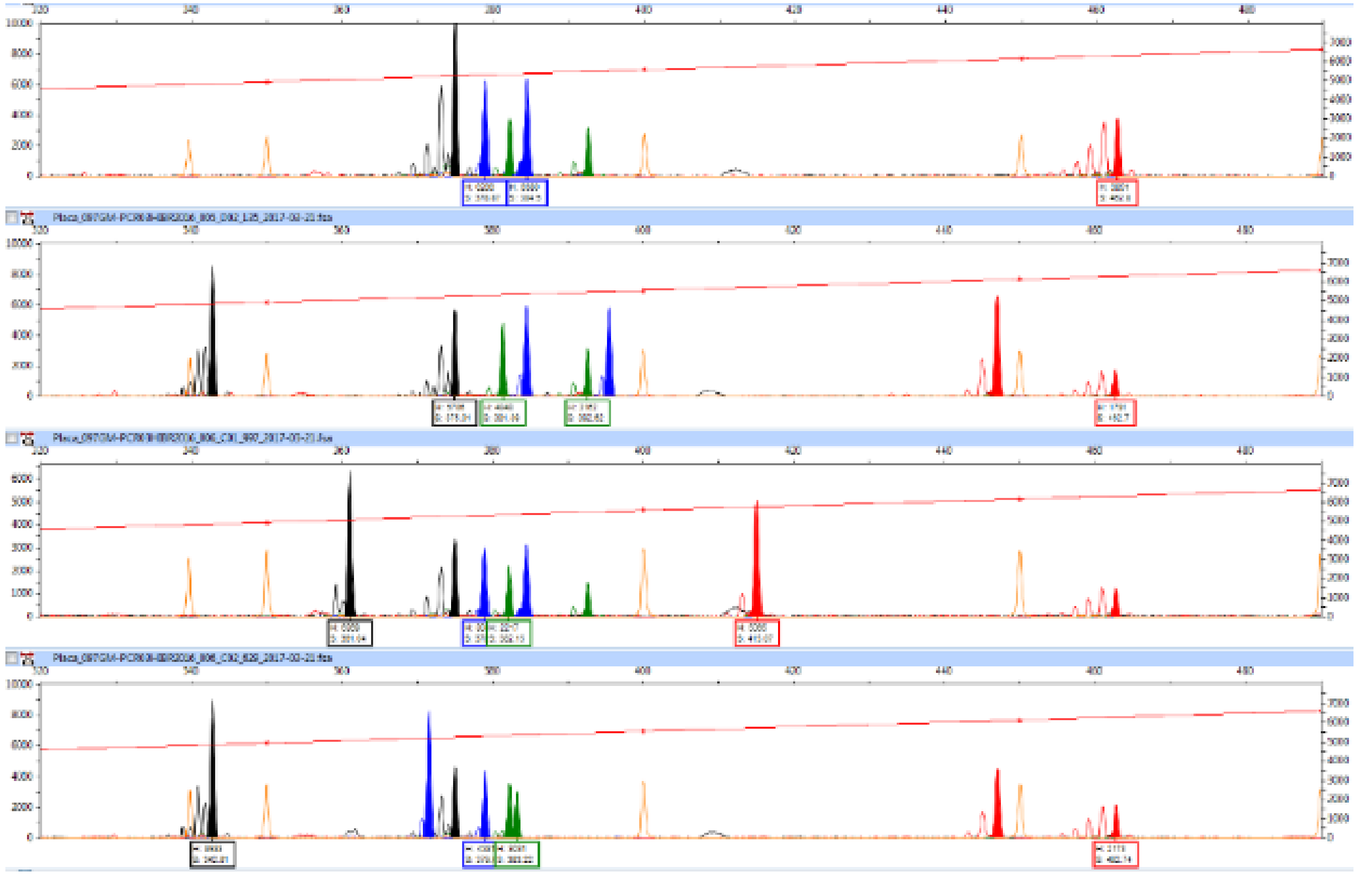




MOLECULAR MARKER ANALYSIS

- **Testing seedlings**
- **No level of resistance - not selected**





Chemical Sprays

Where do table grapes sit here?

Today, most grape varieties in the market are susceptible to disease and fungi (Category 1) and need high spray applications to survive

Category	Resistance level	Chemical sprays needed	Organic sprays needed
1	Susceptible	15-30	7-15
3	Medium	0	4-6
5	Med-high	0	2-4
7	High	0	2
9	Very high	0	2

- Test Block Spain
- No chemical control
- Timpson™ vs new selection with resistance level to Powdery Mildew



www.bloomfreshglobal.com

