PRATICHE DI GESTIONE SOSTENIBILE DELL'INTERFILARE A TUTELA DELLA QUALITA' IN VITICOLTURA

SOTTOMISURA 16.2

Progetto VELTHA Vite e vino, Eccellenza del Territorio, dell'Habitus e dell'Ambiente

PIF43/2015 Bolgheri e la costa toscana: territori promotori di eccellenze vitivinicole, innovazioni tecnologiche, salvaguardia ambientale e valorizzazione territoriale

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AZIONI DI PROGETTO - UNITÀ DISPAA - MACROAZIONI

- STUDI PRELIMINARI BIBLIOGRAFICI → INERBIMENTO DEL VIGNETO
- SCELTA E STUDIO DEI VIGNETI SPERIMENTALI O PARCELLE PILOTA
- MESSA A PUNTO DEI MATERIALI E METODI
- RILIEVI IN CAMPO E STUDIO DELLA QUALITÀ DELLE UVE
- DIVULGAZIONE DEI RISULTATI DEL PROGETTO (AZIONE CONGIUNTA)

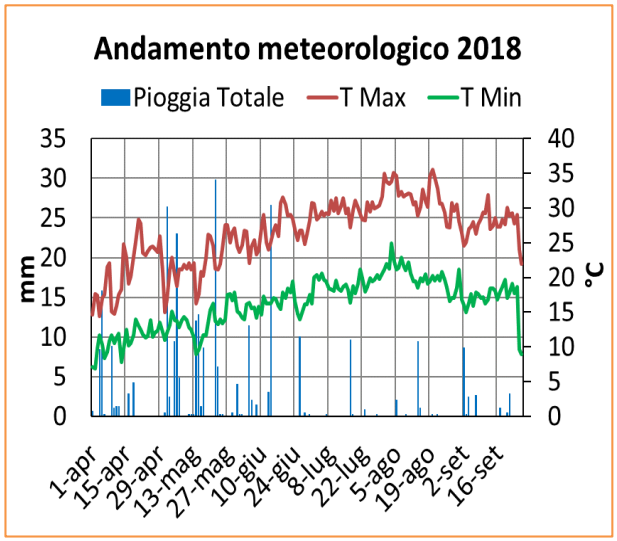
I VIGNETI SPERIMENTALI

MASSETO - N NE - S SO

PERO- N NE - S SO

BELLARIA- E - O

Materiali e Metodi



Parametri vegetativi

Parametri produttivi

Analisi tecnologiche

Analisi delle componenti fenoliche

Peso della produzione

SPSS Data Editor con test della DMS al 95% di probabilità

PERO

Ettari: 3,45
Varietà: Cabernet Sauvignon
Densità: 2,00x0,70
Anno impianto: 2007
Allevamento: cordone speronato
Suolo: Argille plioceniche sottili

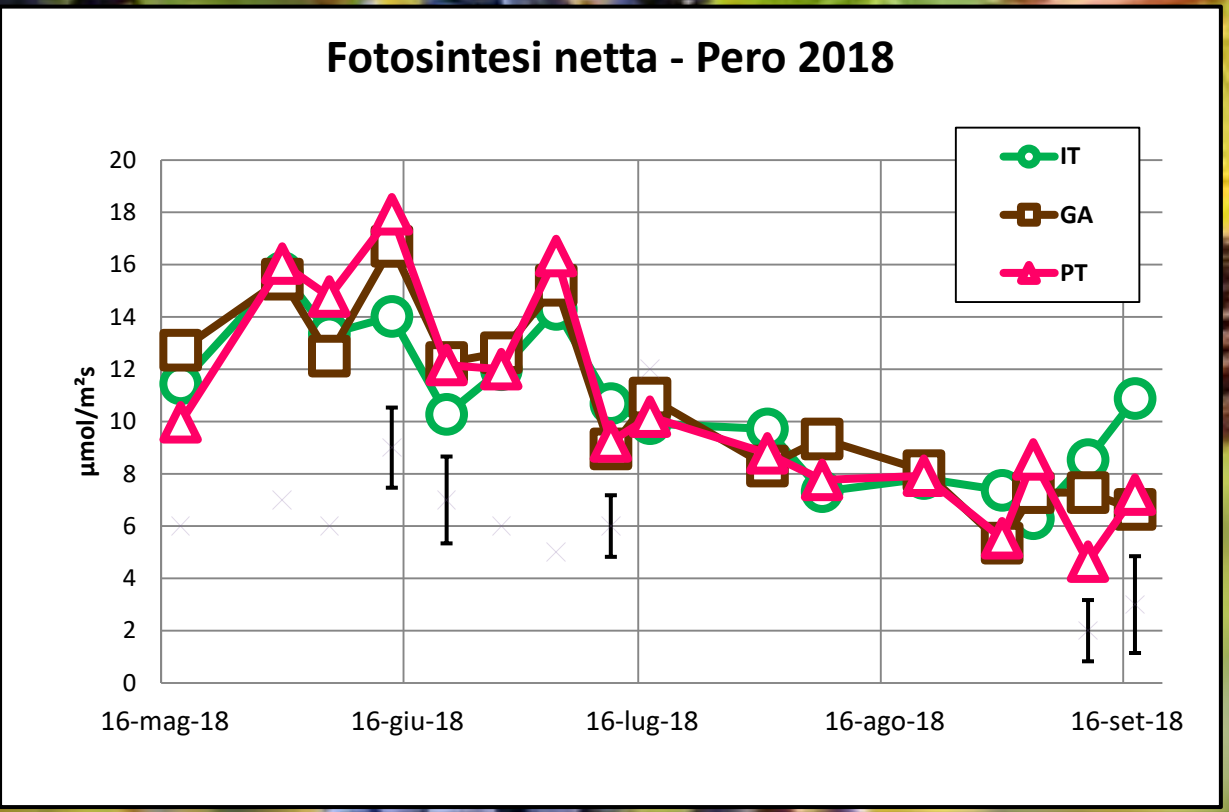
Pero

3 gestioni dell'interfilare:

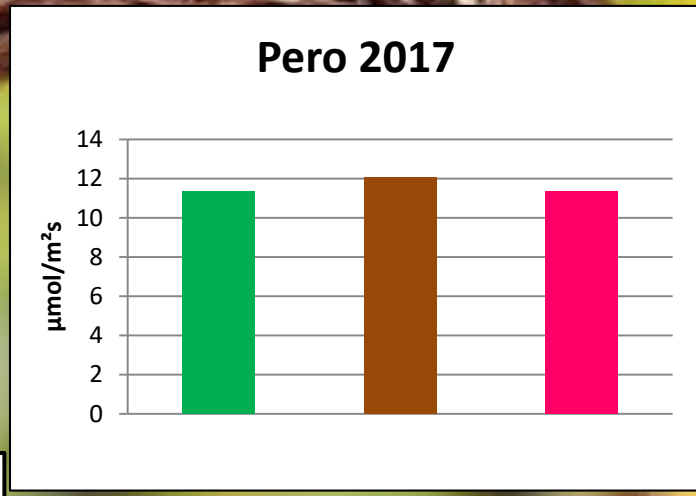
1) INERBIMENTO (I)

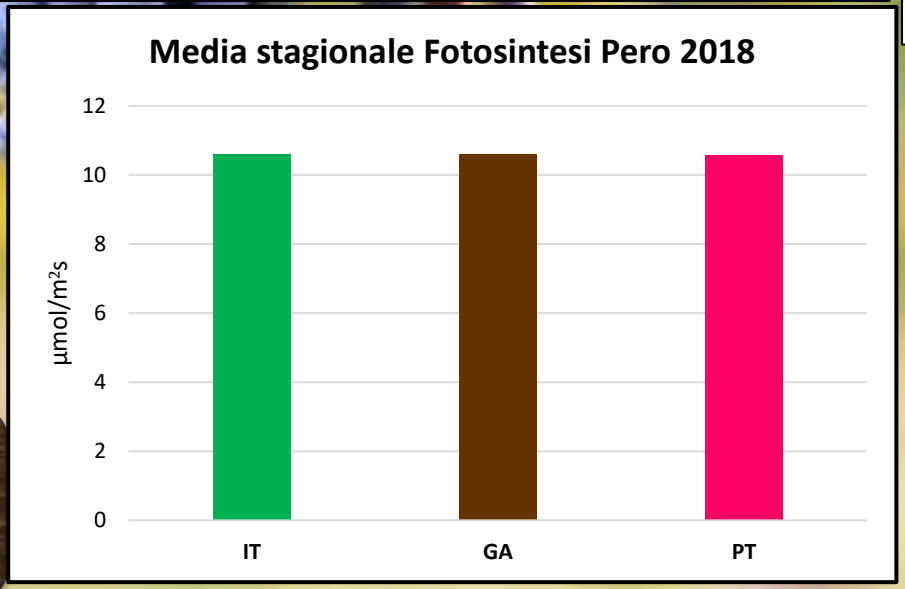
2) GESTIONE AZIENDALE (GA)

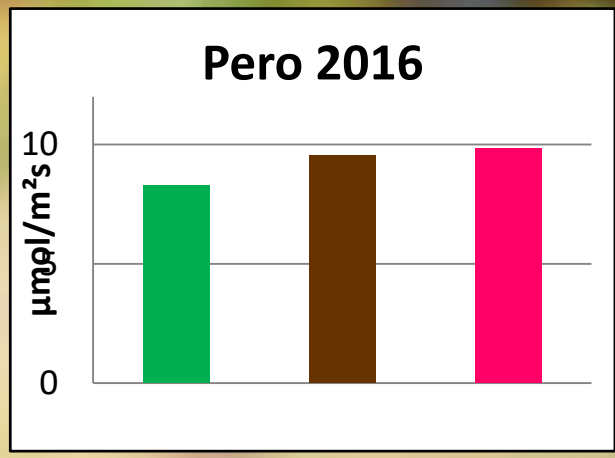
3) PACCIAMATURA (P)



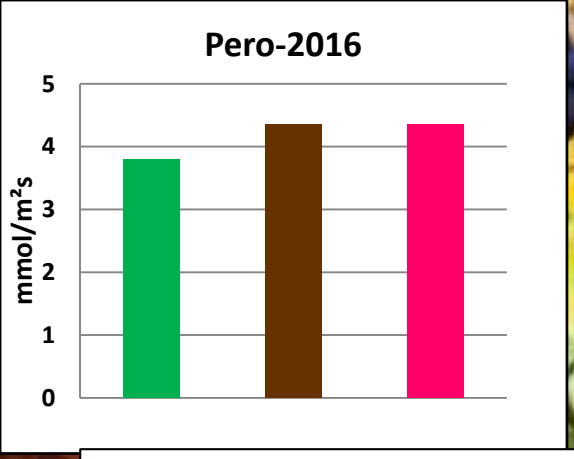
- Valori ottimali PN (no stress)
- Diminuzione valori per senescenza fogliare

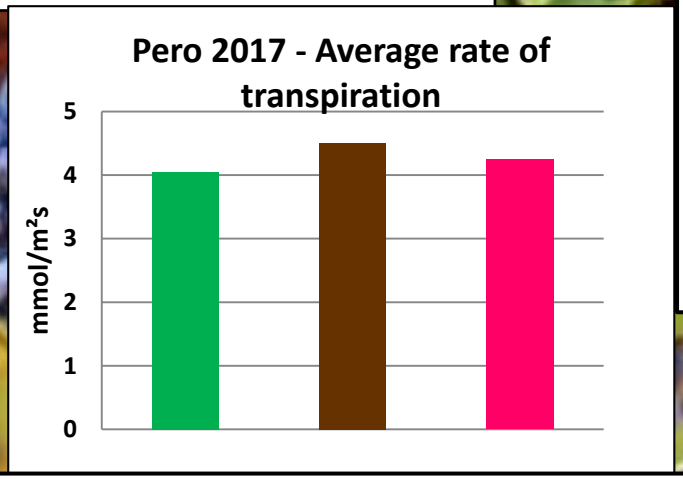


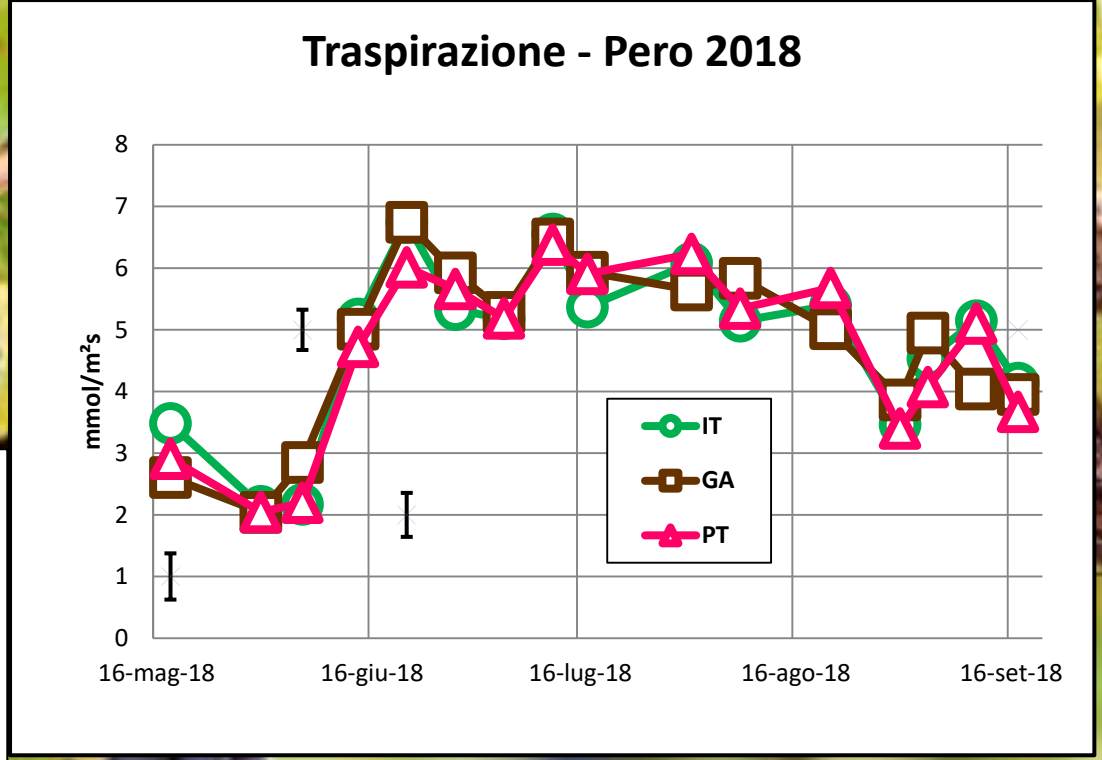


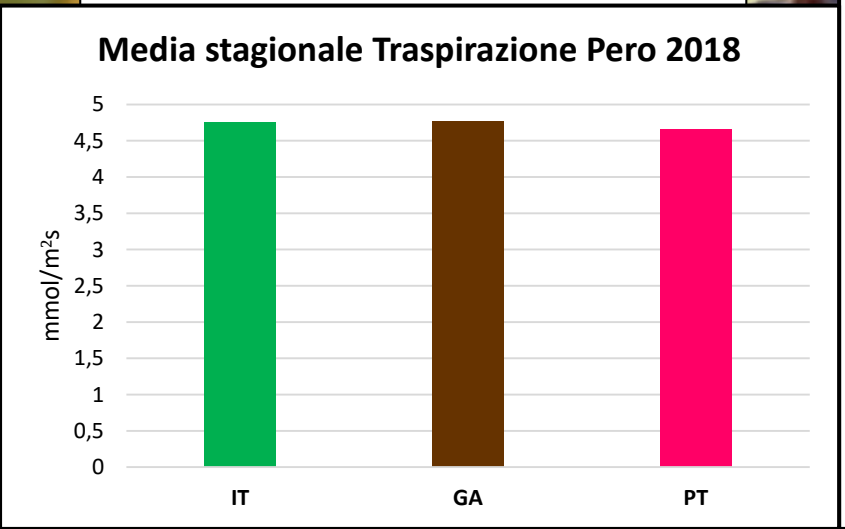


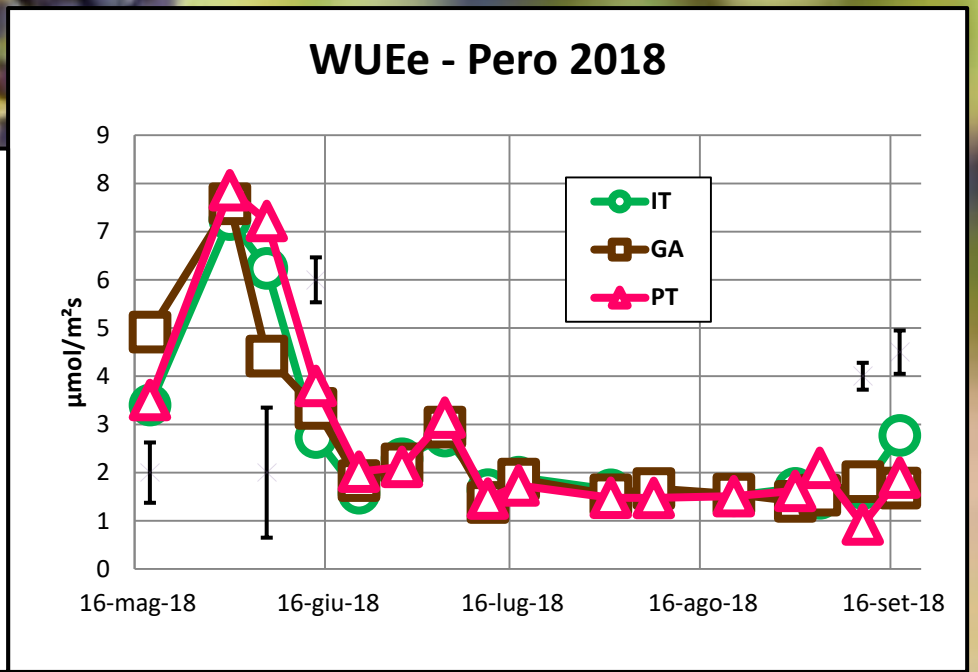
PERO

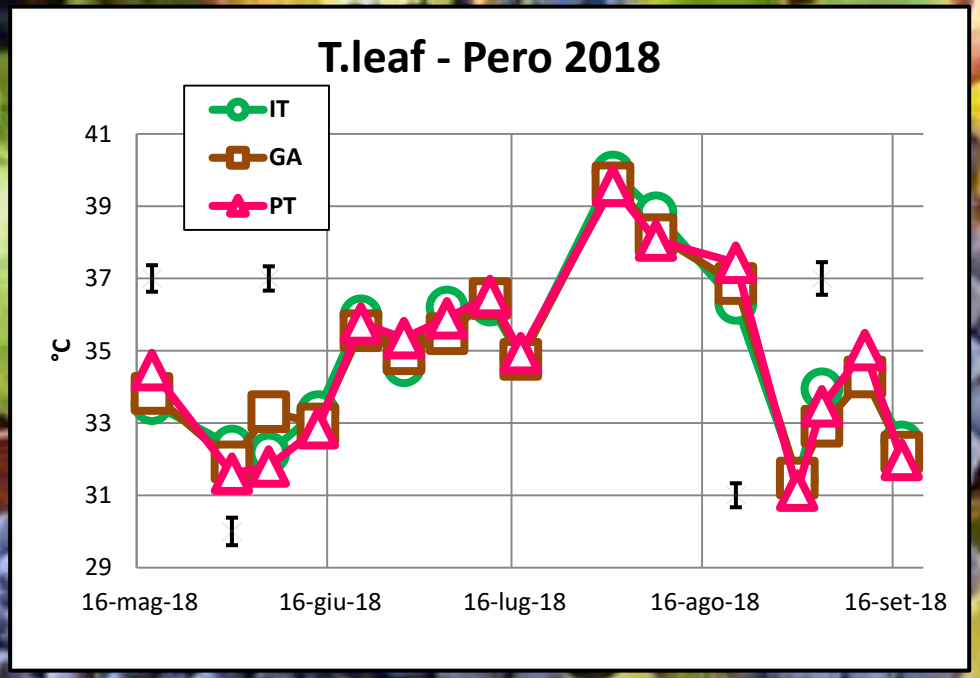

Pero-2016
mmol/m²s
0
1
2
3
4
5

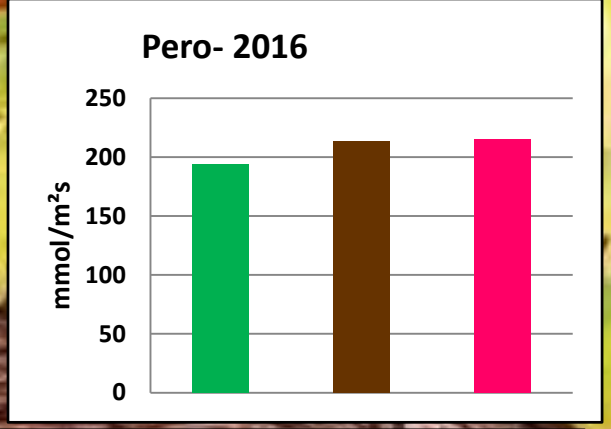

Pero 2017 - Average rate of transpiration
mmol/m²s
0
1
2
3
4
5

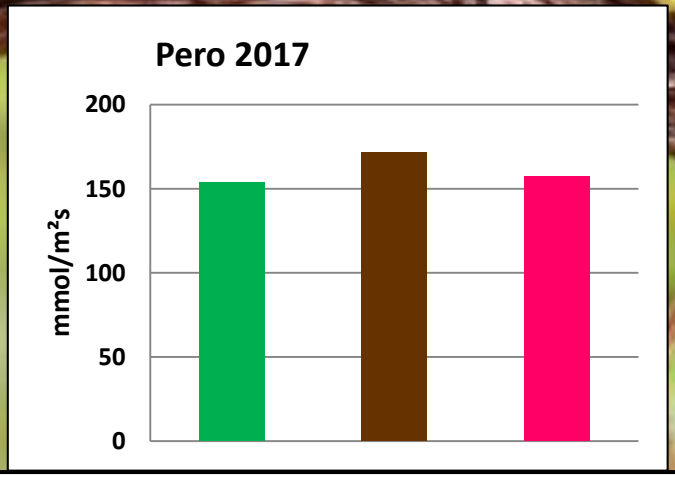

Traspirazione - Pero 2018
mmol/m²s
0
1
2
3
4
5
6
7
8
16-mag-18
16-giu-18
16-lug-18
16-ago-18
16-set-18
IT
GA
PT

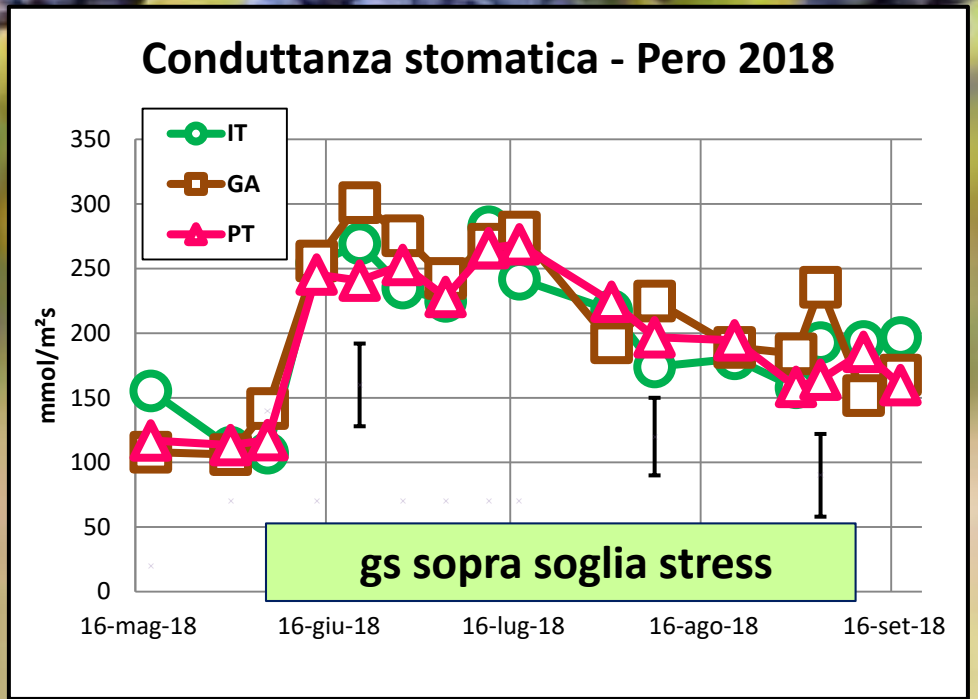

Media stagionale Traspirazione Pero 2018
mmol/m²s
0
0,5
1
1,5
2
2,5
3
3,5
4
4,5
5
IT
GA
PT

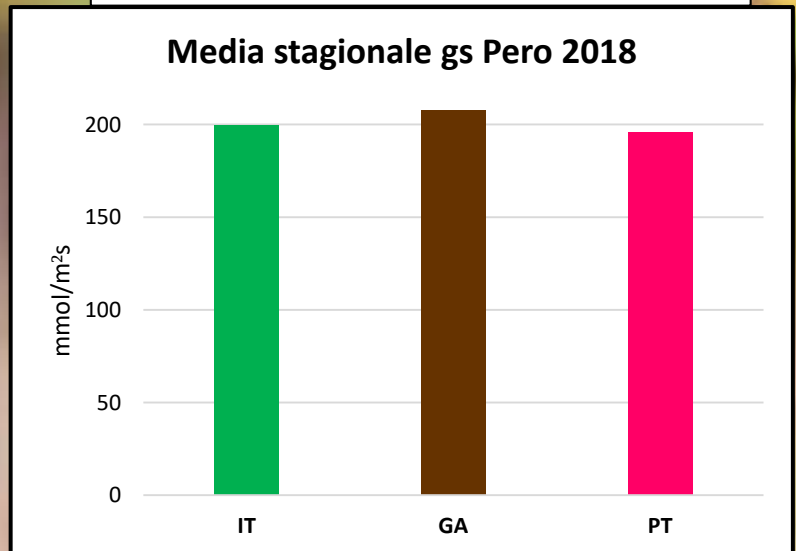

WUEe - Pero 2018
µmol/m²s
0
1
2
3
4
5
6
7
8
9
16-mag-18
16-giu-18
16-lug-18
16-ago-18
16-set-18
IT
GA
PT

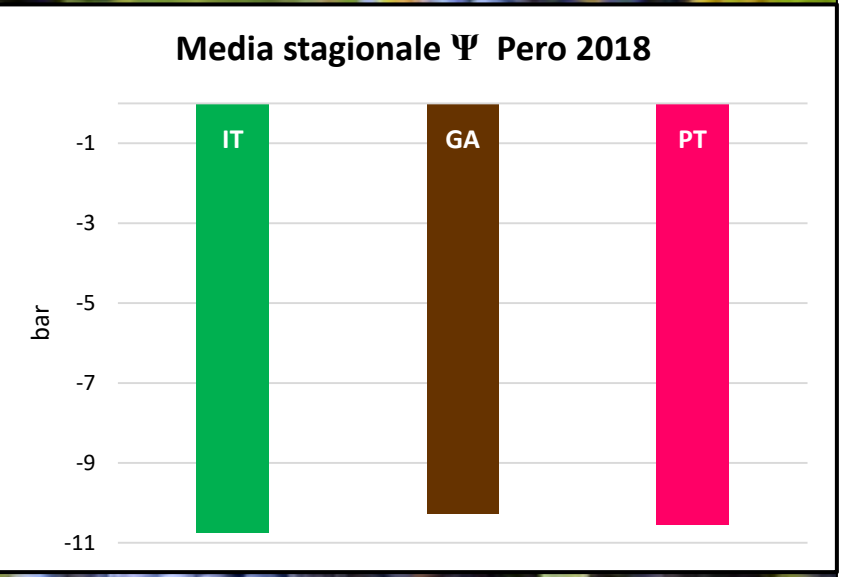

T.leaf - Pero 2018
IT
GA
PT
°C
41
39
37
35
33
31
29
16-mag-18
16-giu-18
16-lug-18
16-ago-18
16-set-18

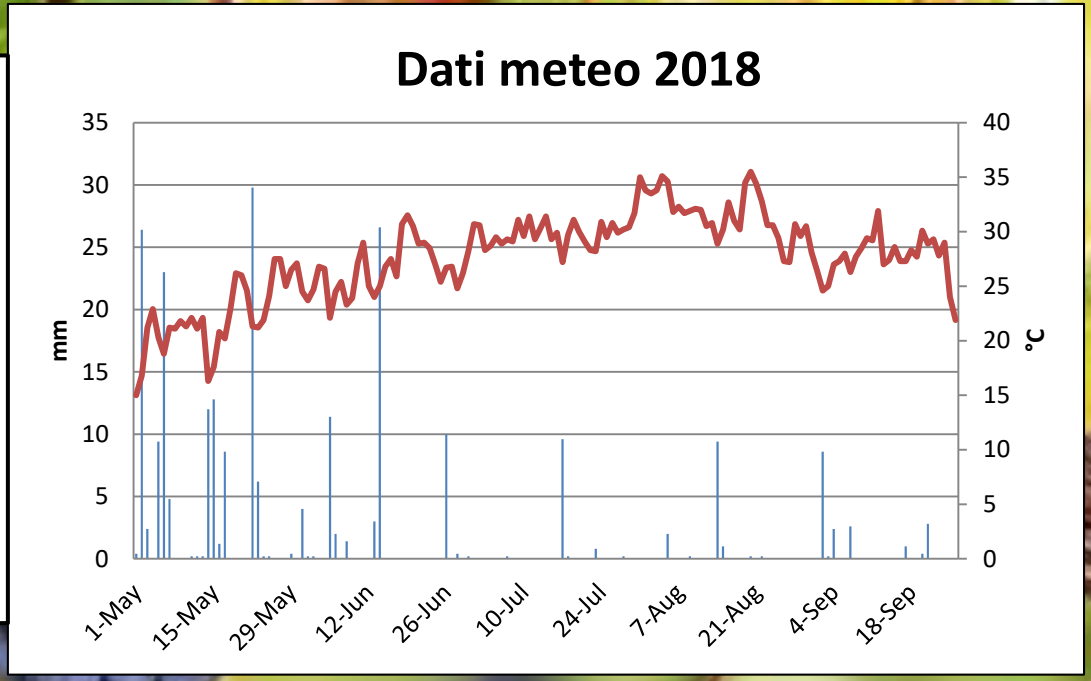

Pero- 2016
mmol/m²s
250
200
150
100
50
0


Pero 2017
mmol/m²s
200
150
100
50
0

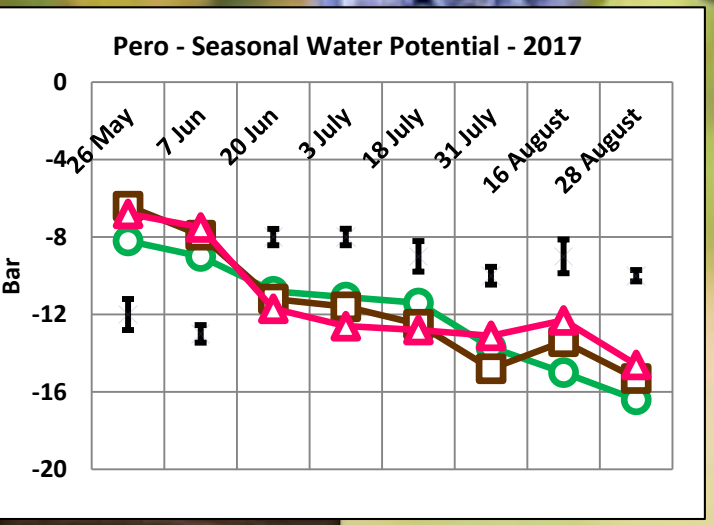

Conduttanza stomatica - Pero 2018
IT
GA
PT
mmol/m²s
350
300
250
200
150
100
50
0
16-mag-18
16-giu-18
16-lug-18
16-ago-18
16-set-18
gs sopra soglia stress

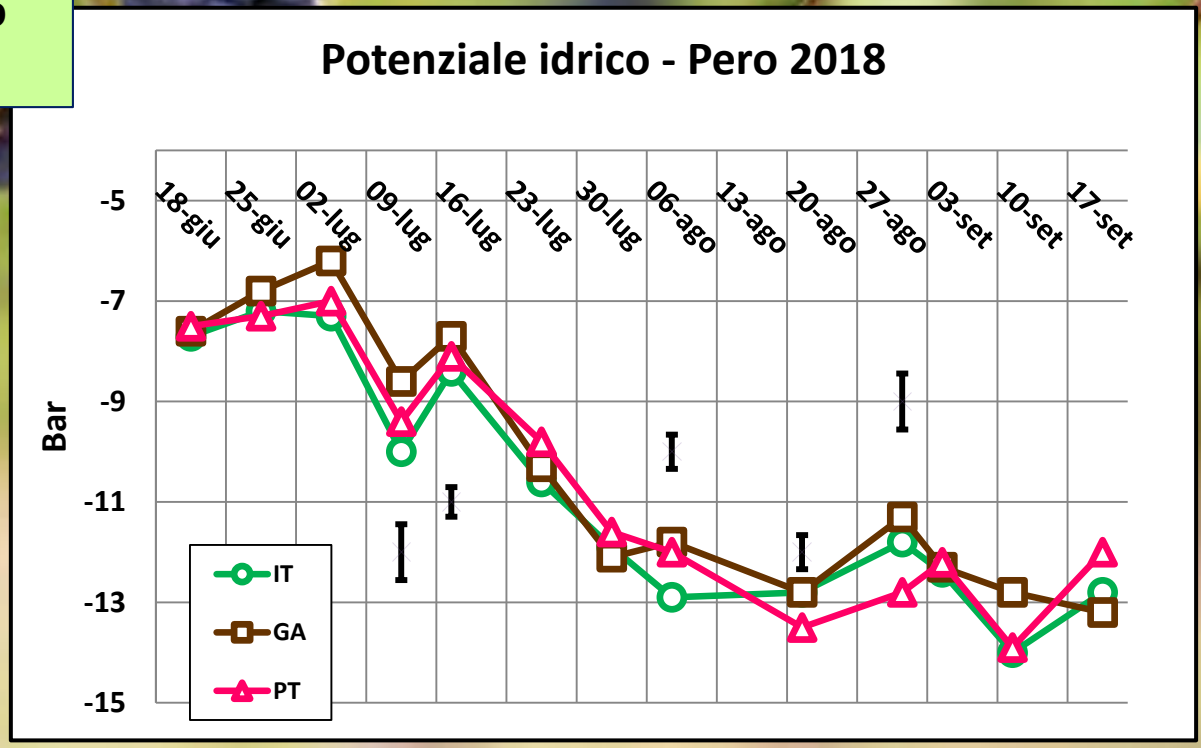

Media stagionale gs Pero 2018
mmol/m²s
200
150
100
50
0
IT
GA
PT

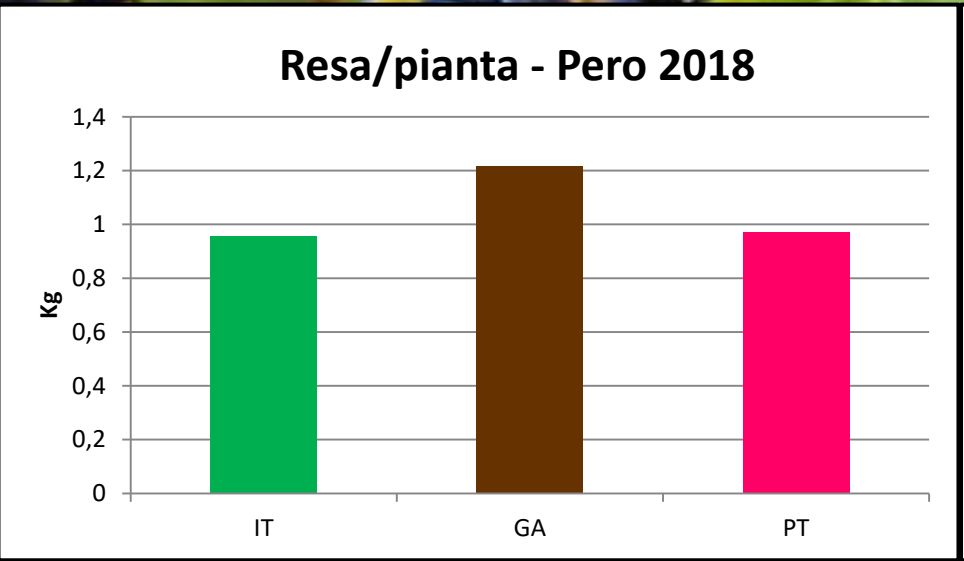


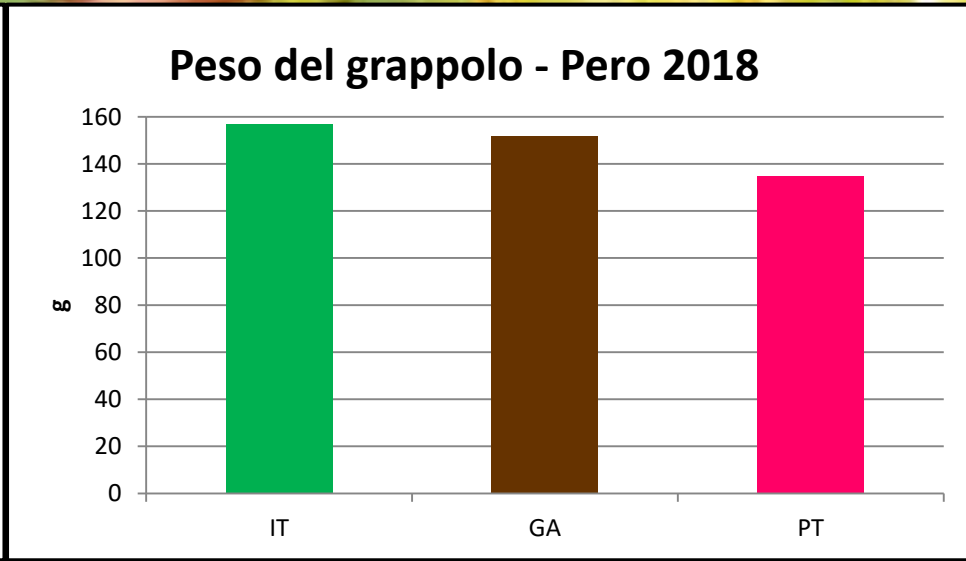


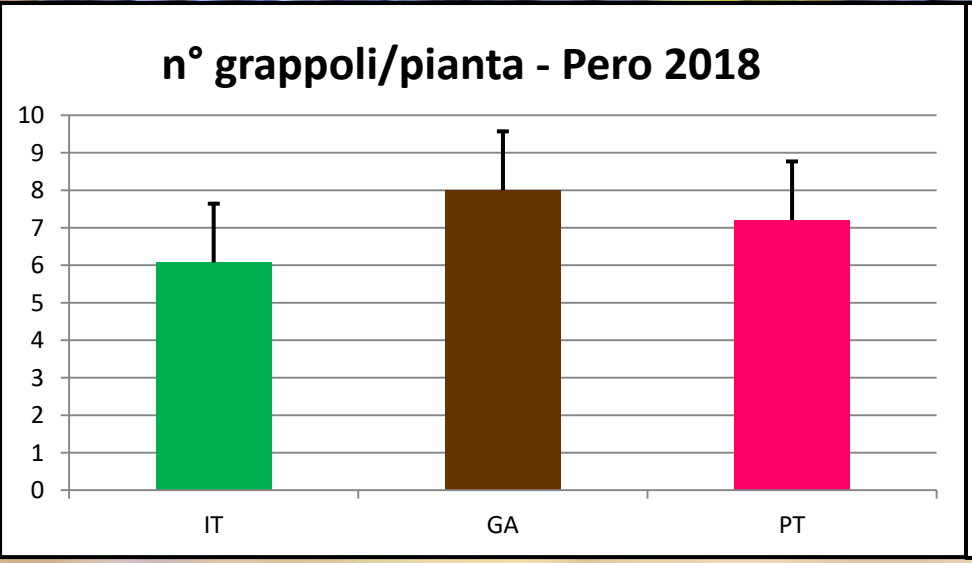
Da Agosto livello soglia, no stress. Piogge estive

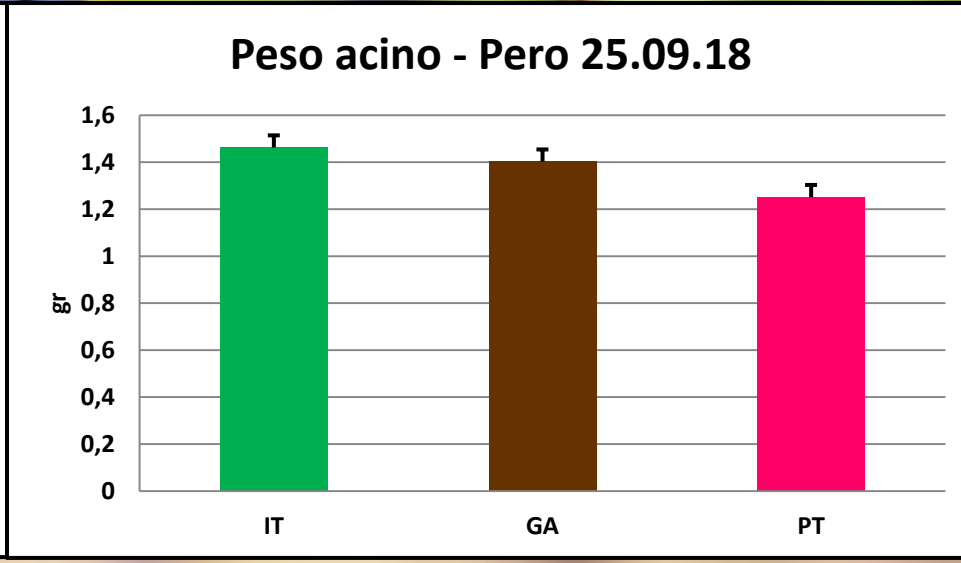




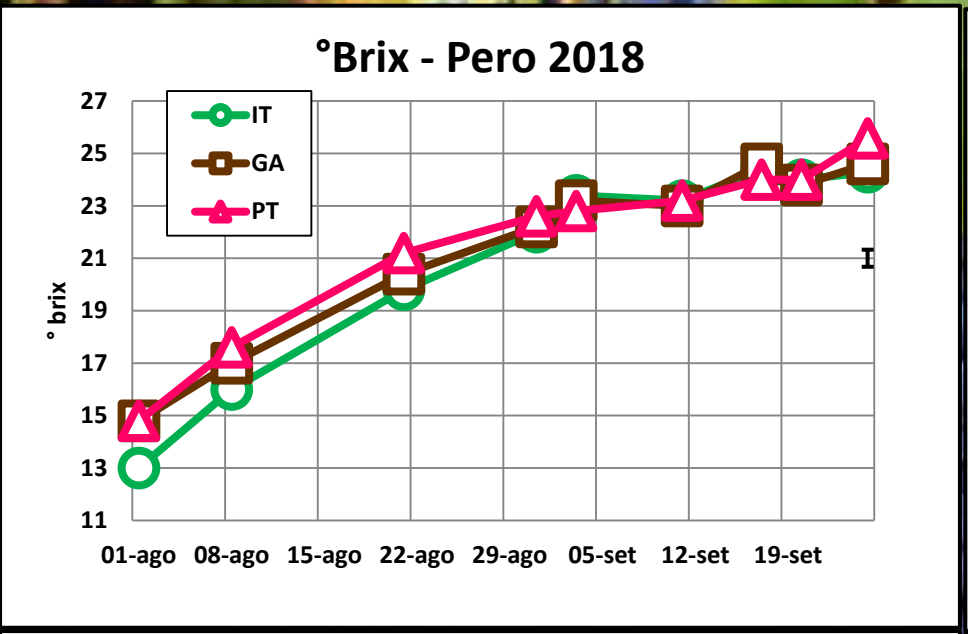


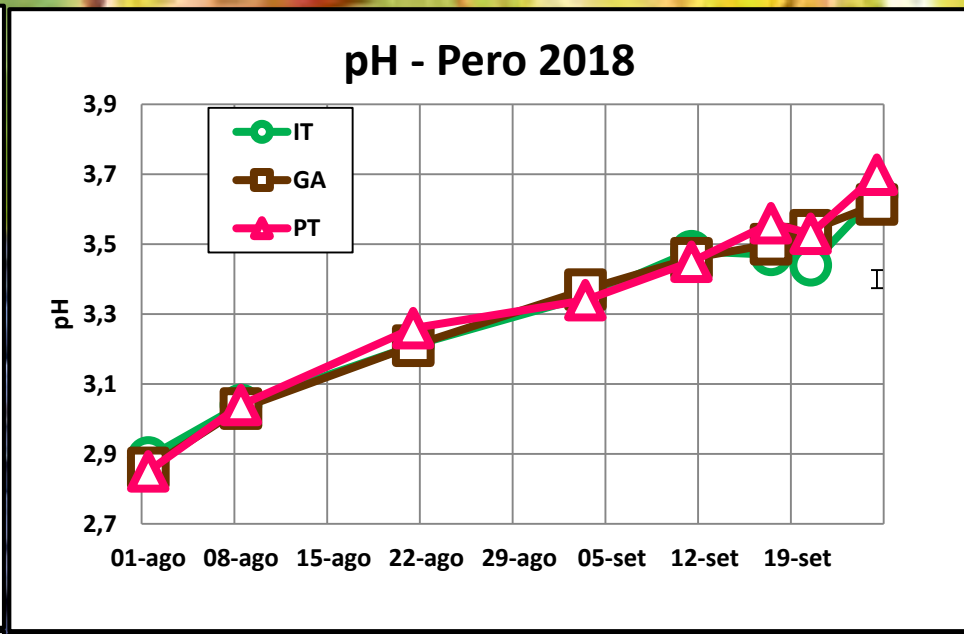


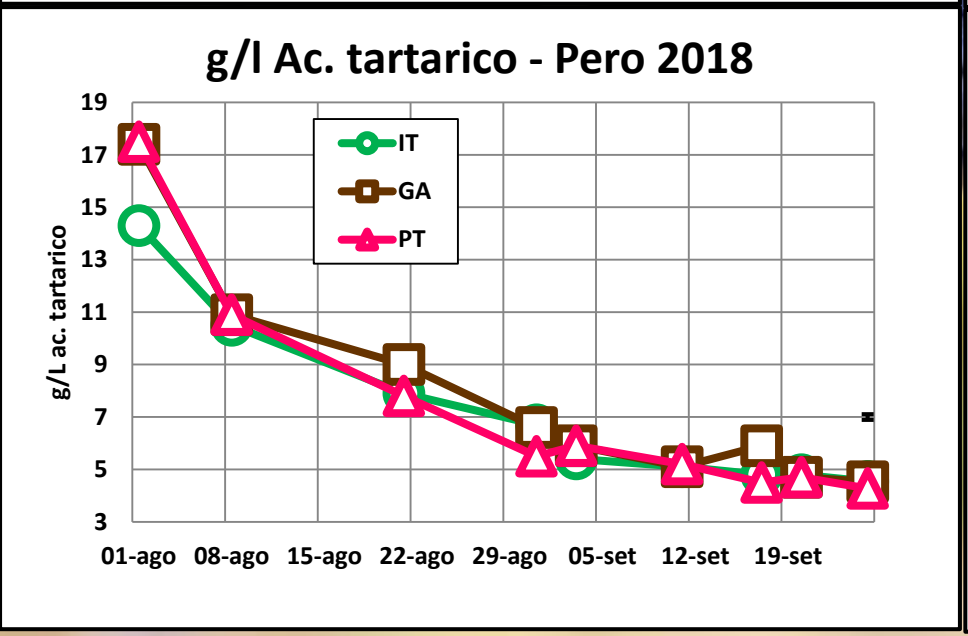


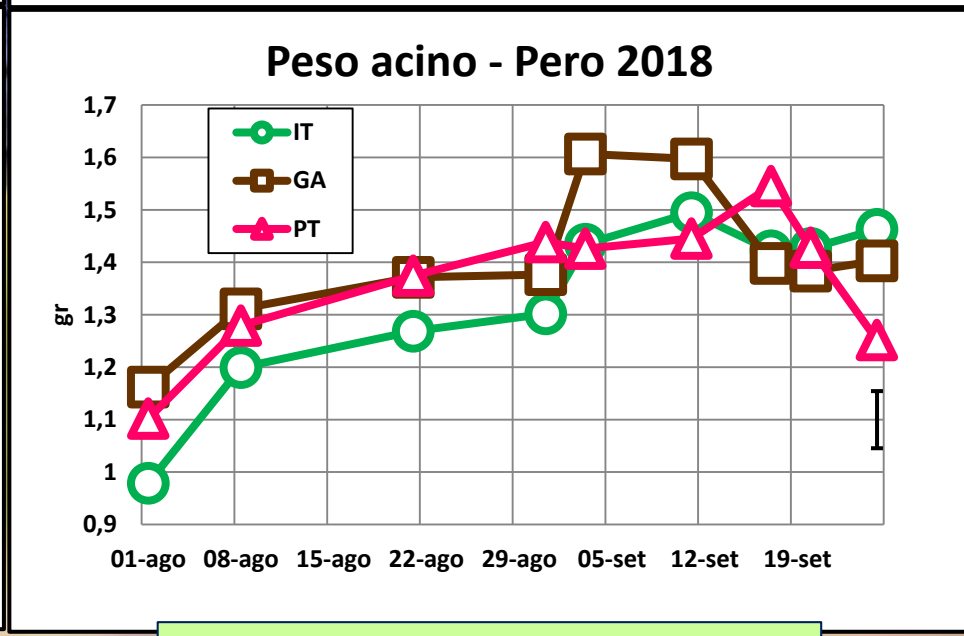


PT disidratazione acino, potenziale più negativo nel periodo più caldo



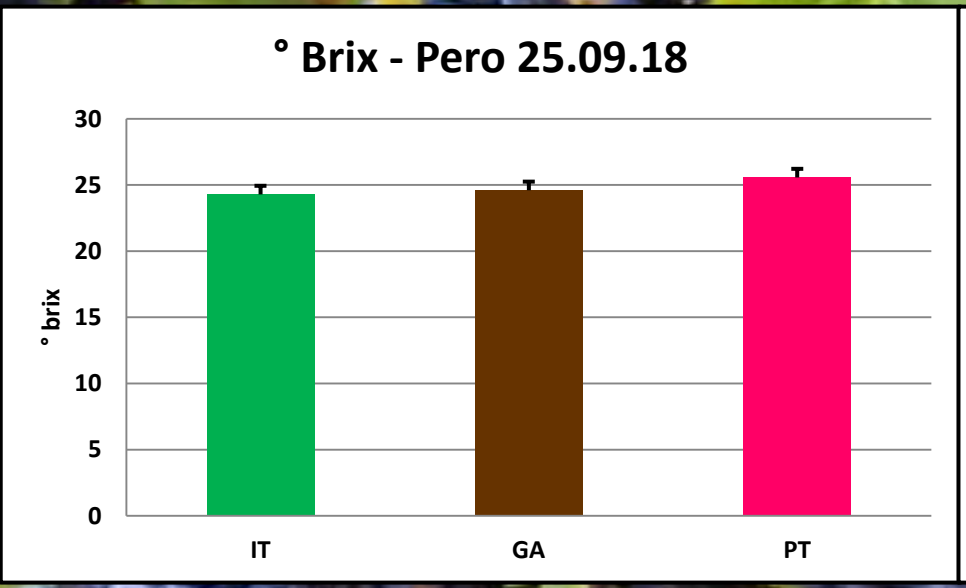


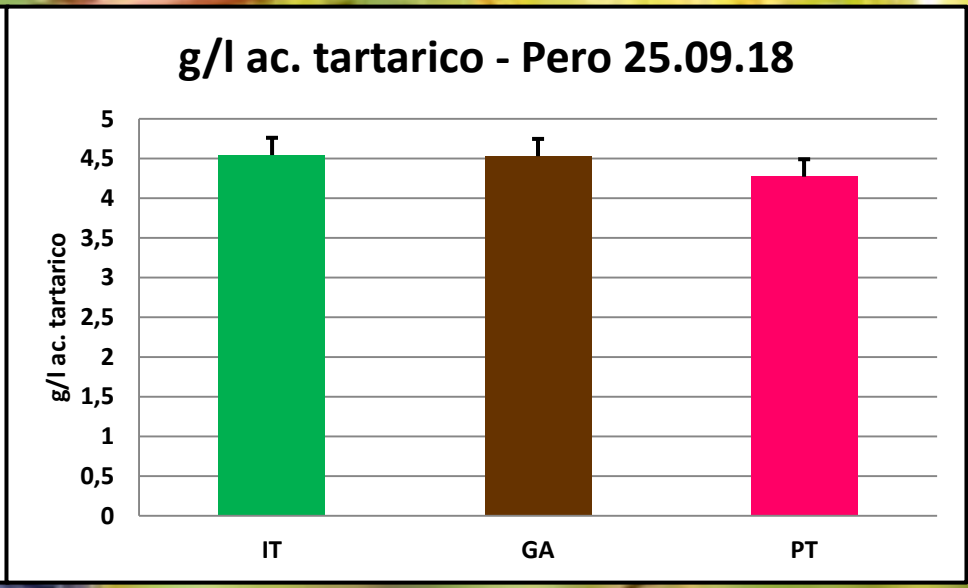


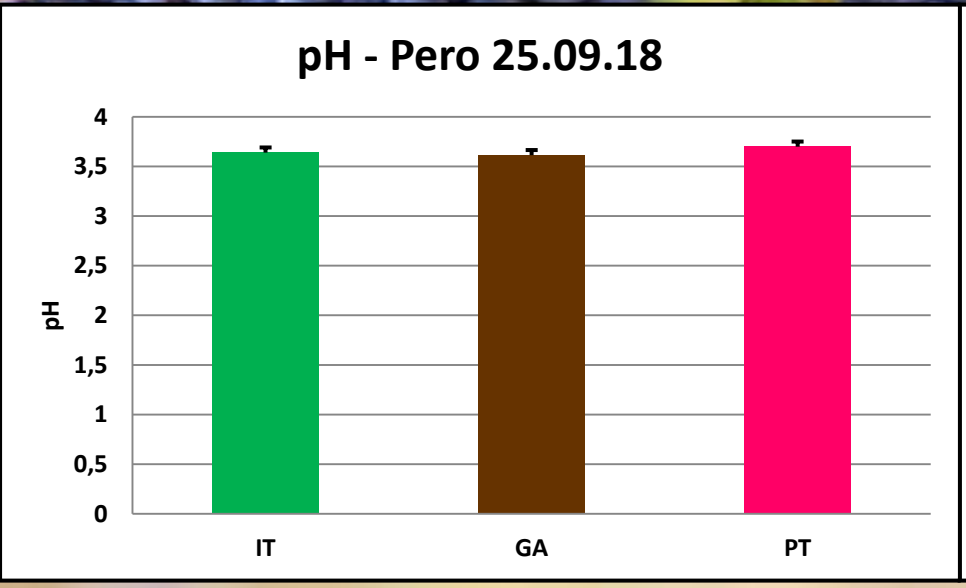


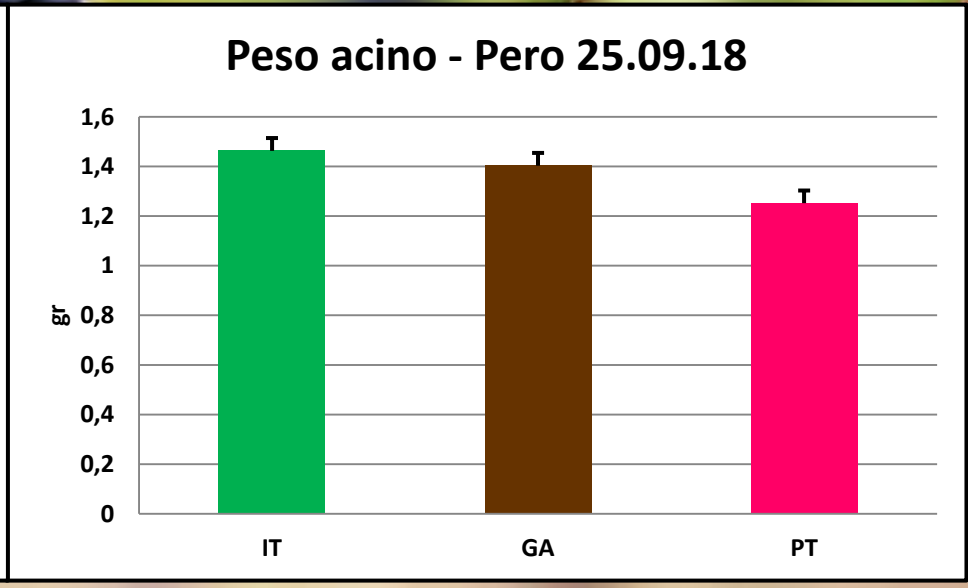
Technological Analysis

PT stato maturazione più avanzato, possibile causa dimensione acino

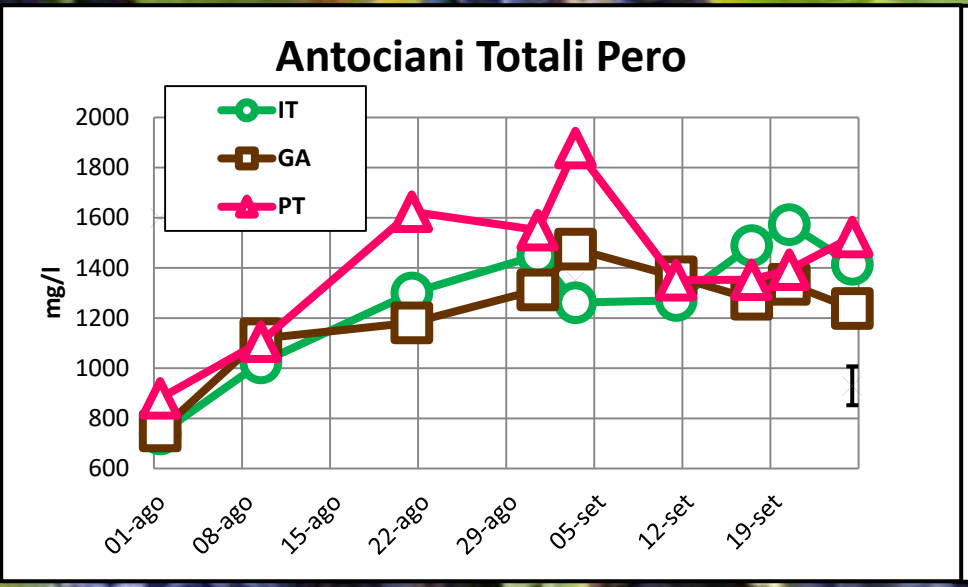

° Brix - Pero 25.09.18
° brix
30
25
20
15
10
5
0
IT
GA
PT

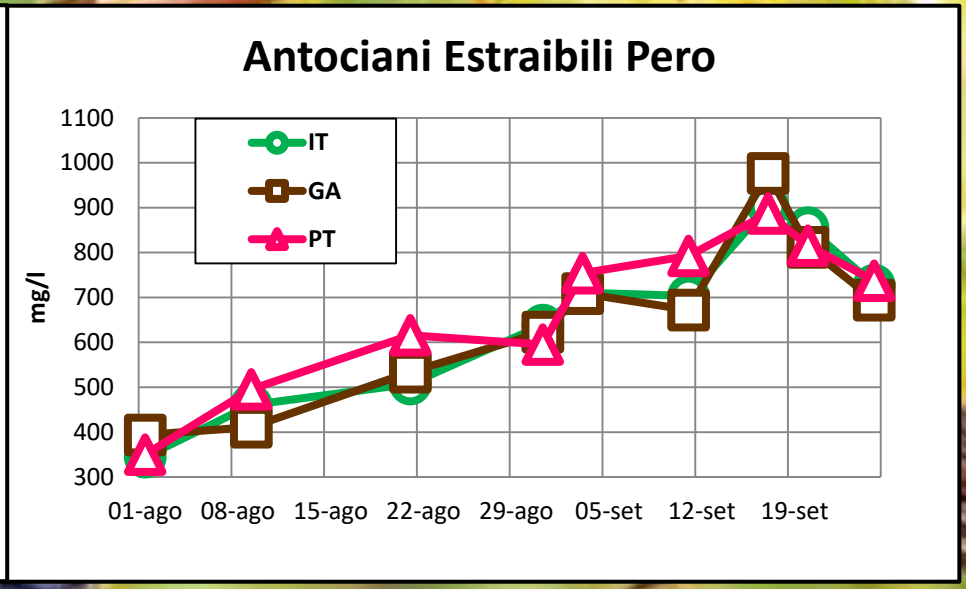

g/l ac. tartarico - Pero 25.09.18
g/l ac. tartarico
5
4,5
4
3,5
3
2,5
2
1,5
1
0,5
0
IT
GA
PT

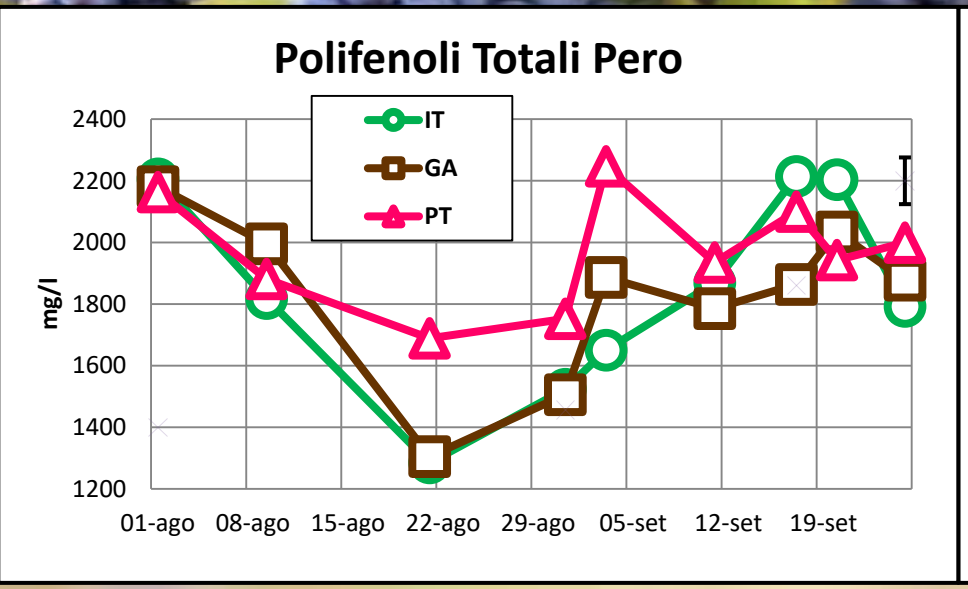

pH - Pero 25.09.18
pH
4
3,5
3
2,5
2
1,5
1
0,5
0
IT
GA
PT

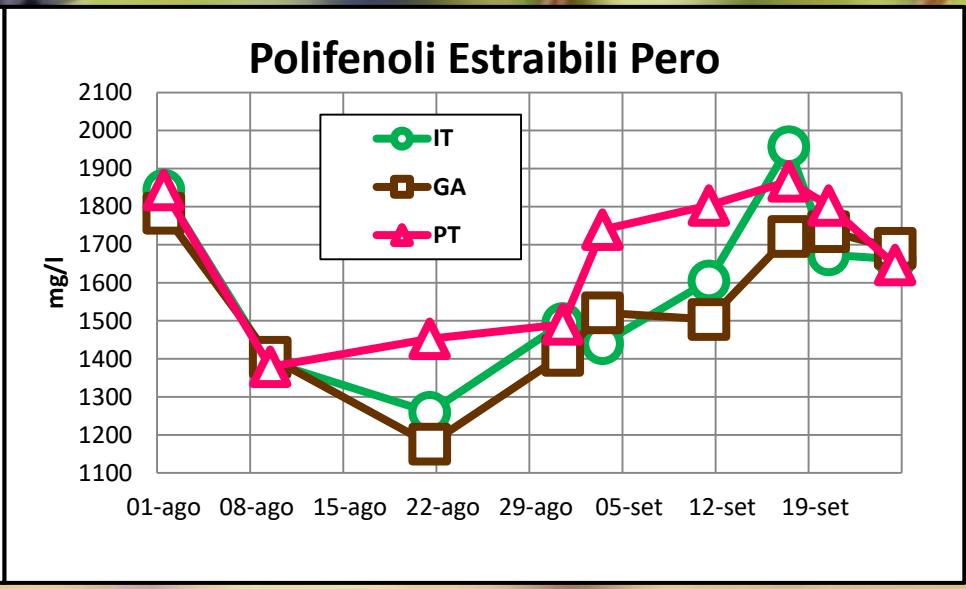

Peso acino - Pero 25.09.18
gr
1,6
1,4
1,2
1
0,8
0,6
0,4
0,2
0
IT
GA
PT

PERO



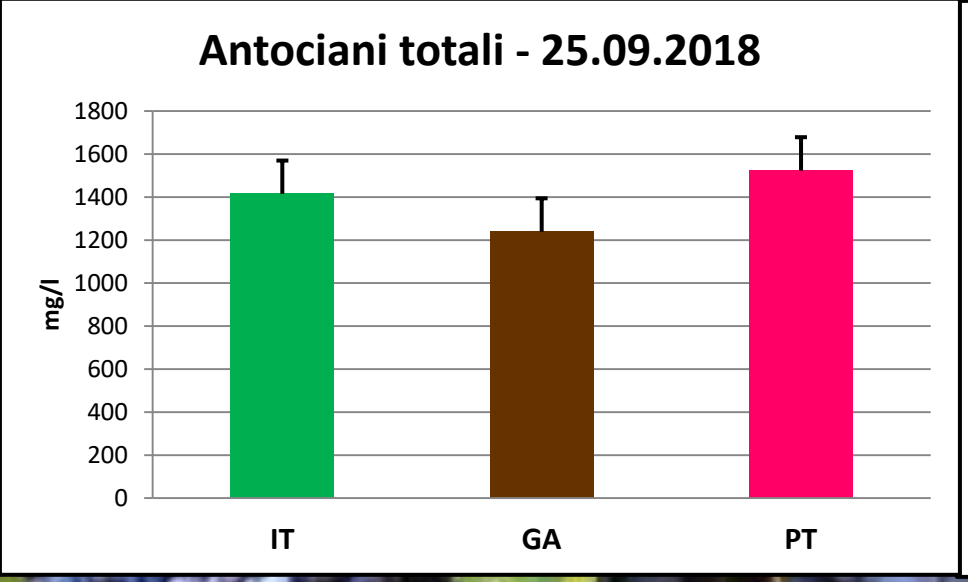


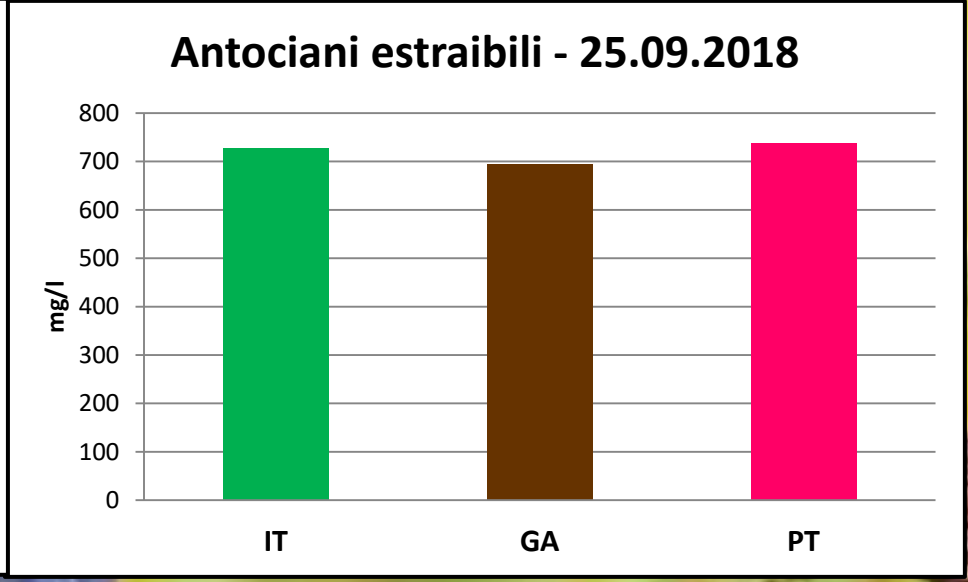




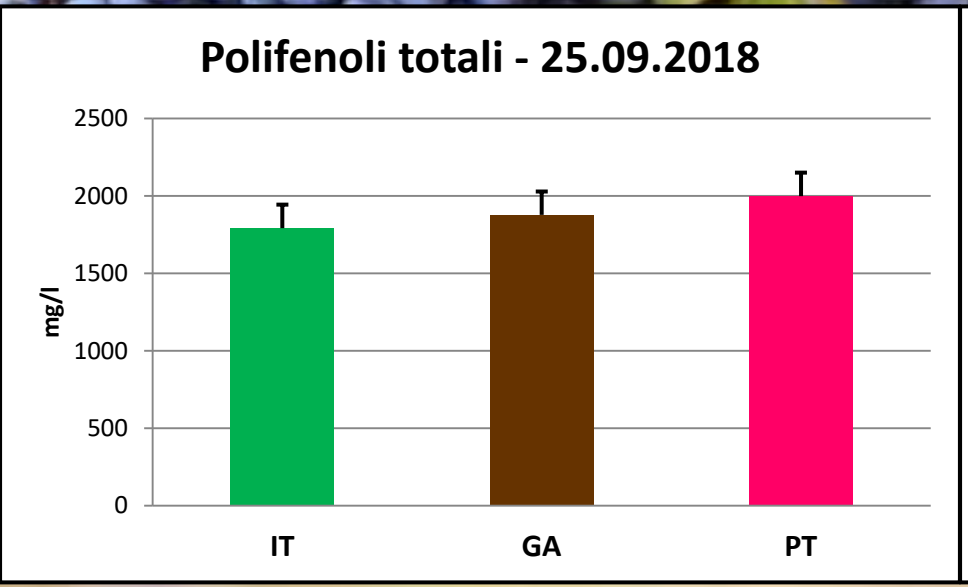
PERO

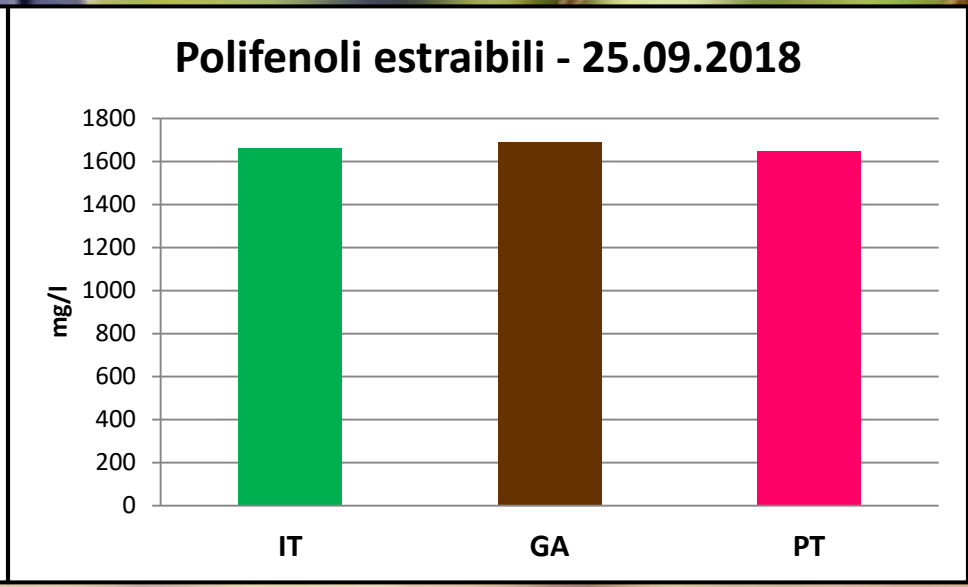
Phenolic Analysis





Phenolic Analysis





PERO

	PERO 2018							
	Brix	pH	Acidity g/L tartaric acid	Berry weight g	Tot Anth mg/L	Extr Anth mg/L	Tot Poly mg/L	Extr Poly mg/L
IT	24,28	3,6	4,5	1,5	1415	728	1792	1662
GA	24,6	3,6	4,5	1,4	1239	694	1878	1690
PT	25,57	3,7	4,3	1,3	1523	737	1999	1647
lsd	0,3	0,03	0,1	0,1	155,3	ns	151,1	ns

	PERO 2017							
	Brix	pH	Acidity g/L tartaric acid	Berry weight g	Tot Anth mg/L	Extr Anth mg/L	Tot Poly mg/L	Extr Poly mg/L
IT	28,53	3,6	4,7	0,77	1696	715	3607	3383
GA	27,93	3,6	4,8	0,74	2004	782	3977	3469
PT	29,47	3,5	5,1	0,61	1777	673	3854	3242
lsd	ns	ns	ns	0,16	259	92	ns	ns

PERO

IT meno stress (sia Pero che Bellaria) piante meglio acclimatate

PERO Conclusions

- No difference in the hottest time (gas exchange)
- GA less mid-season water stress
- PT lowest berry weight and highest sugar
- PT and GA similar treatment for polyphenols accumulation
- PT best treatment for anthocyanins accumulation

PERO

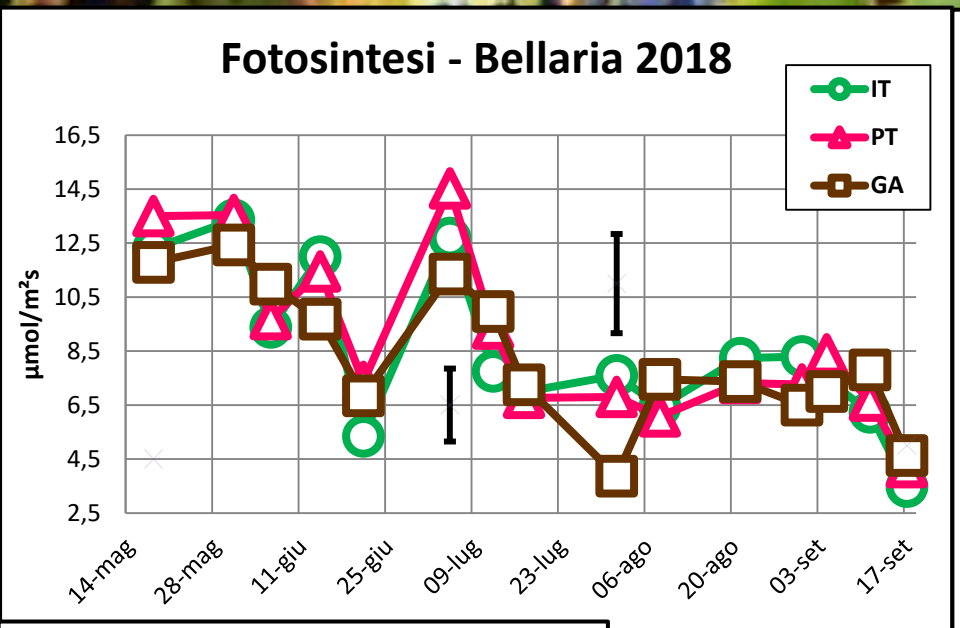
BELLARIA

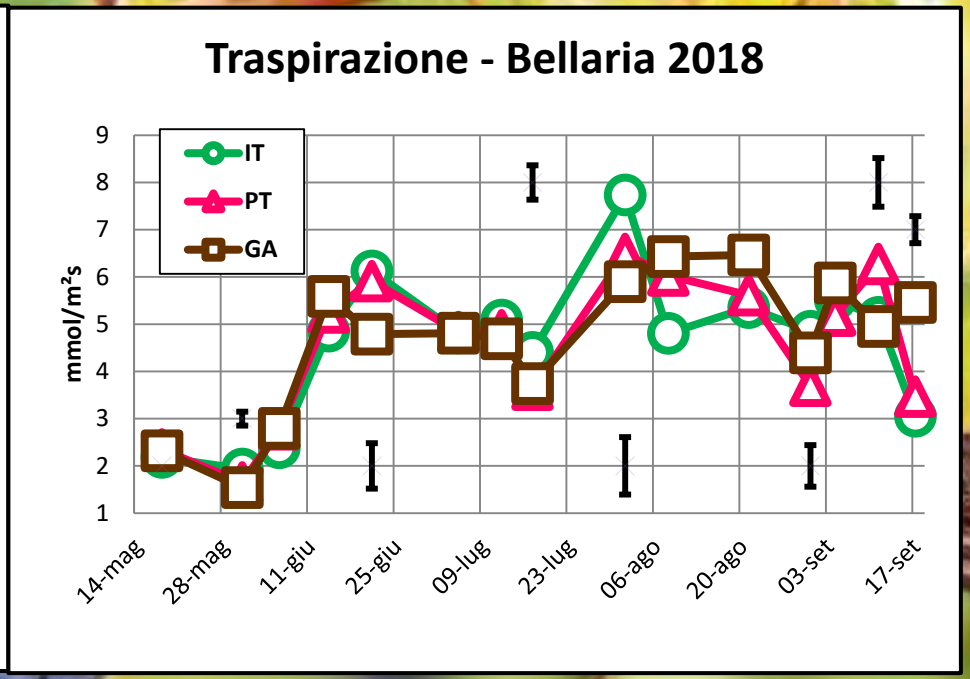
Ettari: 4,15
Varietà: Merlot
Densità: 2,40x0,80
Anno impianto: 1995
Allevamento: cordone speronato
Suolo: Scheletrico calcareo sottile

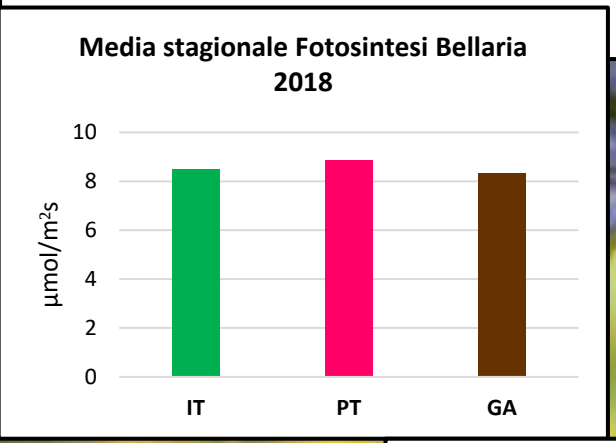
Bellaria

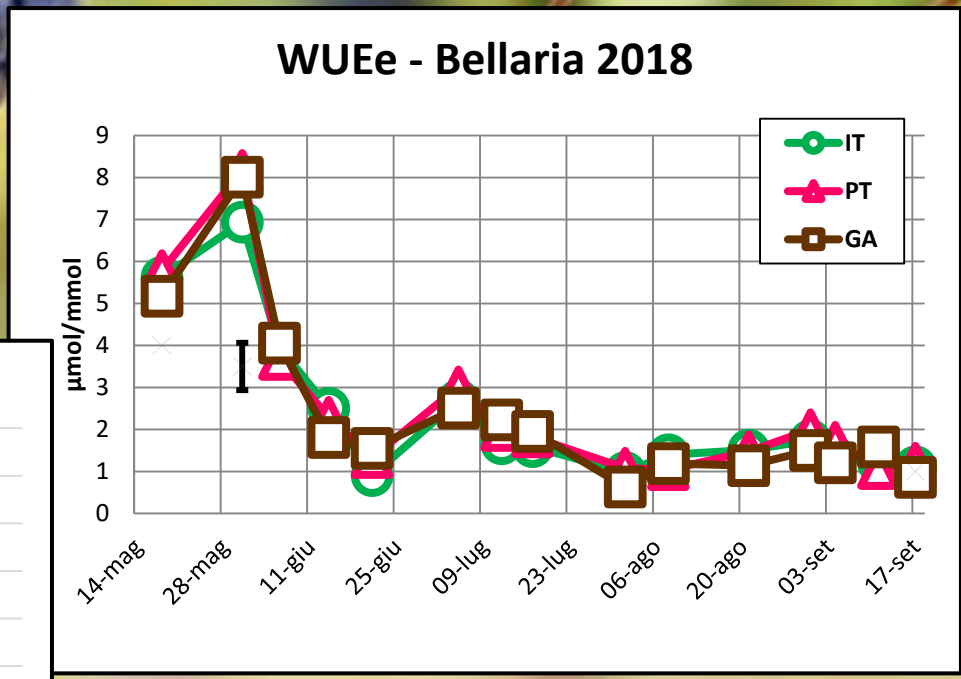
3 gestioni dell'interfilare:

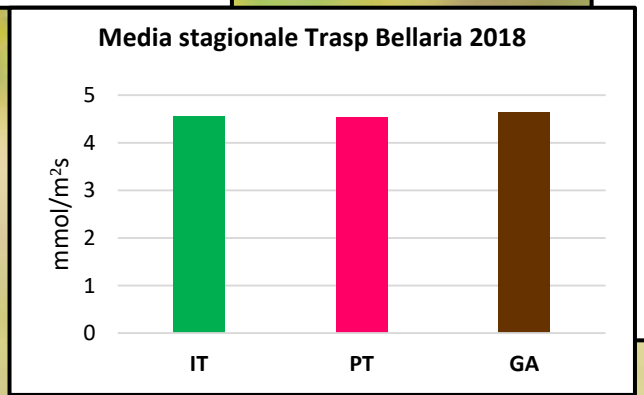
1) INERBIMENTO (I)
2) GESTIONE AZIENDALE (GA)
3) PACCIAMATURA (P)

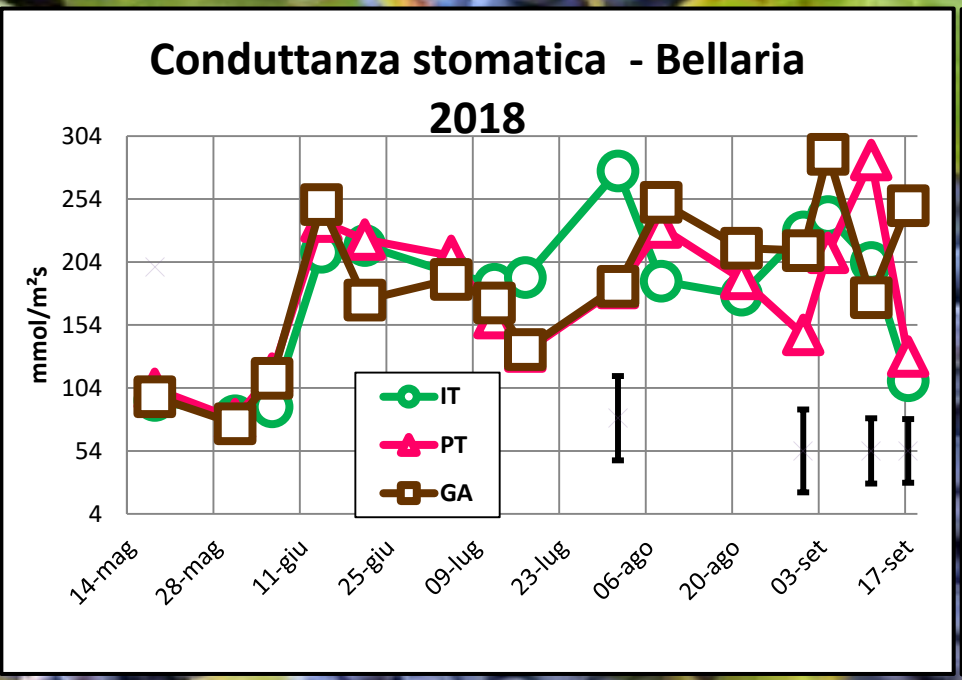

Fotosintesi - Bellaria 2018
IT
PT
GA
µmol/m²s
16,5
14,5
12,5
10,5
8,5
6,5
4,5
2,5
14-mag
28-mag
11-giu
25-giu
09-lug
23-lug
06-ago
20-ago
03-set
17-set

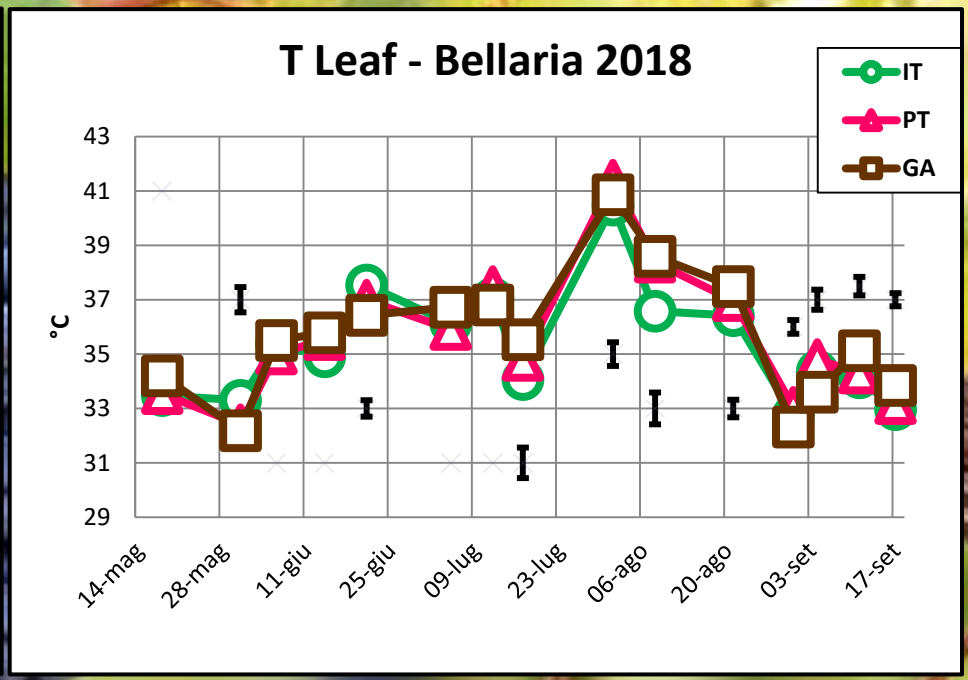

Traspirazione - Bellaria 2018
IT
PT
GA
mmol/m²s
9
8
7
6
5
4
3
2
1
14-mag
28-mag
11-giu
25-giu
09-lug
23-lug
06-ago
20-ago
03-set
17-set

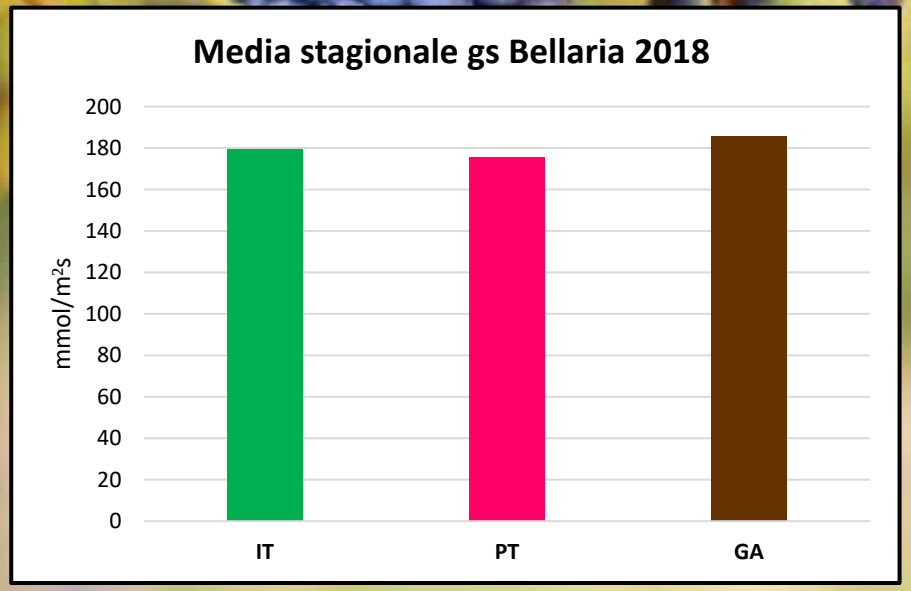

Media stagionale Fotosintesi Bellaria 2018
µmol/m²s
10
8
6
4
2
0
IT
PT
GA

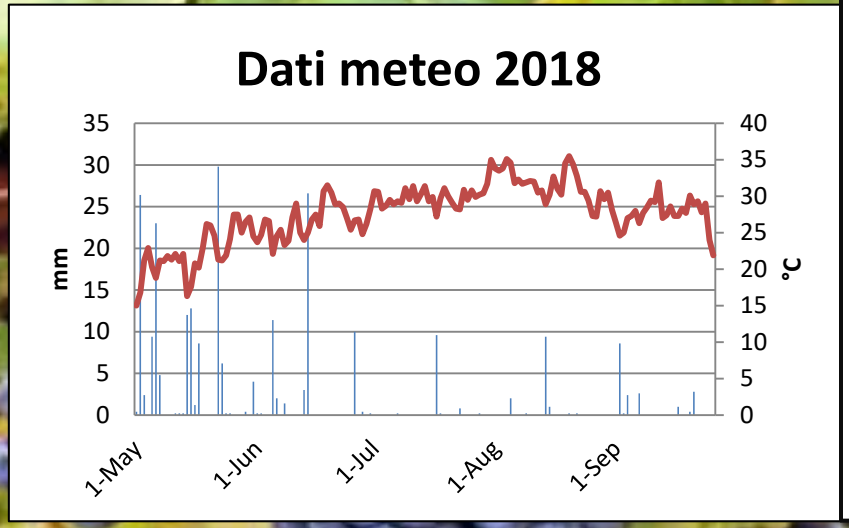

WUEe - Bellaria 2018
IT
PT
GA
µmol/mmol
9
8
7
6
5
4
3
2
1
0
14-mag
28-mag
11-giu
25-giu
09-lug
23-lug
06-ago
20-ago
03-set
17-set

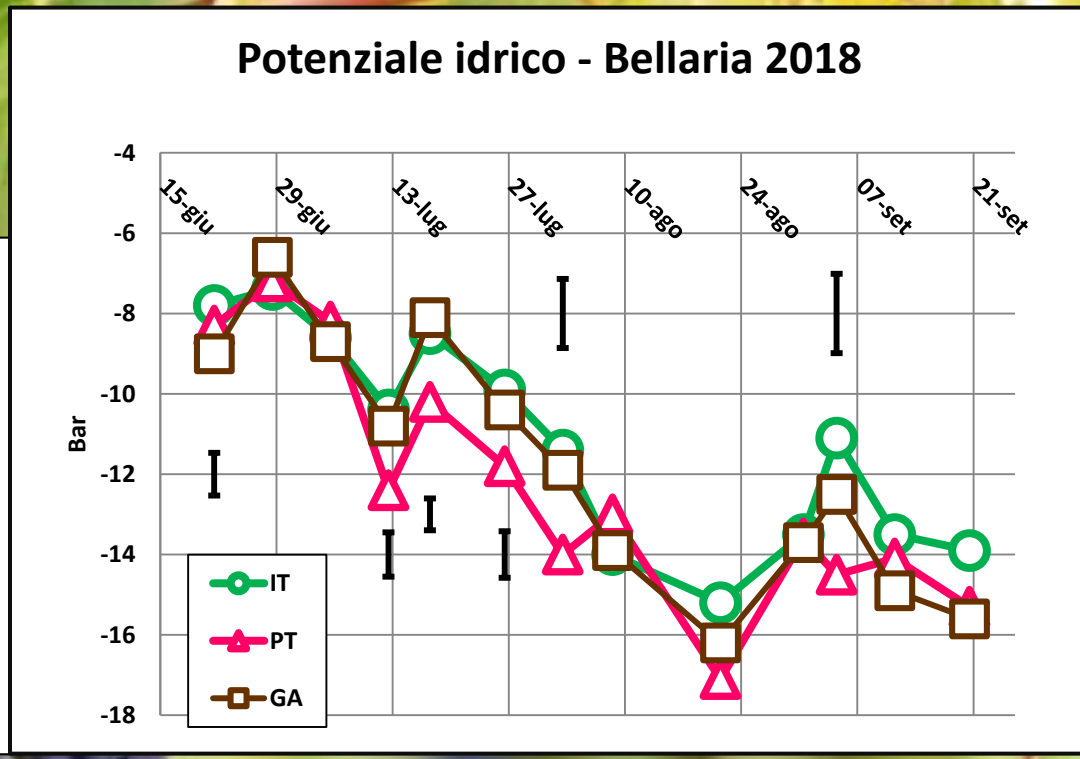

Media stagionale Trasp Bellaria 2018
mmol/m²s
5
4
3
2
1
0
IT
PT
GA

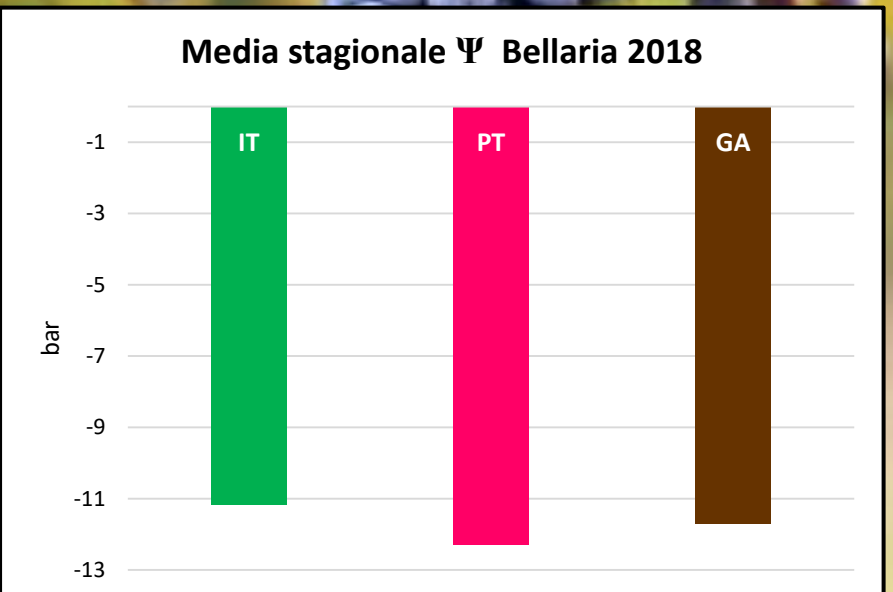

Conduttanza stomatica - Bellaria 2018
mmol/m²s
304
254
204
154
104
54
4
14-mag
28-mag
11-giu
25-giu
09-lug
23-lug
06-ago
20-ago
03-set
17-set
IT
PT
GA

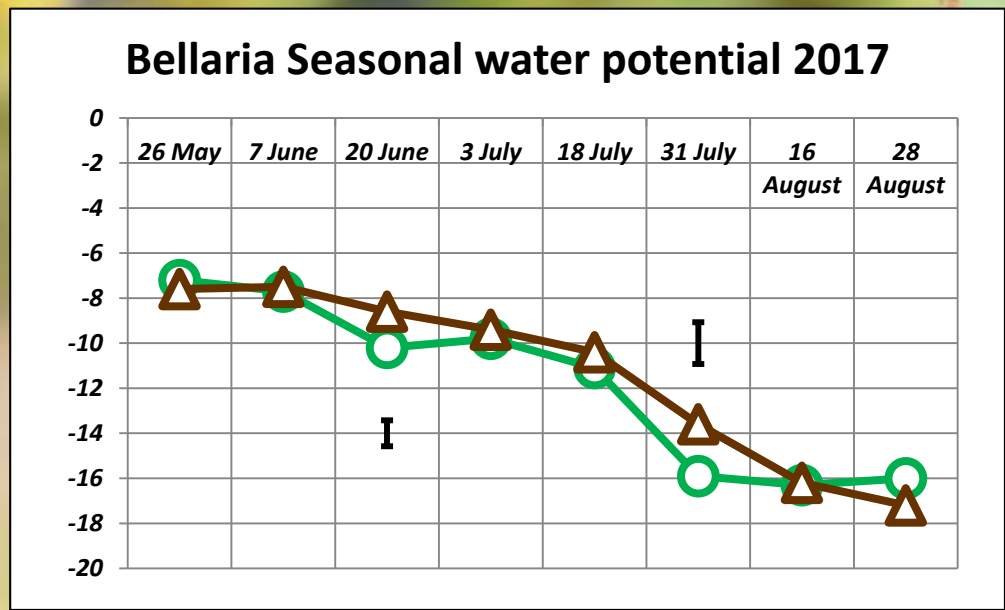

T Leaf - Bellaria 2018
°C
43
41
39
37
35
33
31
29
14-mag
28-mag
11-giu
25-giu
09-lug
23-lug
06-ago
20-ago
03-set
17-set
IT
PT
GA

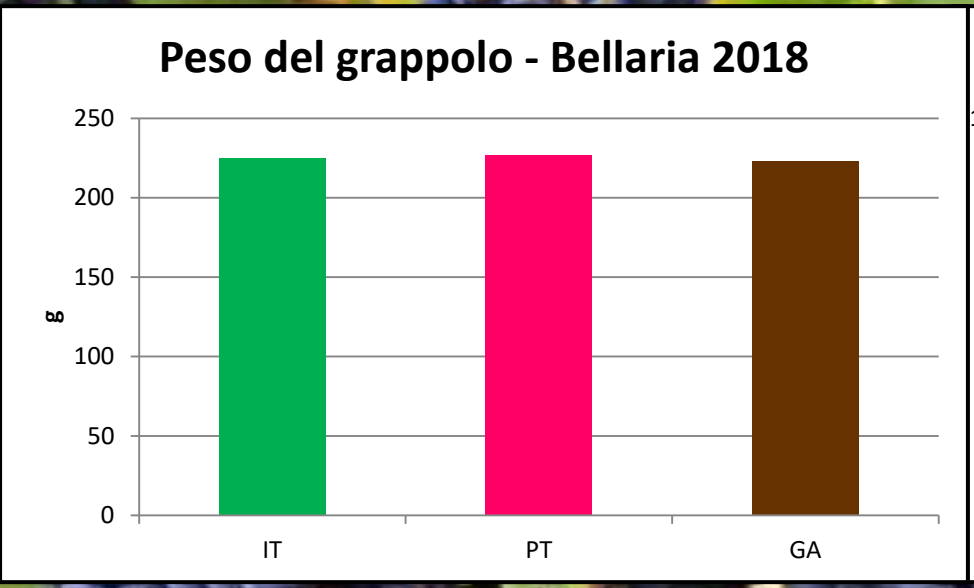

Media stagionale gs Bellaria 2018
mmol/m²s
200
180
160
140
120
100
80
60
40
20
0
IT
PT
GA

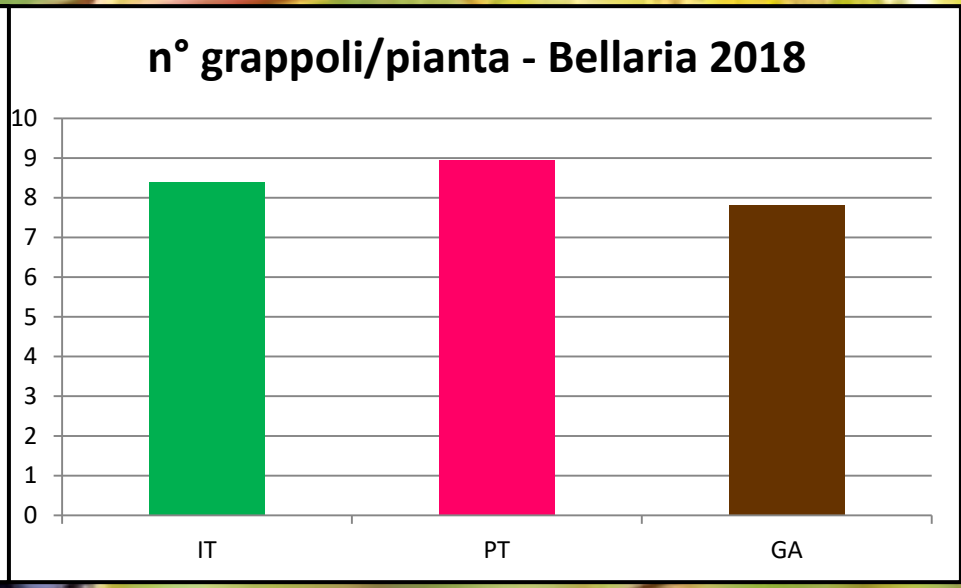

Dati meteo 2018
mm
°C
35
30
25
20
15
10
5
0
40
35
30
25
20
15
10
5
0
1-May
1-Jun
1-Jul
1-Aug
1-Sep

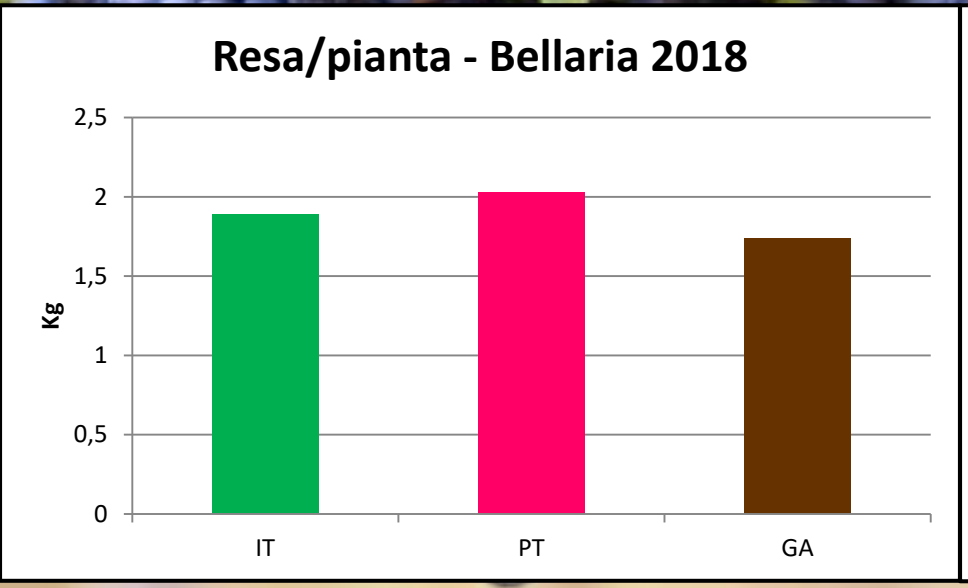

Potenziale idrico - Bellaria 2018
Bar
-4
-6
-8
-10
-12
-14
-16
-18
15-giu
29-giu
13-lug
27-lug
10-ago
24-ago
07-set
21-set
IT
PT
GA

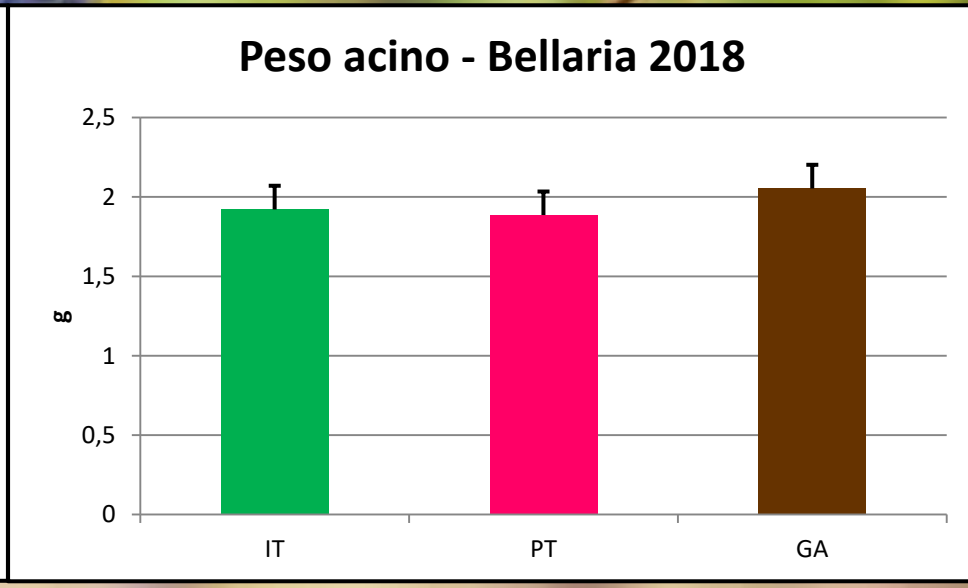

Media stagionale Ψ Bellaria 2018
bar
-1
-3
-5
-7
-9
-11
-13
IT
PT
GA


Bellaria Seasonal water potential 2017
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
26 May
7 June
20 June
3 July
18 July
31 July
16 August
28 August



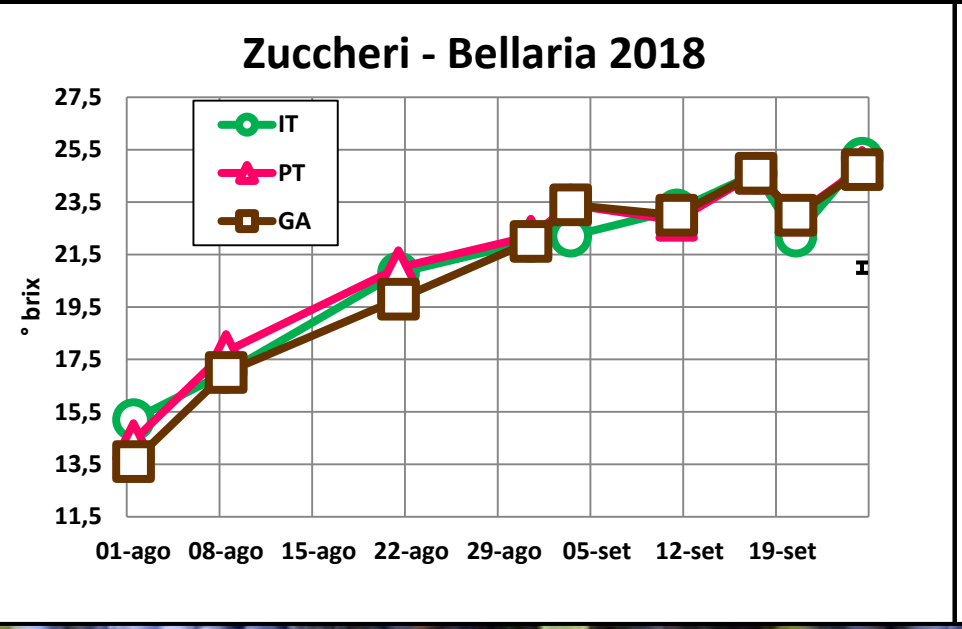


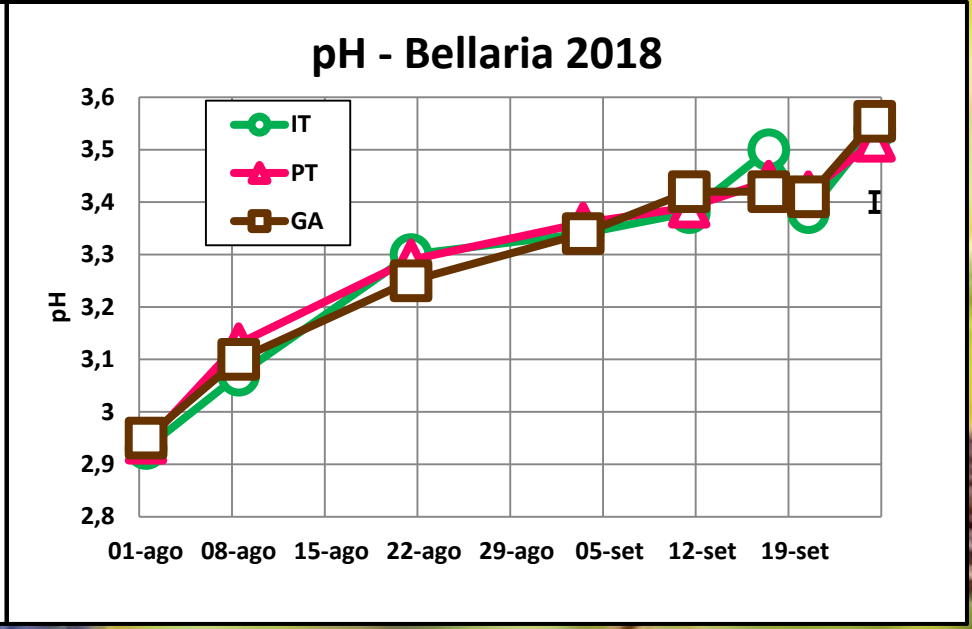


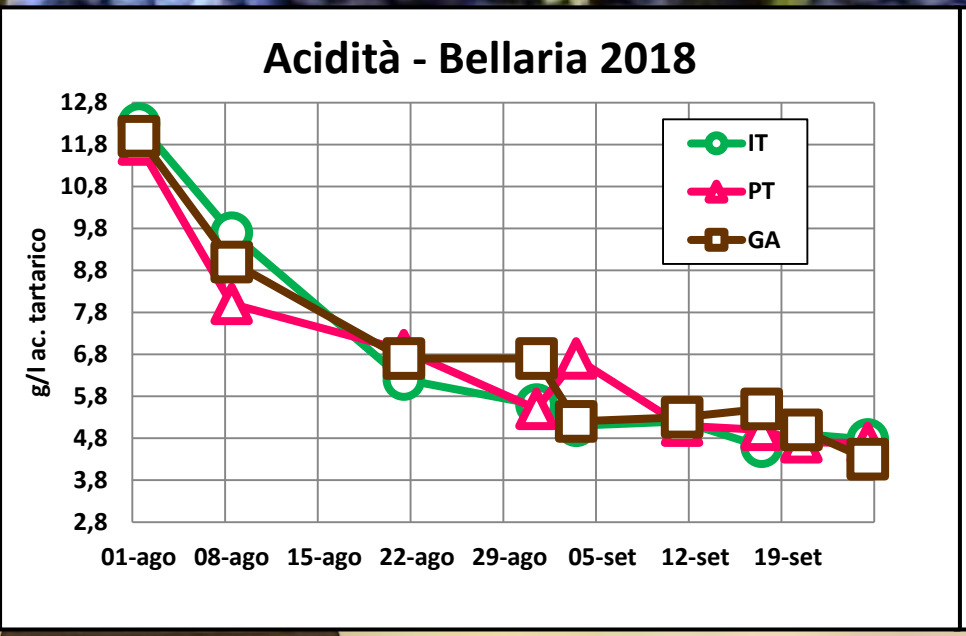


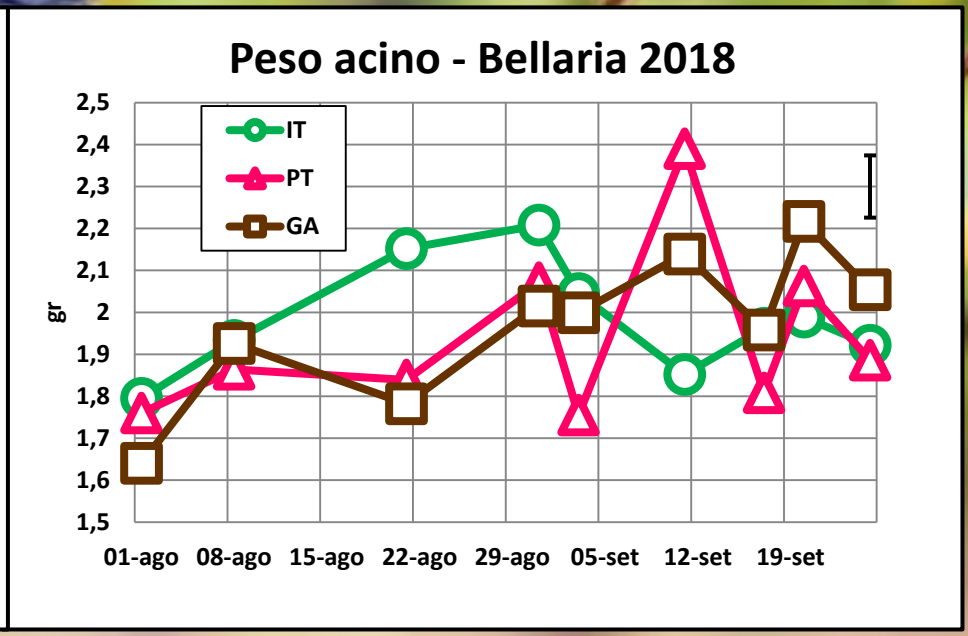
BELLARIA

PT disidratazione acino, potenziale più negativo nel periodo più caldo

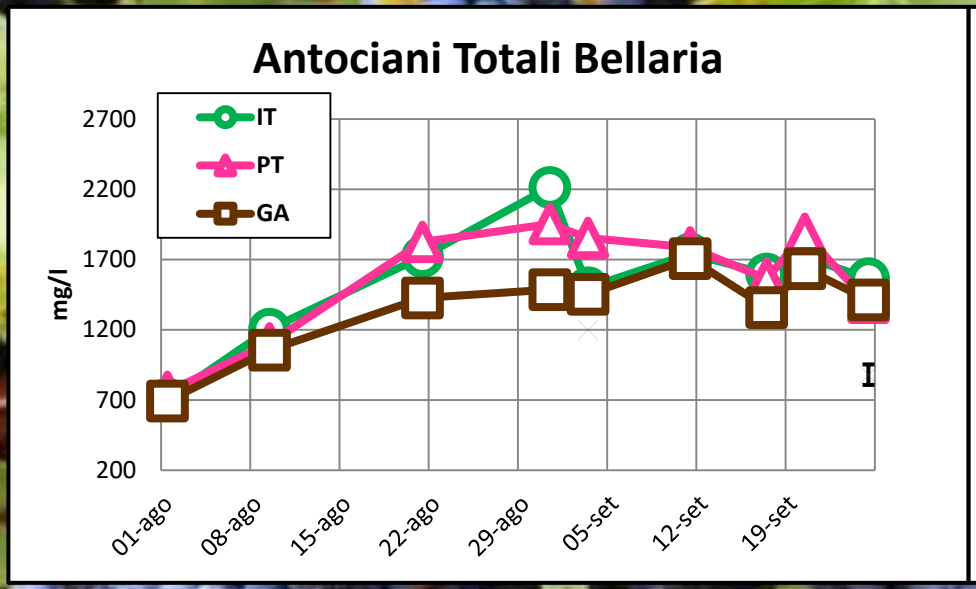

Zuccheri - Bellaria 2018
° brix
27,5
25,5
23,5
21,5
19,5
17,5
15,5
13,5
11,5
01-ago
08-ago
15-ago
22-ago
29-ago
05-set
12-set
19-set
IT
PT
GA

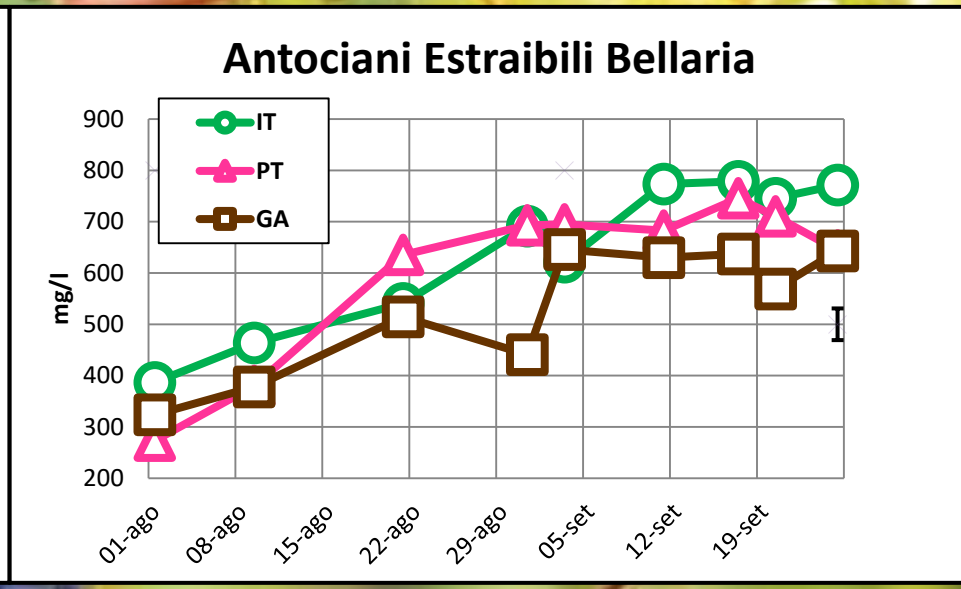

pH - Bellaria 2018
pH
3,6
3,5
3,4
3,3
3,2
3,1
3
2,9
2,8
01-ago
08-ago
15-ago
22-ago
29-ago
05-set
12-set
19-set
IT
PT
GA

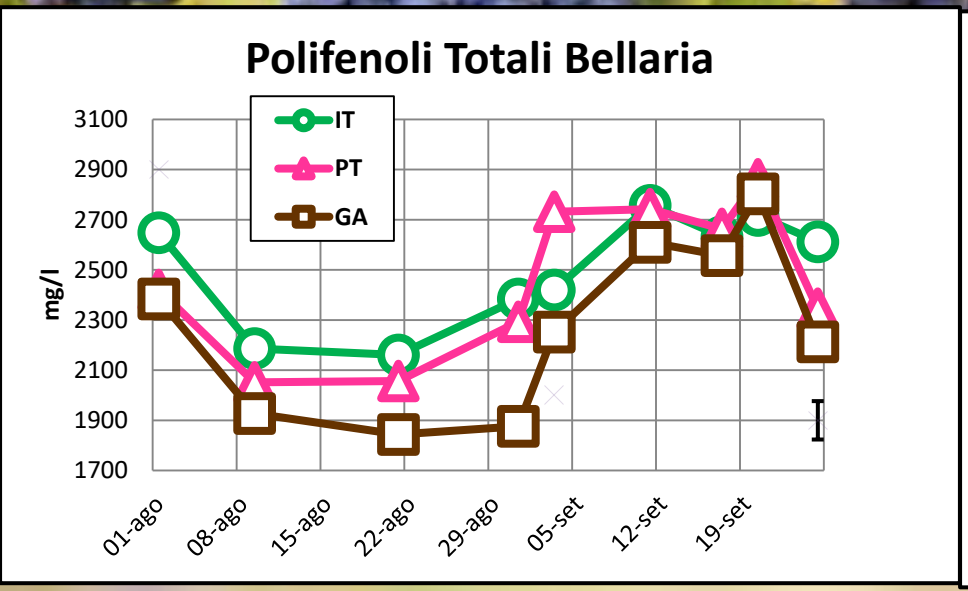

Acidità - Bellaria 2018
g/l ac. tartarico
12,8
11,8
10,8
9,8
8,8
7,8
6,8
5,8
4,8
3,8
2,8
01-ago
08-ago
15-ago
22-ago
29-ago
05-set
12-set
19-set
IT
PT
GA

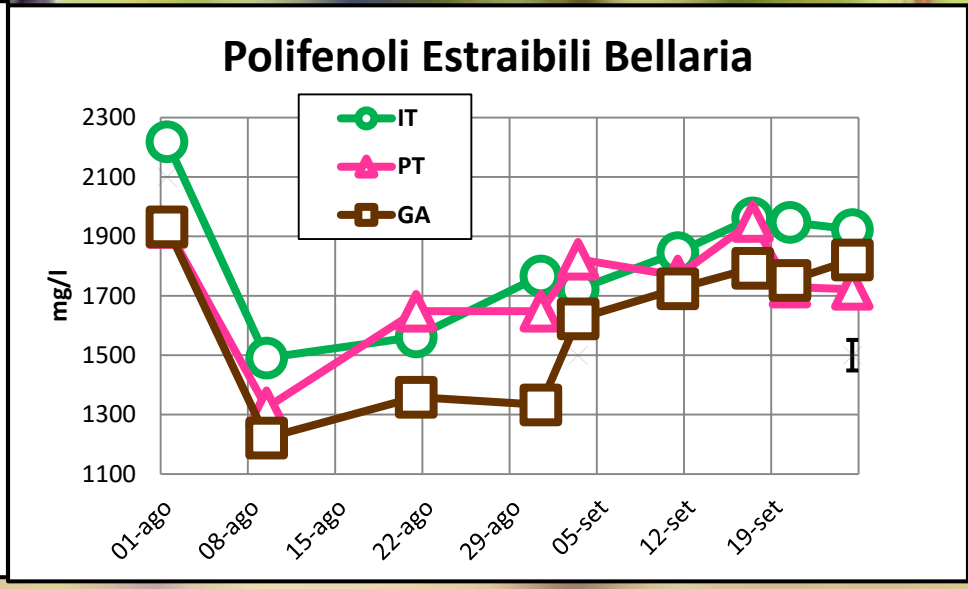

Peso acino - Bellaria 2018
gr
2,5
2,4
2,3
2,2
2,1
2
1,9
1,8
1,7
1,6
1,5
01-ago
08-ago
15-ago
22-ago
29-ago
05-set
12-set
19-set
IT
PT
GA

BELLARIA

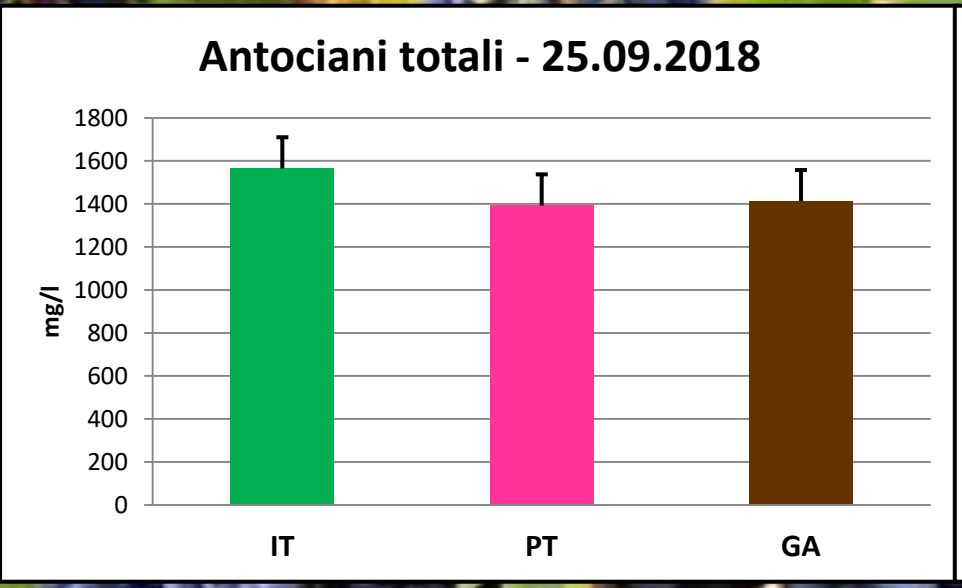

Antociani Totali Bellaria
IT
PT
GA
mg/l
2700
2200
1700
1200
700
200
01-ago
08-ago
15-ago
22-ago
29-ago
05-set
12-set
19-set

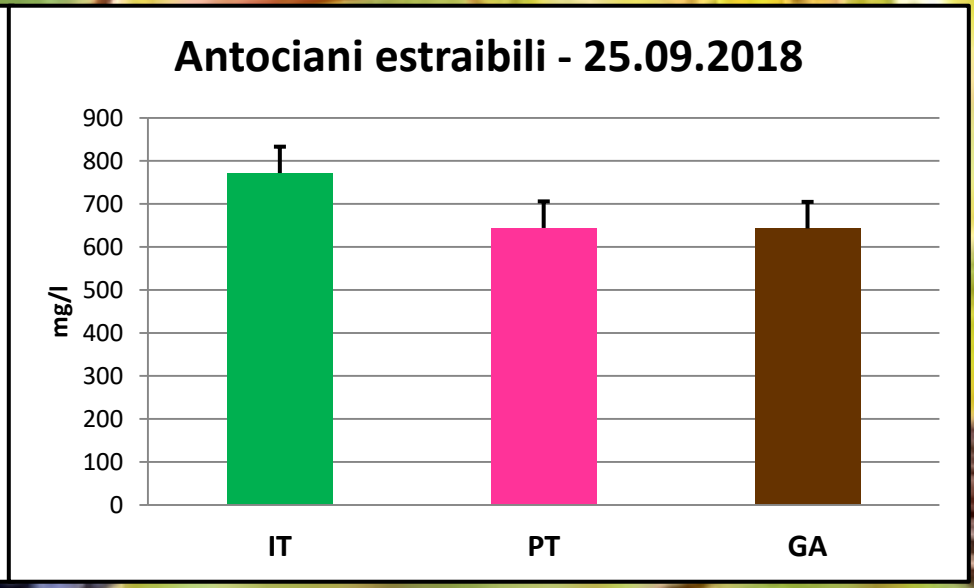

Antociani Estraibili Bellaria
IT
PT
GA
mg/l
900
800
700
600
500
400
300
200
01-ago
08-ago
15-ago
22-ago
29-ago
05-set
12-set
19-set

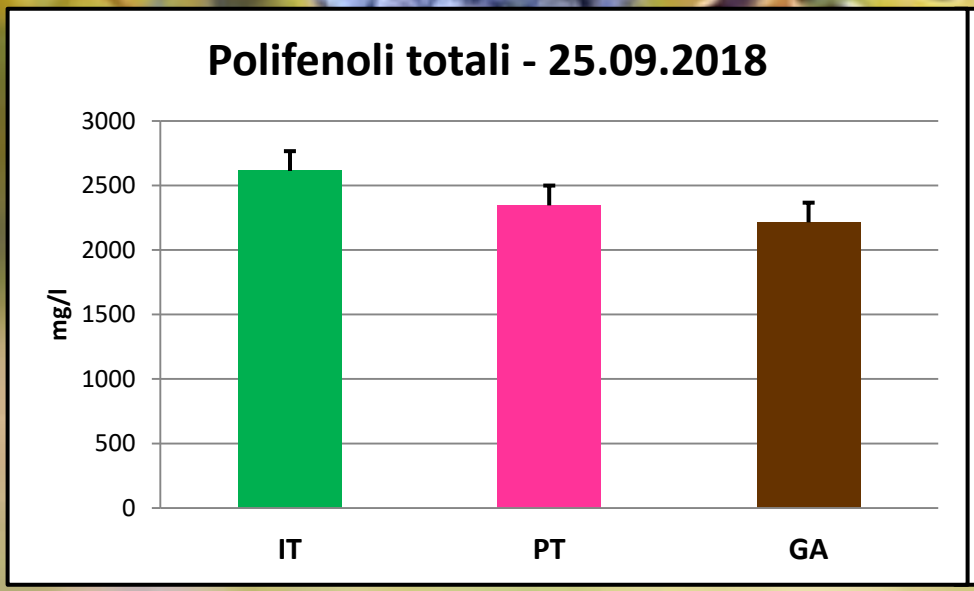

Polifenoli Totali Bellaria
IT
PT
GA
mg/l
3100
2900
2700
2500
2300
2100
1900
1700
01-ago
08-ago
15-ago
22-ago
29-ago
05-set
12-set
19-set

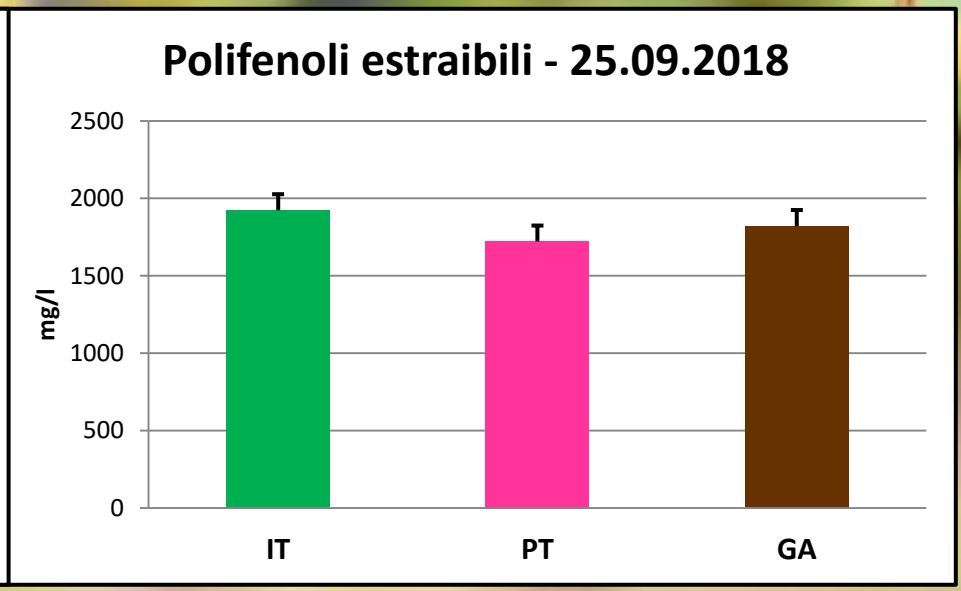

Polifenoli Estraibili Bellaria
IT
PT
GA
mg/l
2300
2100
1900
1700
1500
1300
1100
01-ago
08-ago
15-ago
22-ago
29-ago
05-set
12-set
19-set

Phenolic Analysis









	BELLARIA 2017							
	Brix	pH	Acidity g/L tartaric acid	Berry weight g	Tot Anth mg/L	Extr Anth mg/L	Tot Poly mg/L	Extr Poly mg/L
GA	27,2	3,4	5,5	1,29	1646	645	2712	2337
IT	27,33	3,5	5,9	1,16	1917	735	2899	2344
lsd	ns	ns	0,3	ns	178	90	ns	ns

	BELLARIA							
	Brix	pH	Acidity g/L tartaric acid	Berry weight g	Tot Anth mg/L	Extr Anth mg/L	Tot Poly mg/L	Extr Poly mg/L
IT	25,17	3,5	4,8	1,92	1565	772	2612	1923
PT	24,83	3,5	4,7	1,89	1392	644	2345	1722
GA	24,74	3,6	4,3	2,05	1413	643	2213	1821
lsd	0,197	0,02	ns	0,07	72,6	31	76,6	51,5

BELLARIA Conclusions

- No difference in the hottest time (gas exchange)
- PT more water stress
- GA highest berry weight
- IT highest sugars
- IT best treatment for anthocyanins and polyphenols accumulation

MASSETO

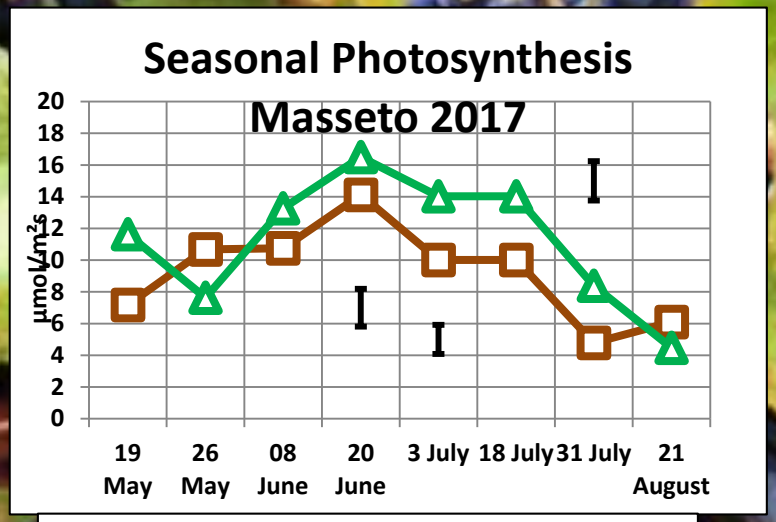
Ettari: 6,63
Varietà: Merlot
Densità: 3,00x0,85
Anno impianto: 1984
Allevamento: cordone speronato
Suolo: Argille limose sottili e brecce

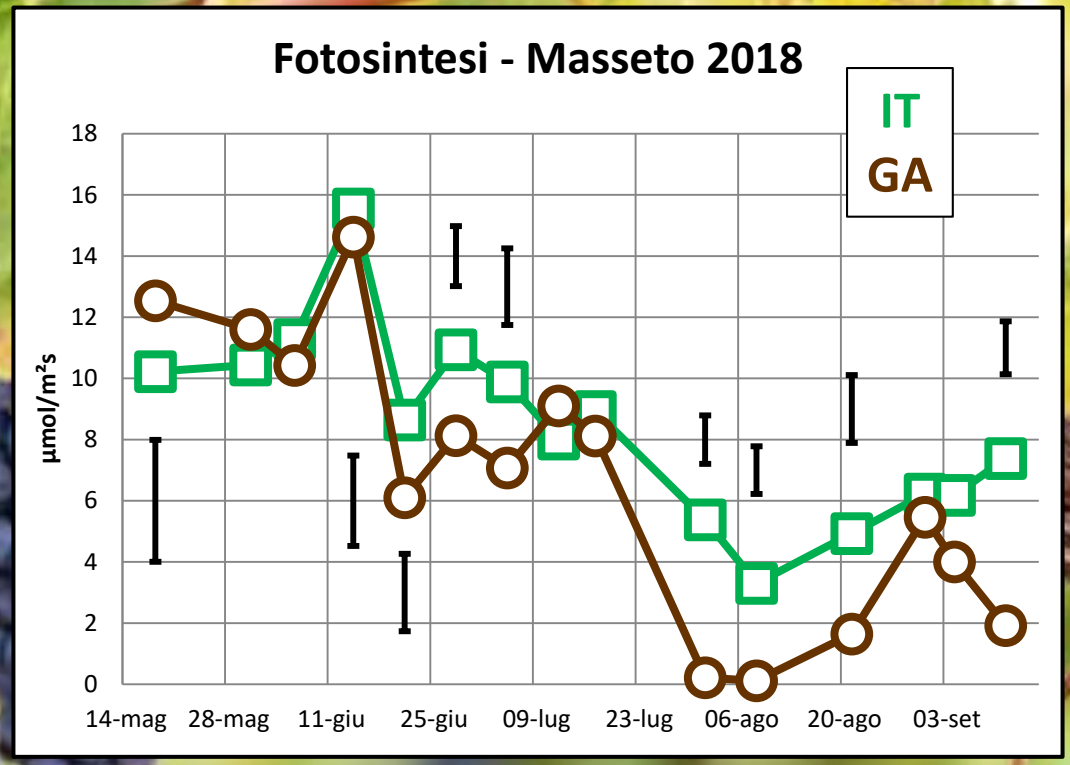
<u>Masseto</u>

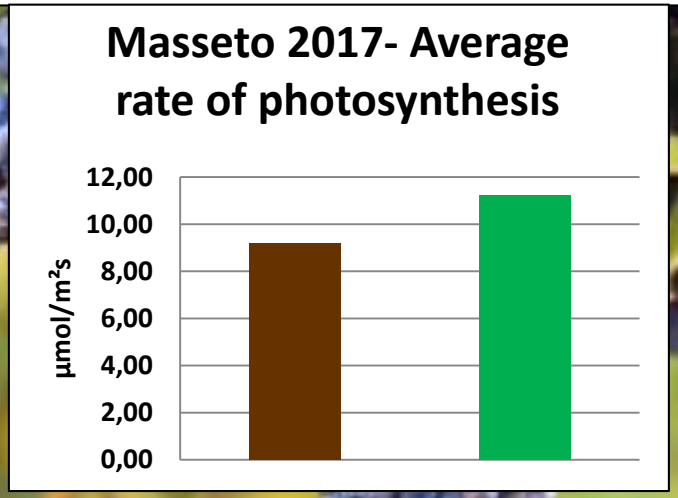
2 gestioni dell'interfilare:

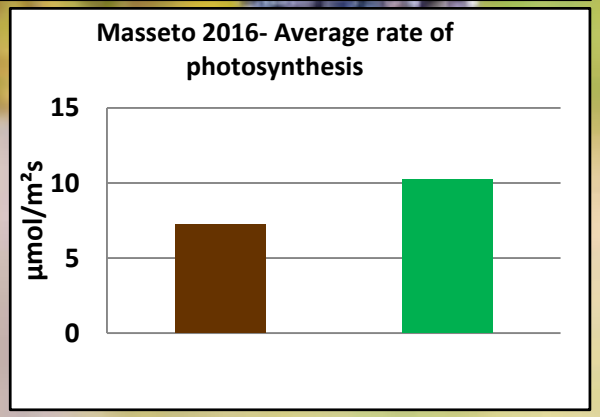
1) INERBIMENTO (IT)

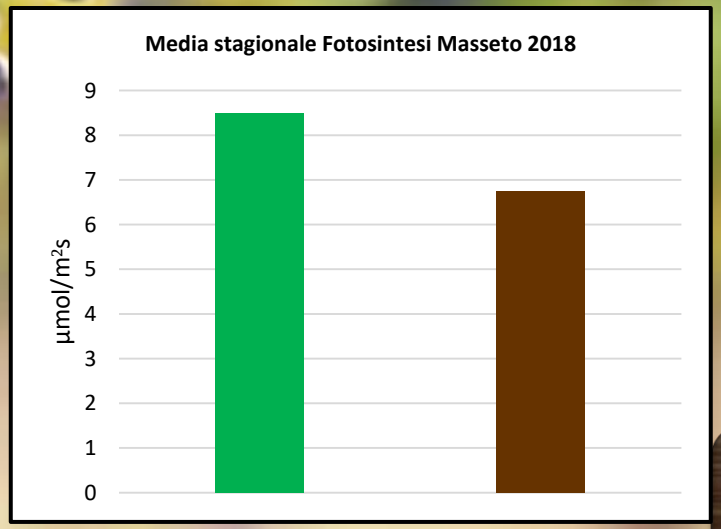
2) GESTIONE AZIENDALE (GA)


Seasonal Photosynthesis
Masseto 2017
µmol/m²s
20
18
16
14
12
10
8
6
4
2
0
19 May
26 May
08 June
20 June
3 July
18 July
31 July
21 August

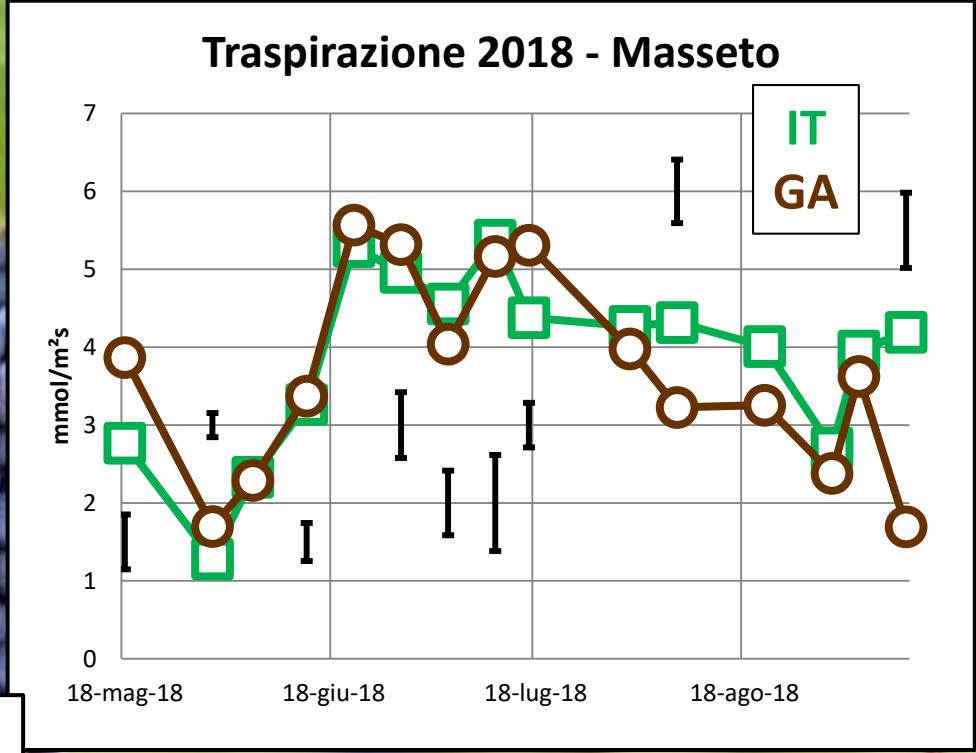

Fotosintesi - Masseto 2018
IT
GA
µmol/m²s
18
16
14
12
10
8
6
4
2
0
14-mag
28-mag
11-giu
25-giu
09-lug
23-lug
06-ago
20-ago
03-set

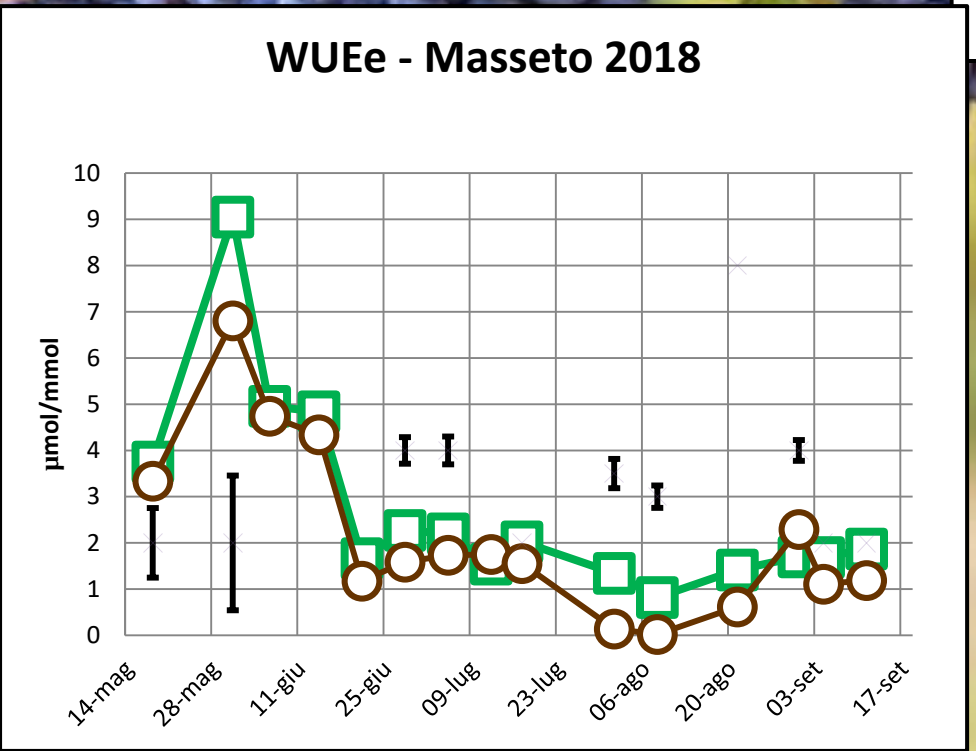

Masseto 2017- Average rate of photosynthesis
µmol/m²s
12,00
10,00
8,00
6,00
4,00
2,00
0,00

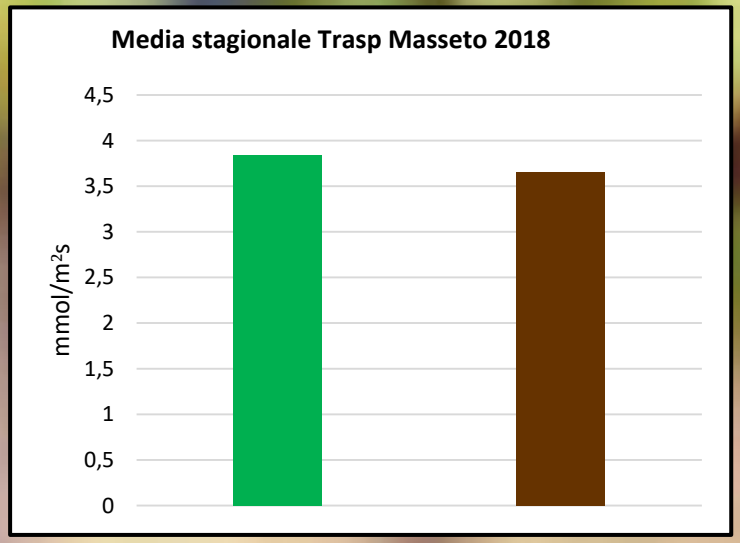

Masseto 2016- Average rate of photosynthesis
µmol/m²s
15
10
5
0

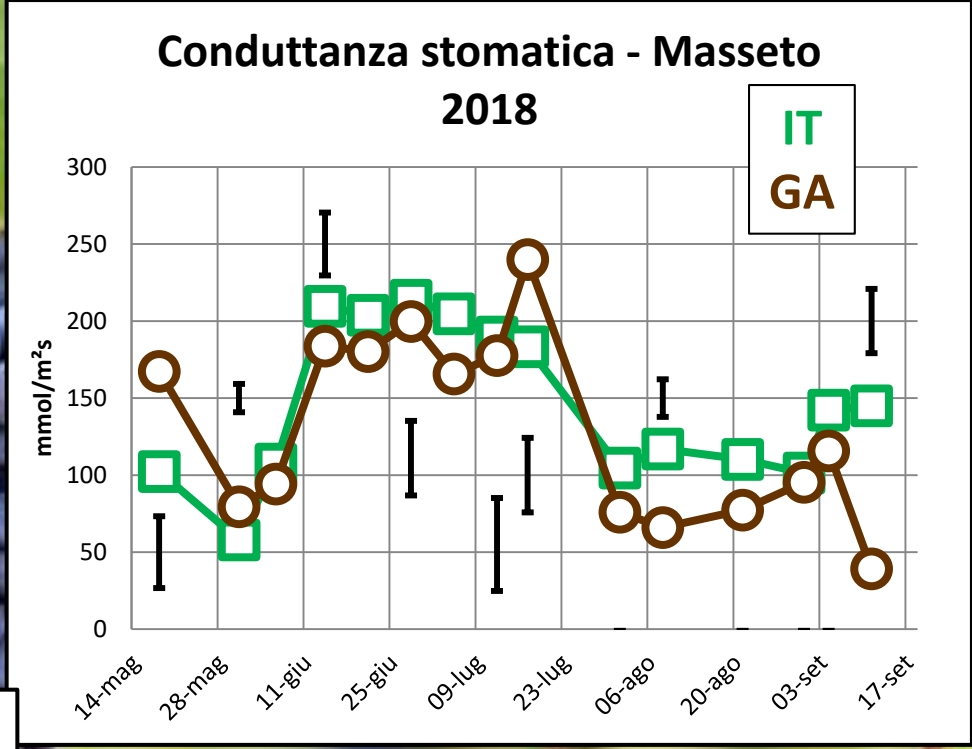

Media stagionale Fotosintesi Masseto 2018
µmol/m²s
9
8
7
6
5
4
3
2
1
0

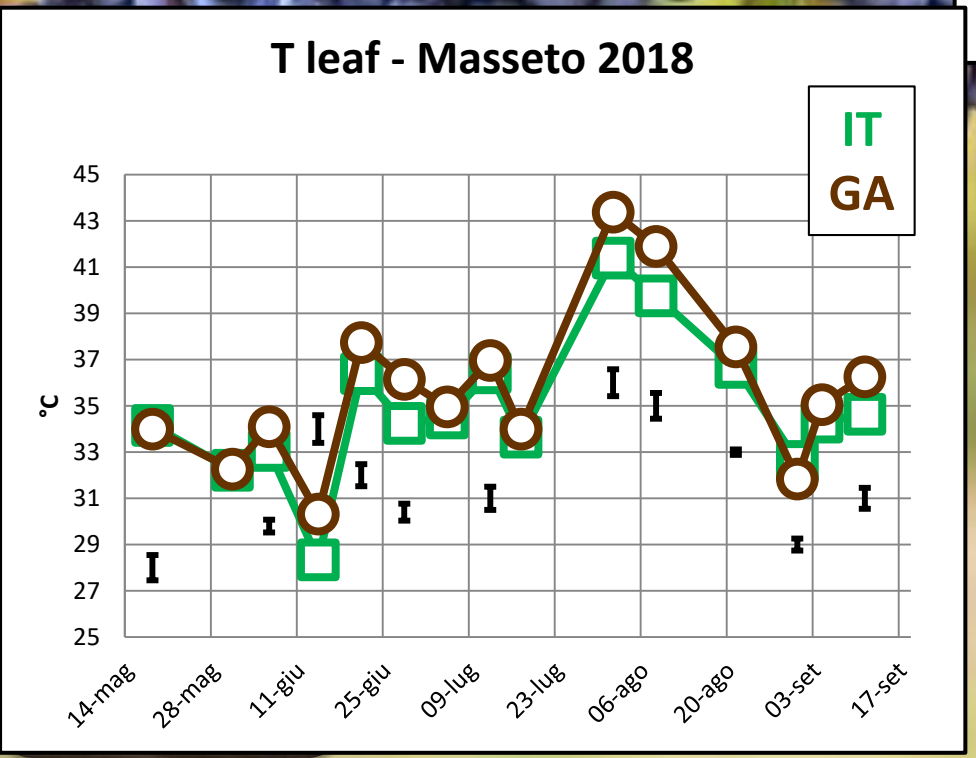
MASSETO

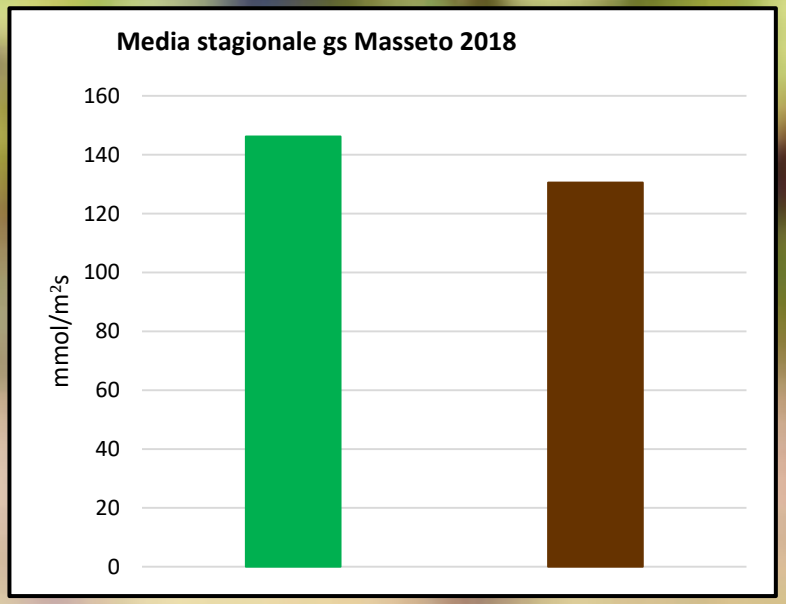

Traspirazione 2018 - Masseto
IT
GA
mmol/m²s
0
1
2
3
4
5
6
7
18-mag-18
18-giu-18
18-lug-18
18-ago-18

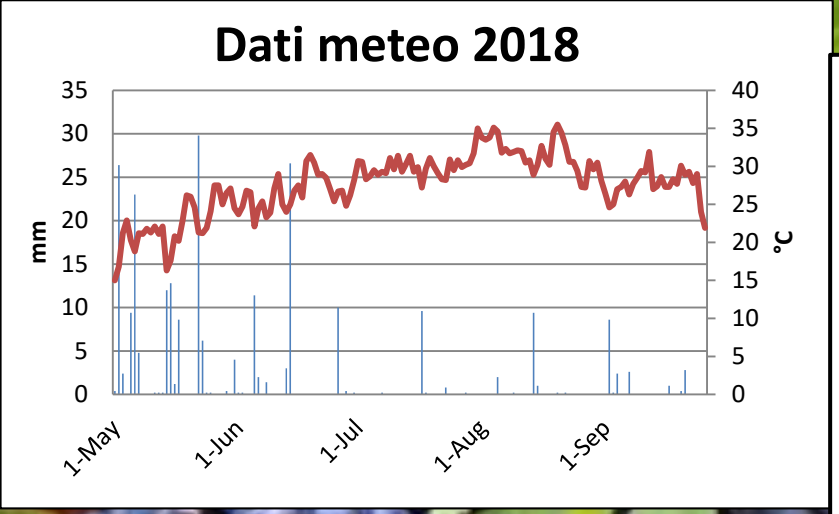

WUEe - Masseto 2018
µmol/mmol
0
1
2
3
4
5
6
7
8
9
10
14-mag
28-mag
11-giu
25-giu
09-lug
23-lug
06-ago
20-ago
03-set
17-set

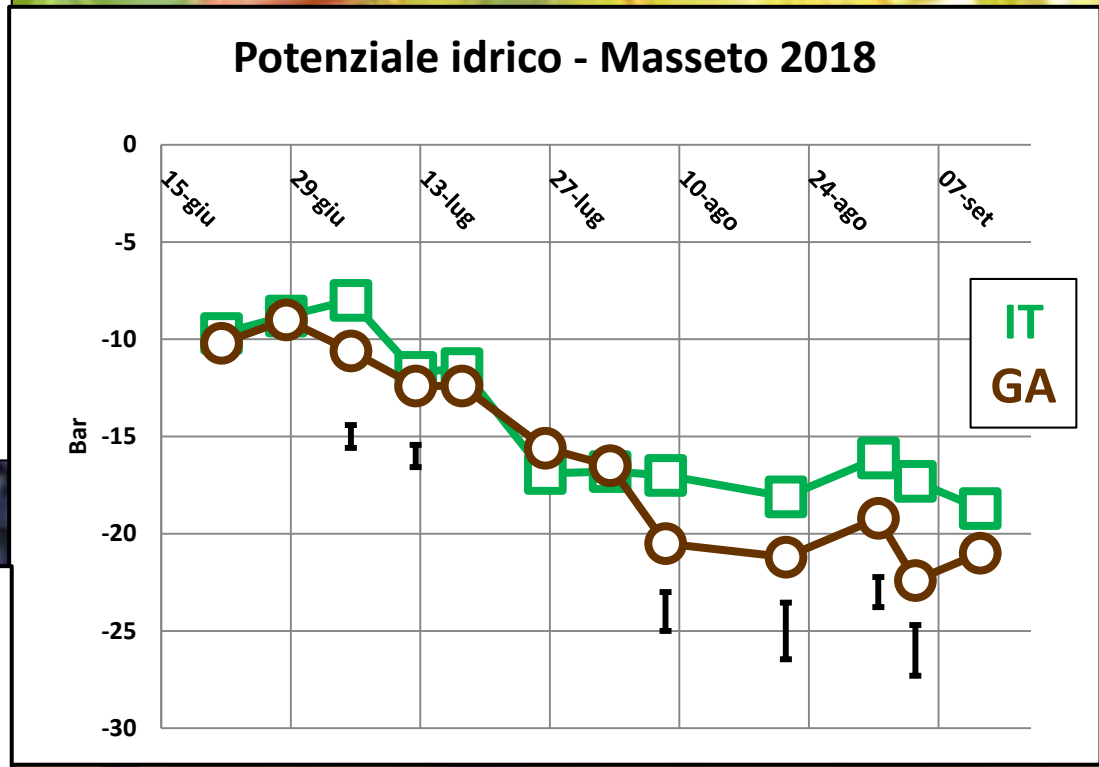

Media stagionale Trasp Masseto 2018
mmol/m²s
0
0,5
1
1,5
2
2,5
3
3,5
4
4,5

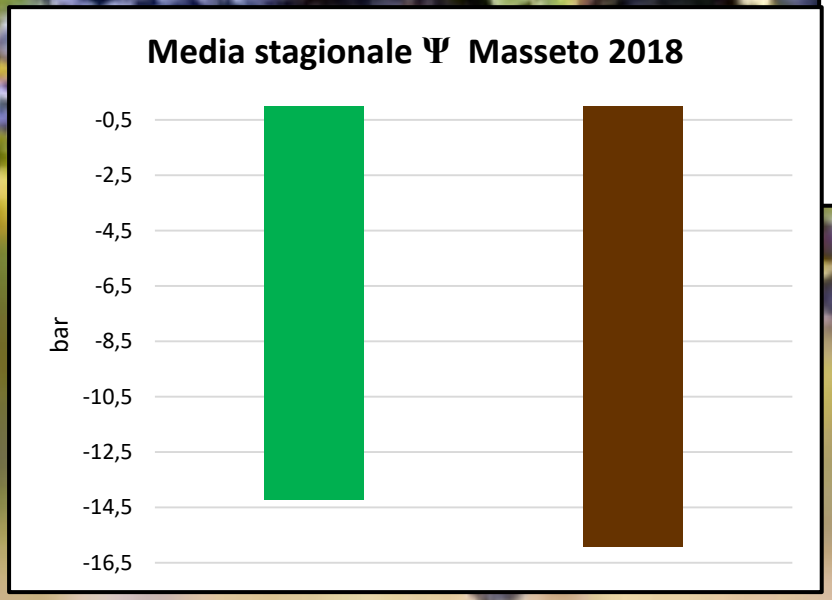

Conduttanza stomatica - Masseto 2018
IT
GA
mmol/m²s
300
250
200
150
100
50
0
14-mag
28-mag
11-giu
25-giu
09-lug
23-lug
06-ago
20-ago
03-set
17-set

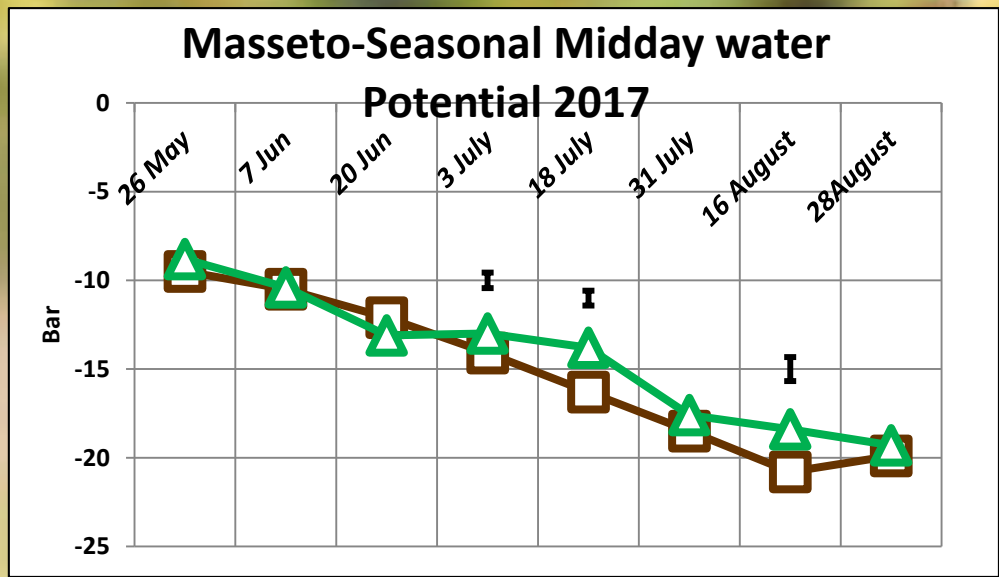

T leaf - Masseto 2018
IT
GA
°C
45
43
41
39
37
35
33
31
29
27
25
14-mag
28-mag
11-giu
25-giu
09-lug
23-lug
06-ago
20-ago
03-set
17-set


Media stagionale gs Masseto 2018
mmol/m²s
160
140
120
100
80
60
40
20
0

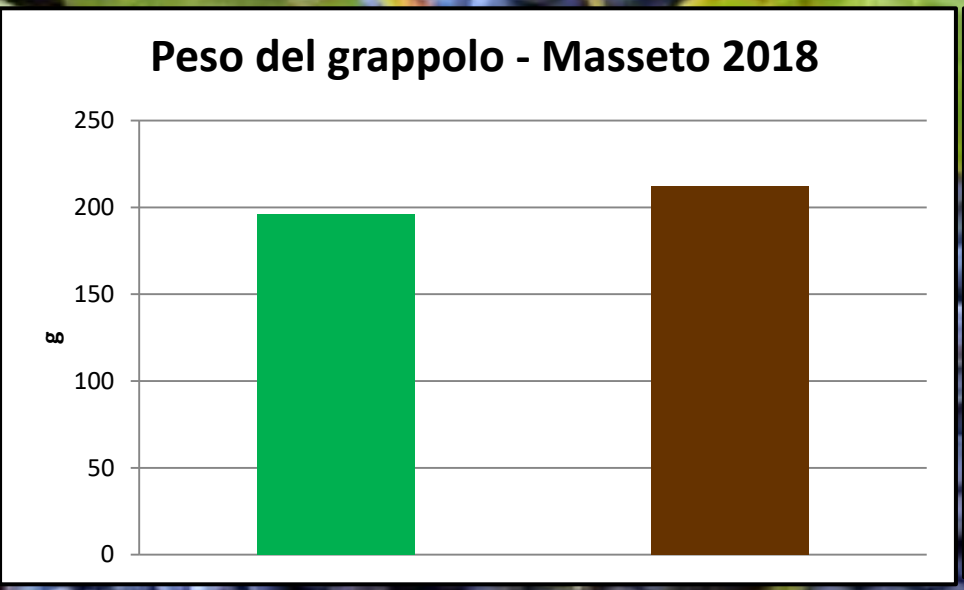

Dati meteo 2018
mm
°C
35
30
25
20
15
10
5
0
40
35
30
25
20
15
10
5
0
1-May
1-Jun
1-Jul
1-Aug
1-Sep

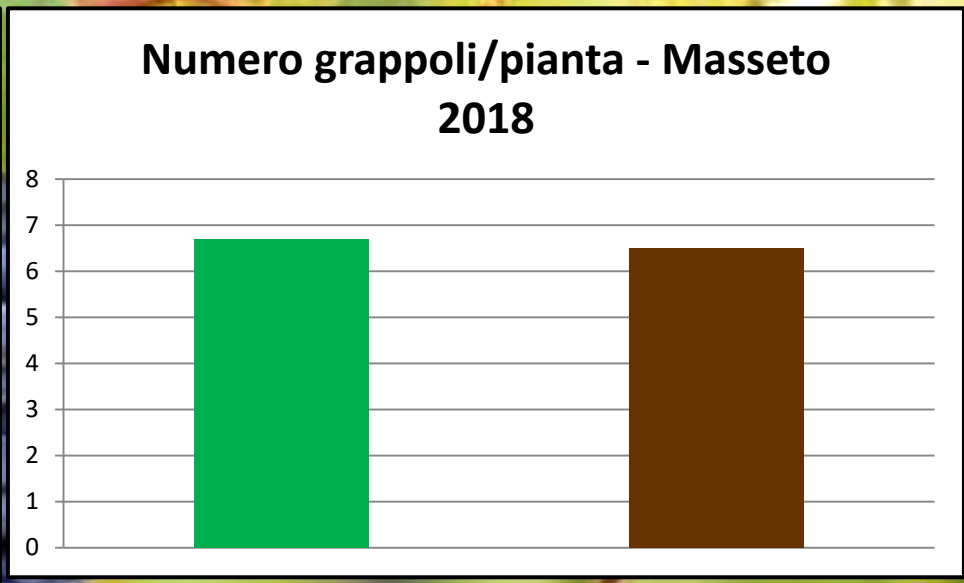

Potenziale idrico - Masseto 2018
Bar
0
-5
-10
-15
-20
-25
-30
15-giu
29-giu
13-lug
27-lug
10-ago
24-ago
07-set
IT
GA

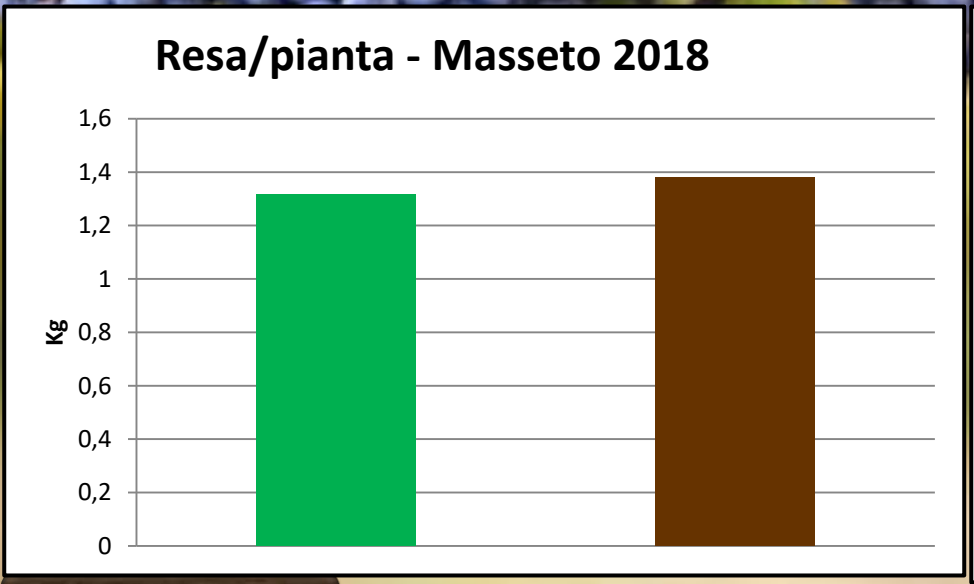

Media stagionale Ψ Masseto 2018
bar
-0,5
-2,5
-4,5
-6,5
-8,5
-10,5
-12,5
-14,5
-16,5

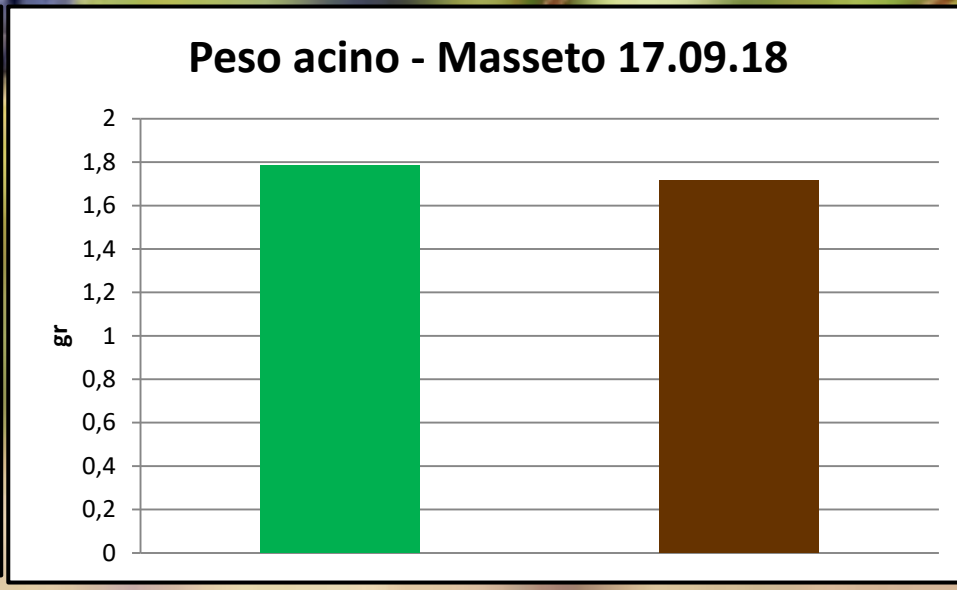

Masseto-Seasonal Midday water Potential 2017
Bar
0
-5
-10
-15
-20
-25
26 May
7 Jun
20 Jun
3 July
18 July
31 July
16 August
28August

MASSETO


Peso del grappolo - Masseto 2018
250
200
150
100
50
0
g


Numero grappoli/pianta - Masseto 2018
8
7
6
5
4
3
2
1
0

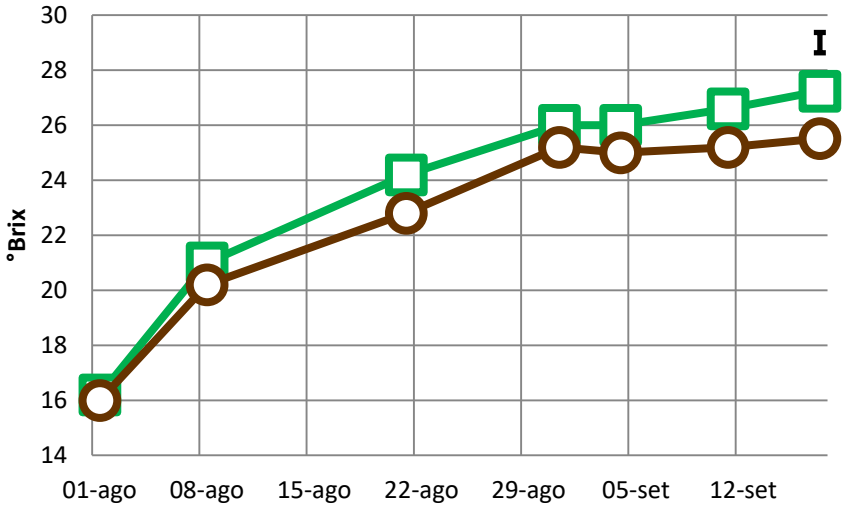

Resa/pianta - Masseto 2018
1,6
1,4
1,2
1
0,8
0,6
0,4
0,2
0
Kg


Peso acino - Masseto 17.09.18
2
1,8
1,6
1,4
1,2
1
0,8
0,6
0,4
0,2
0
gr

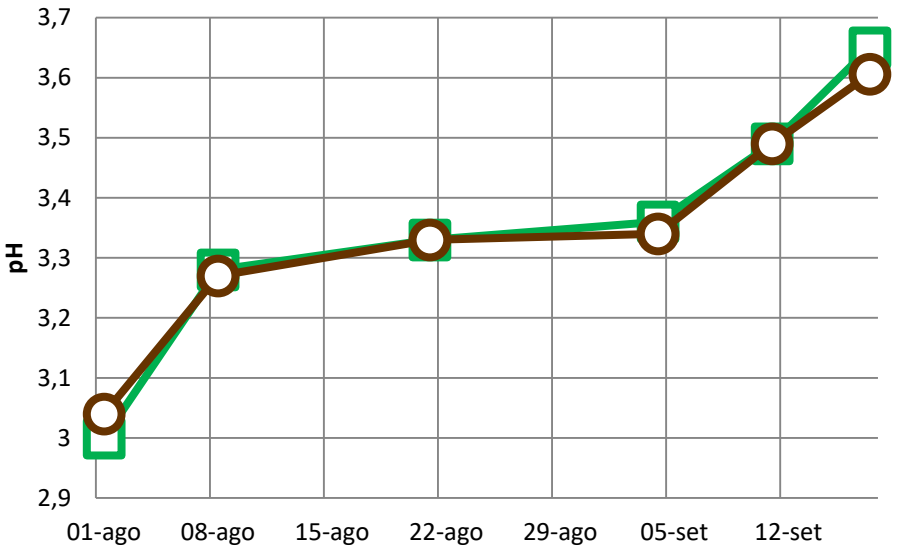
MASSETO

Technological Analysis

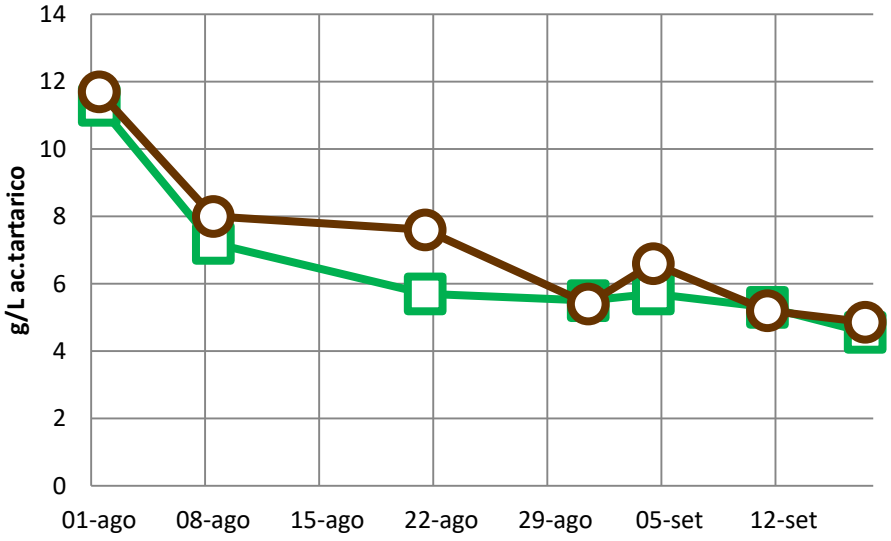
Contenuto zuccherino 2018 - Masseto



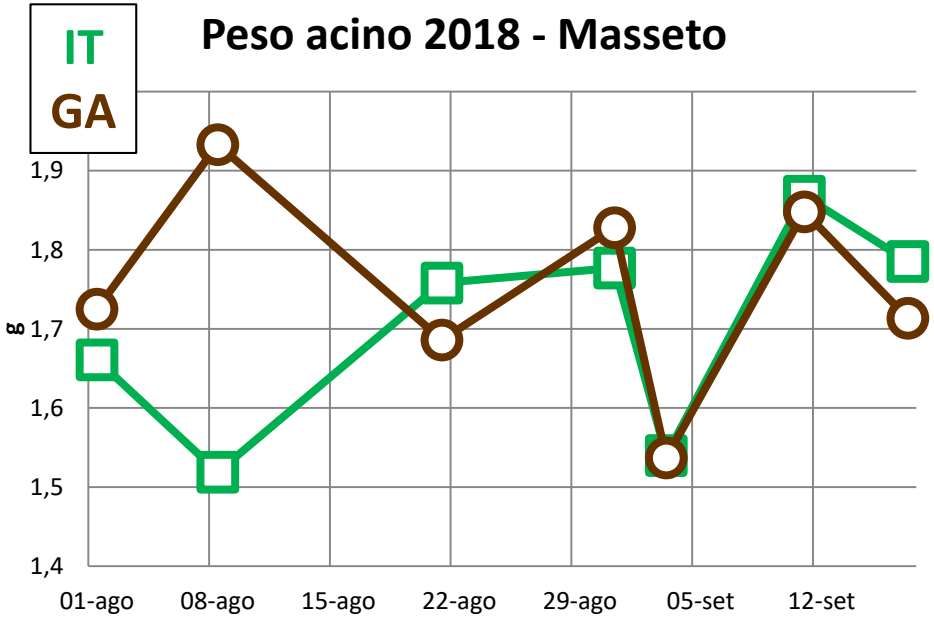
pH 2018 - Masseto

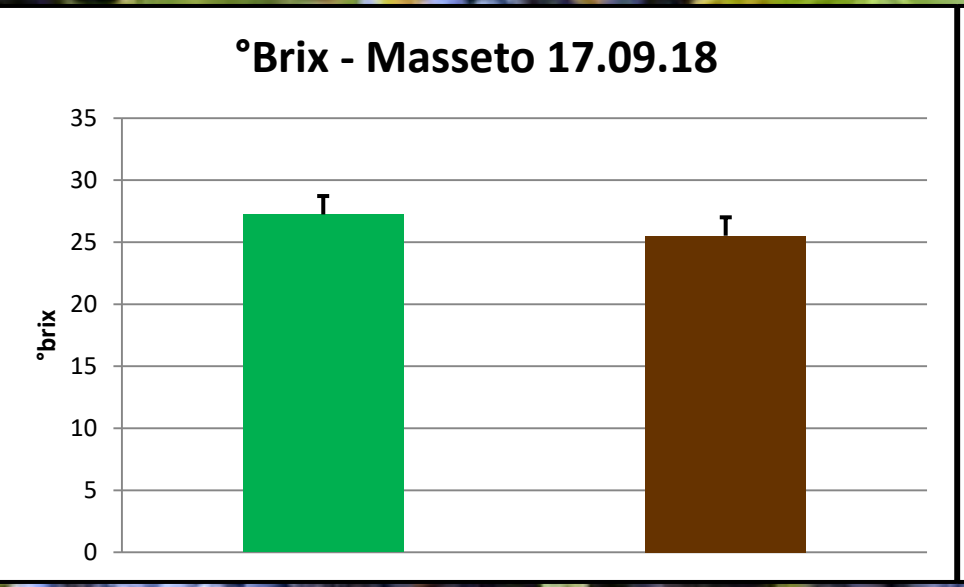


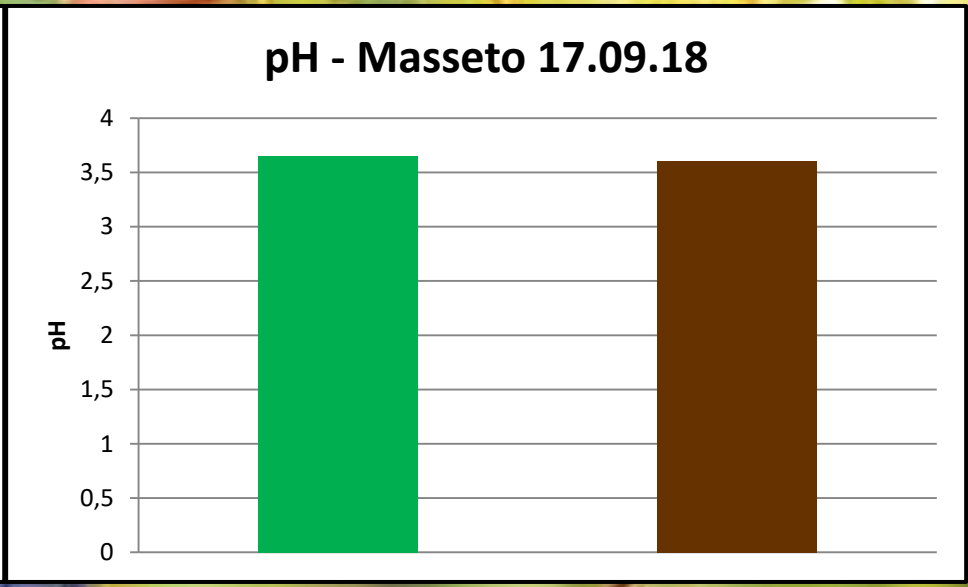
Acidità totale 2018 - Masseto

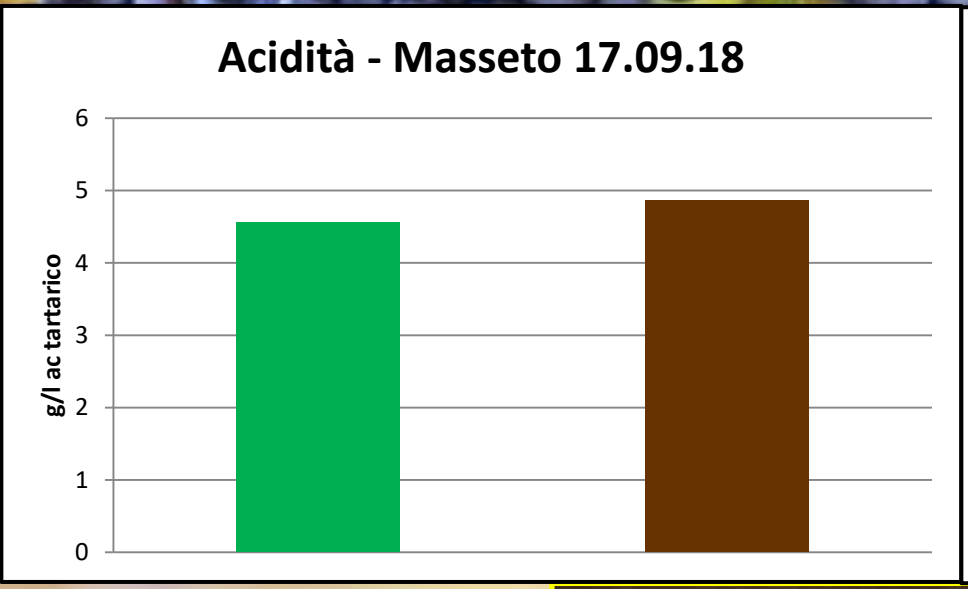


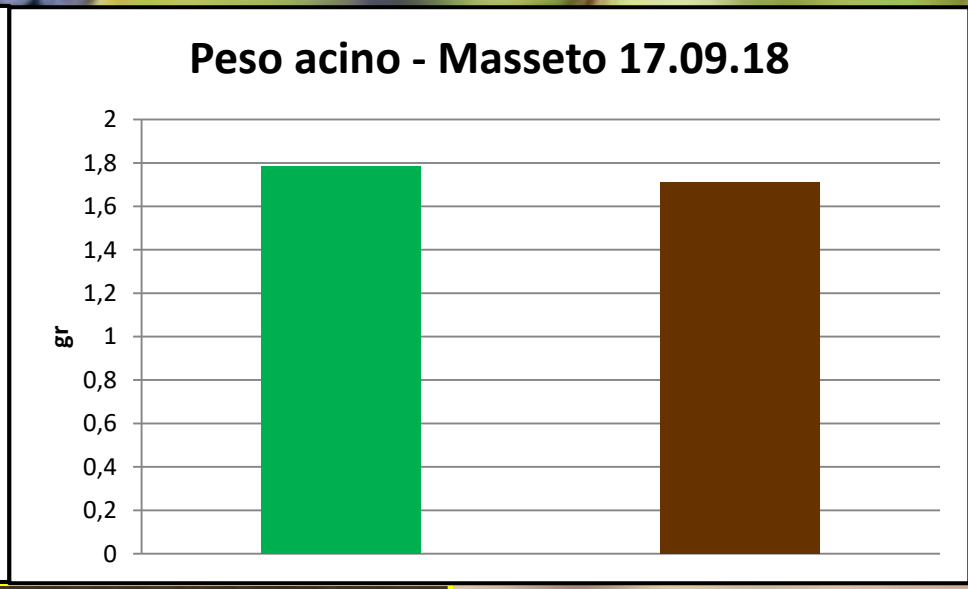
Peso acino 2018 - Masseto







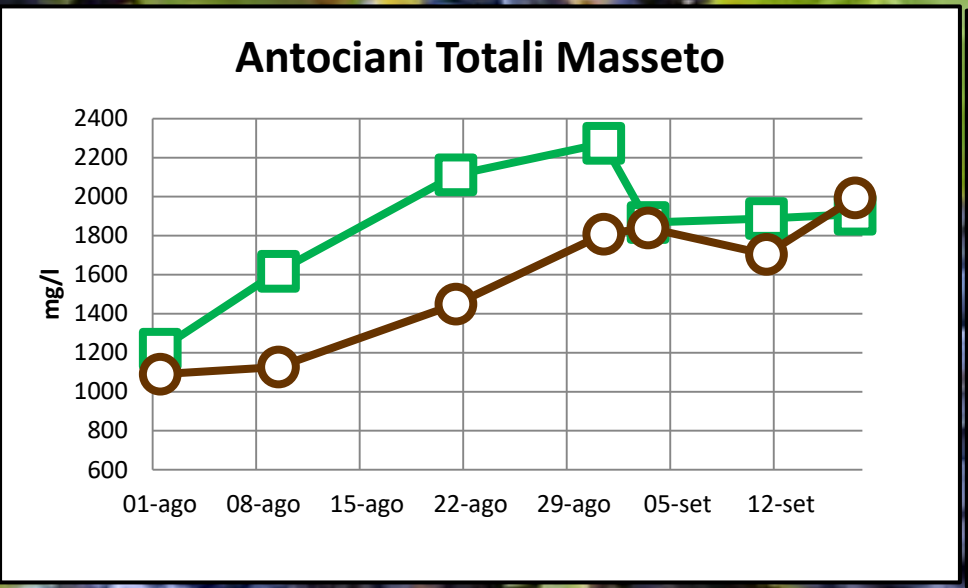


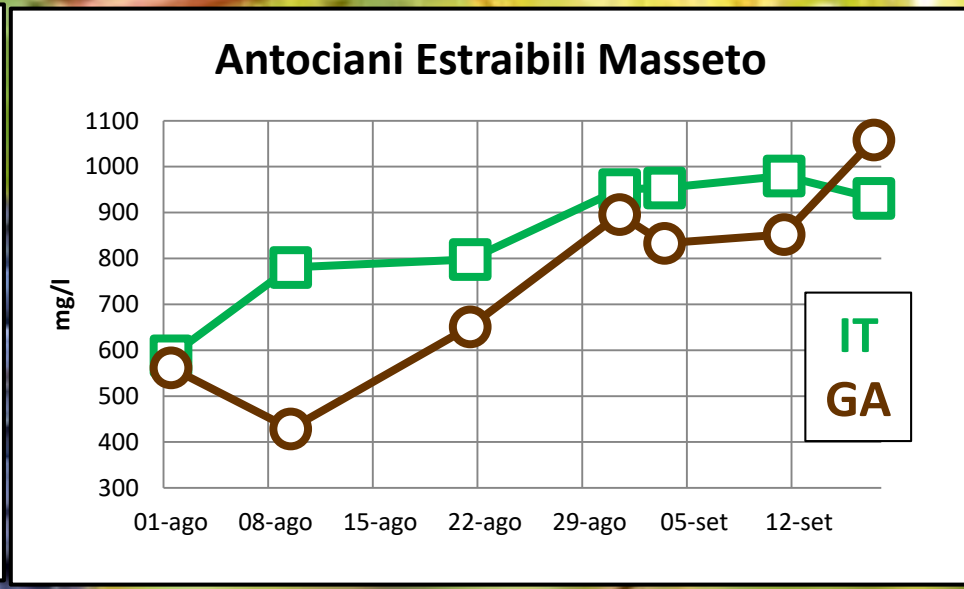


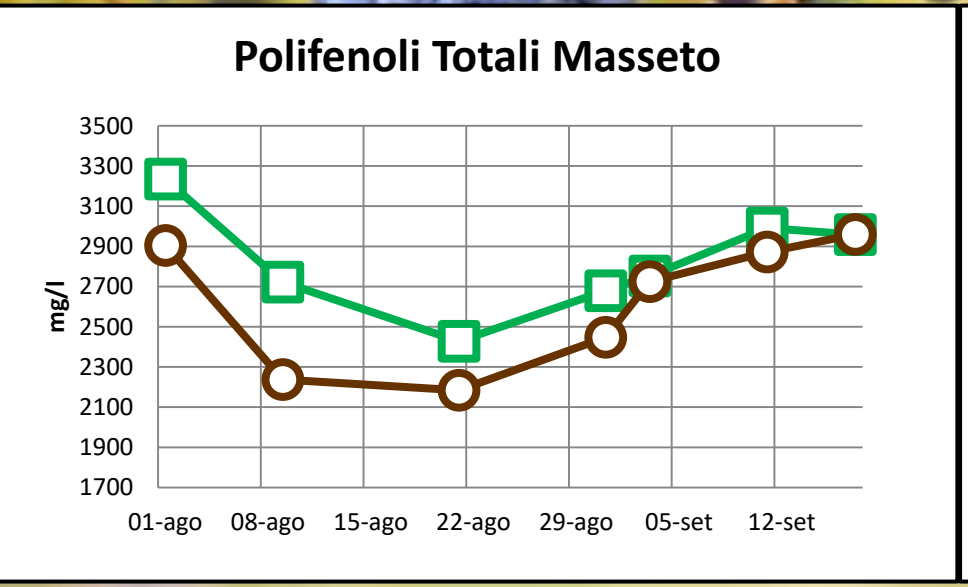
MASSETO

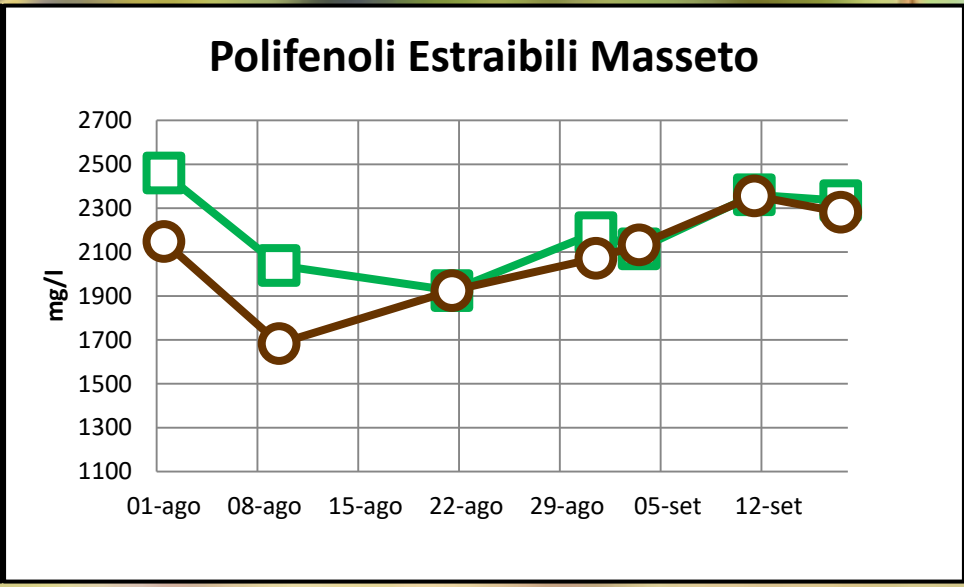
Technological Analysis

Phenolic Analysis

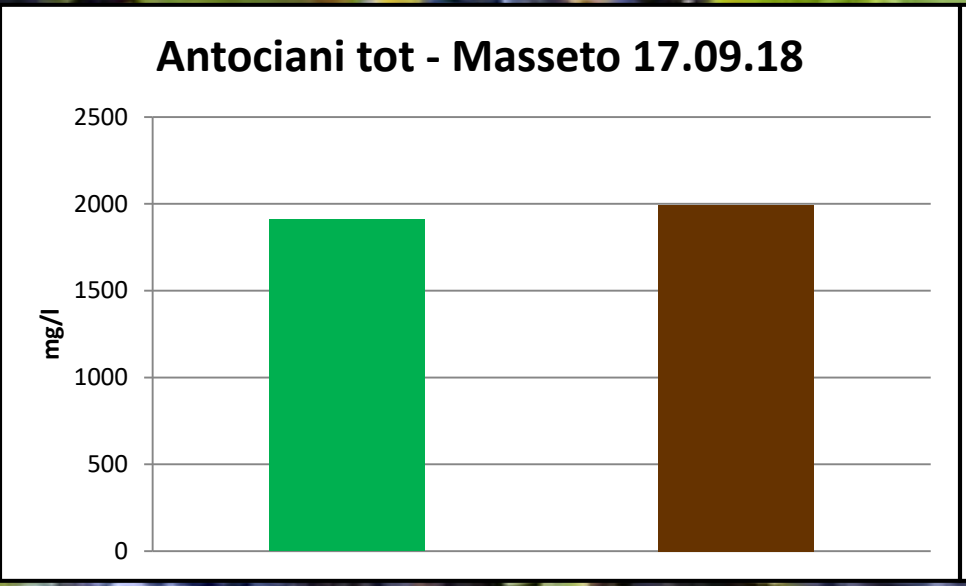


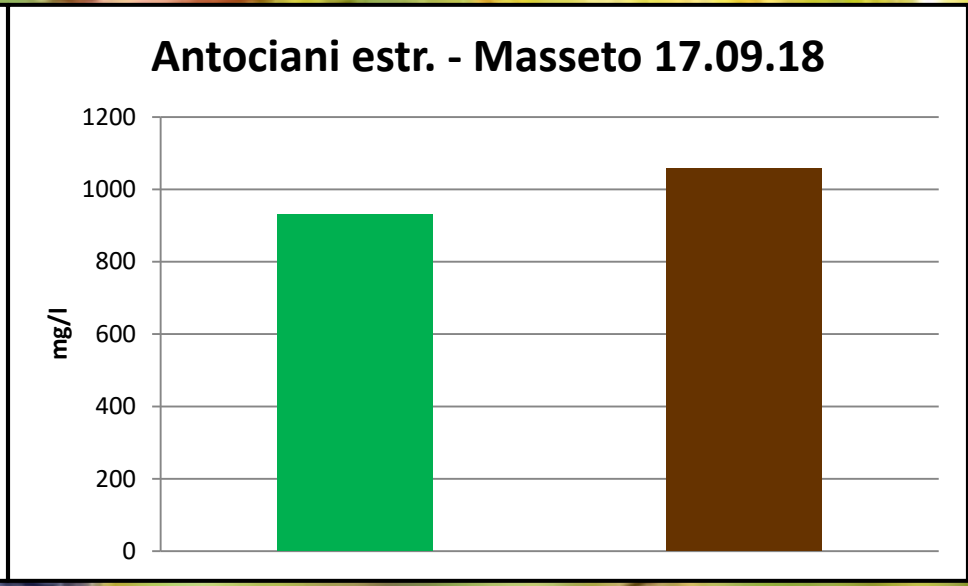


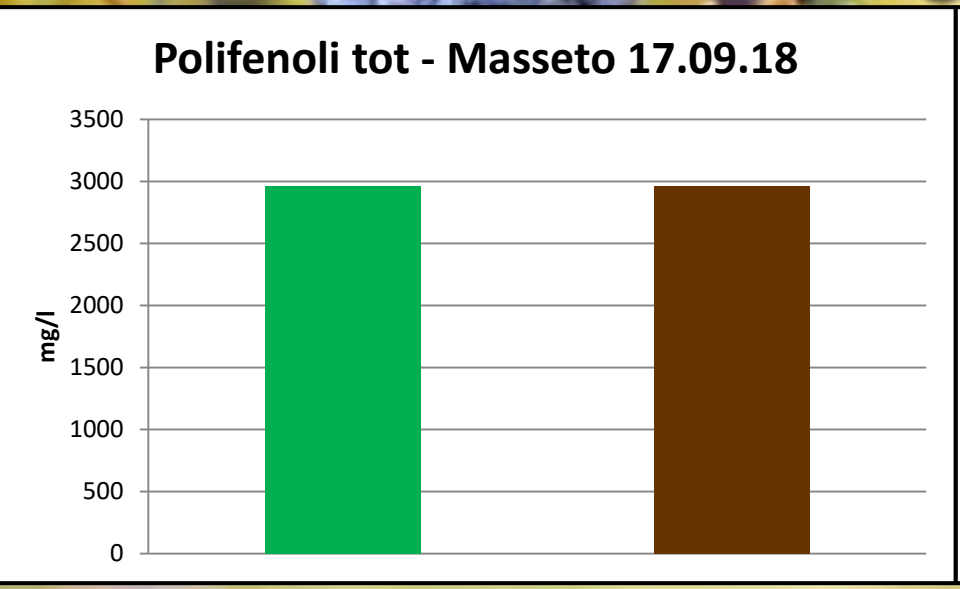


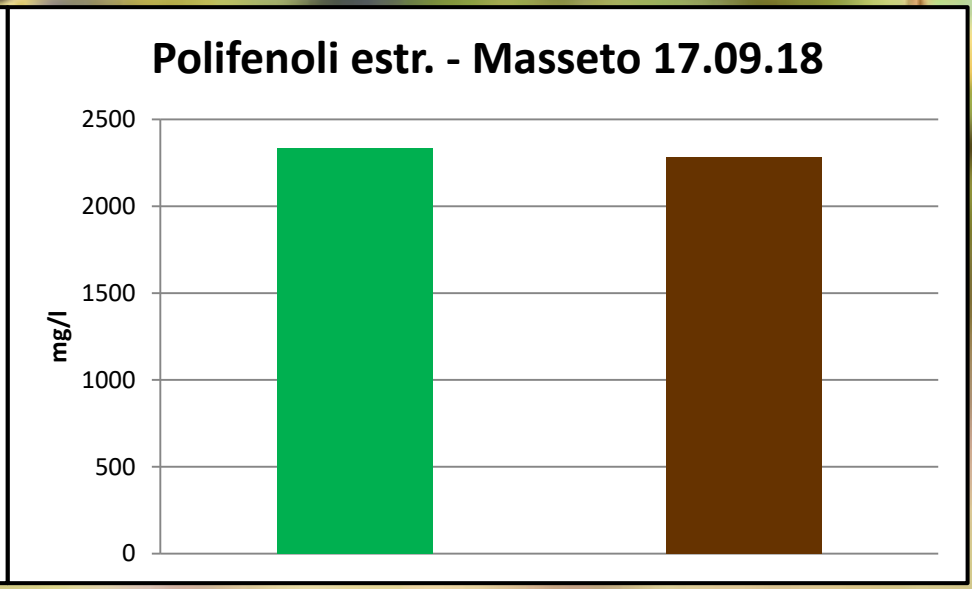


Phenolic Analysis









	MASSETO 2017							
	Brix	pH	Acidity g/L tartaric acid	Berry weight g	Tot Anth mg/L	Extr Anth mg/L	Tot Poly mg/L	Extr Poly mg/L
GA	27,6	3,5	5,7	0,82	2335	811	3393	2758
IT	28,07	3,5	5,6	0,92	2154	775	3366	2565
lsd	ns	ns	ns	ns	ns	ns	ns	ns

	MASSETO 2018							
	Brix	pH	Acidity g/L tartaric acid	Berry weight g	Tot Anth mg/L	Extr Anth mg/L	Tot Poly mg/L	Extr Poly mg/L
IT	27	3,7	4,6	1,8	1910	931	2959	2334
GA	26	3,6	4,9	1,7	1994	1058	2959	2282
lsd	0,4	ns	ns	ns	ns	ns	ns	ns

Masseto Conclusions

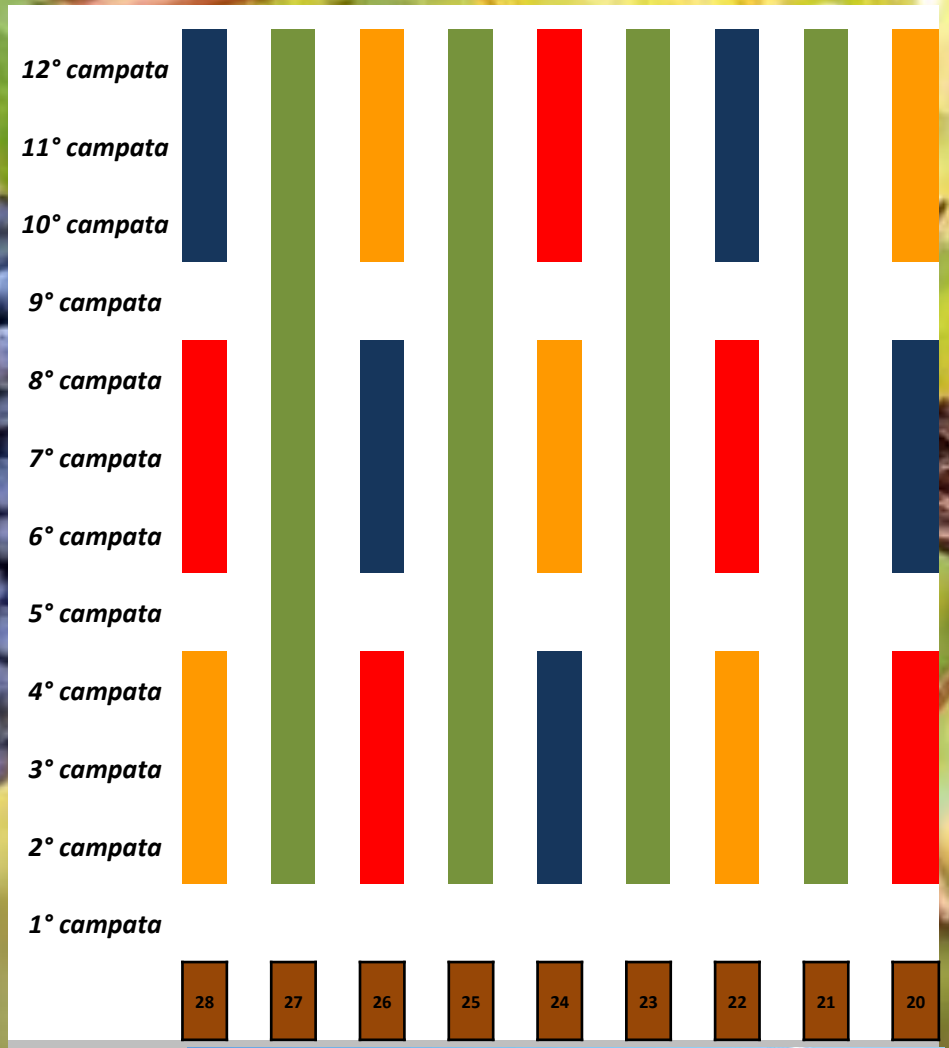
- **IT good values of gas exchange and best behaviour throughout the season**
- **IT less water stress**
- **Only difference in sugars, IT trend more sugars**
- **GA best treatment for anthocyanins accumulation**

BIOSTIMOLANTI

	30 gg prima vendemmia	15 gg prima vendemmia
	1.08.2018	20.08.2018
Estratto	X	X
Idrolizzato	X	X
Estratto	0,7 - 1,5 l/ha	5,625 ml
Idrolizzato	75 - 100 gr/ha	0,375 gr

Biostimolante naturale a base di ultrafiltrato di Ascophyllum nodosum, puro al 100%, che ottimizza tutti i processi fisiologici della pianta ed induce una maggiore resistenza agli stress abiotici.

Granuli idrodispersibili, idrolizzato proteico. Anticipa e migliora la colorazione dell'uva incrementando la resa e la qualità della produzione.



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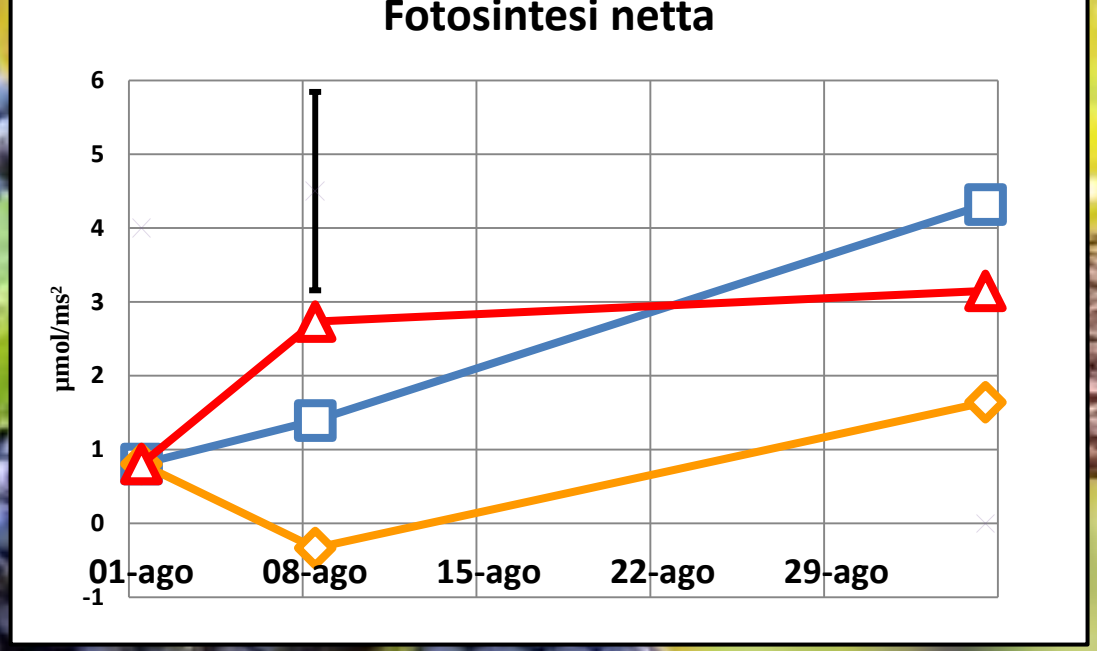
ESTRATTO

IDROLIZZ



Estratto
Idrolizzato
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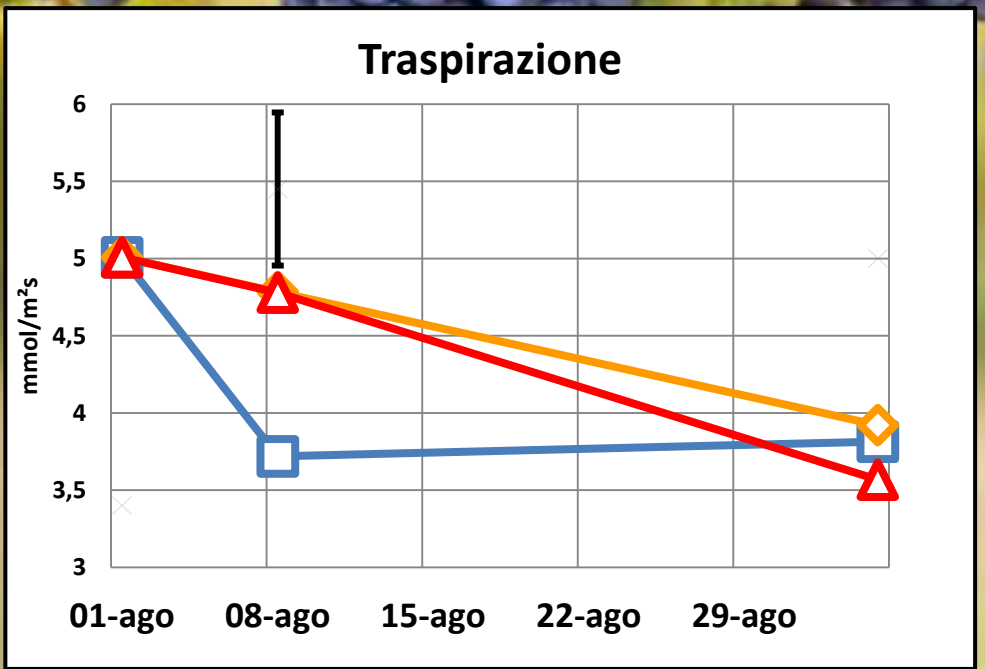

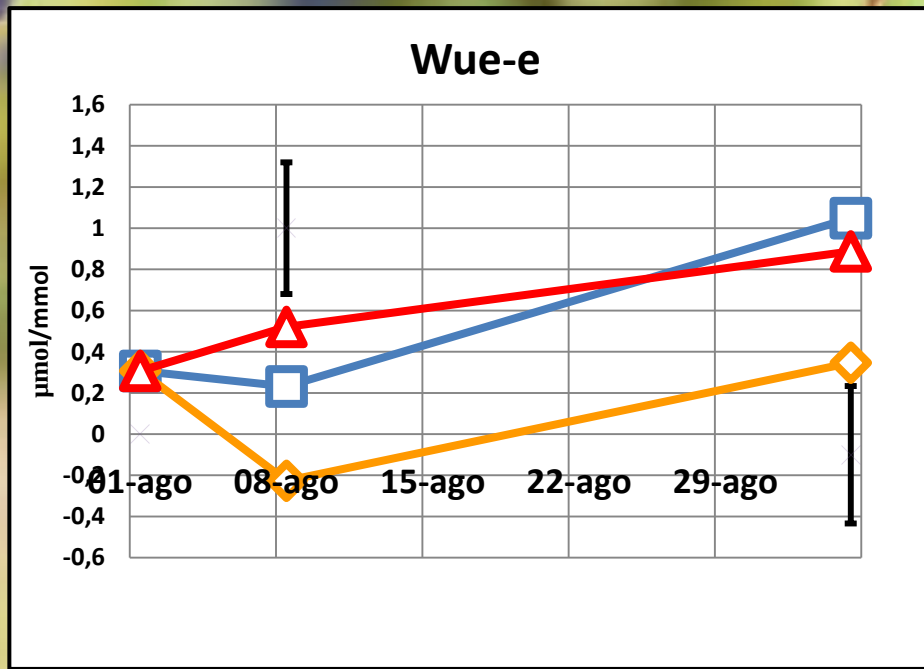

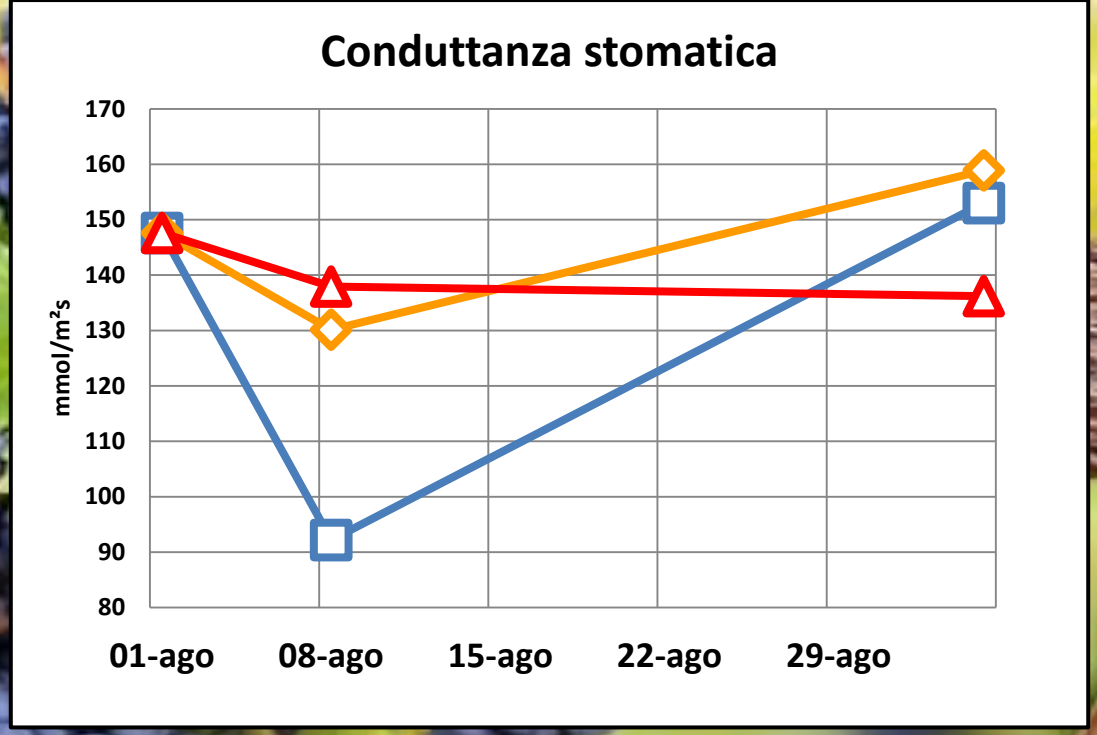

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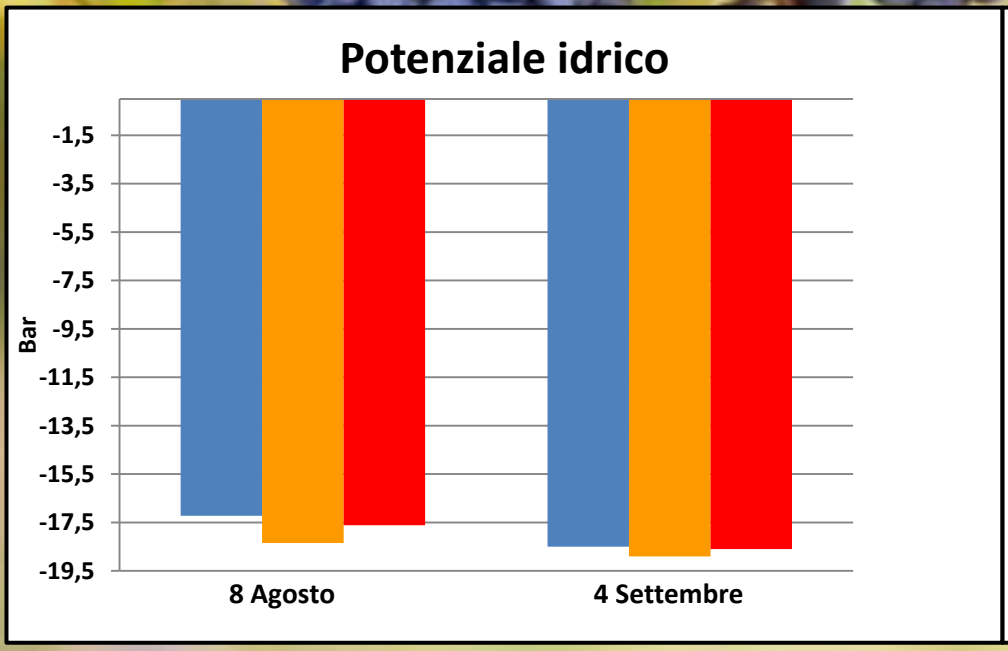

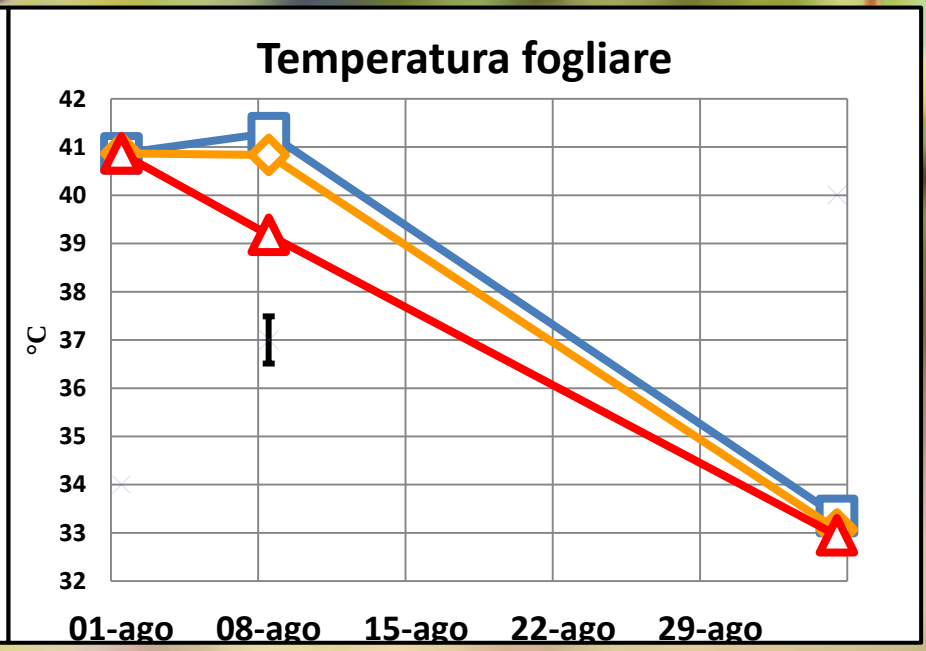

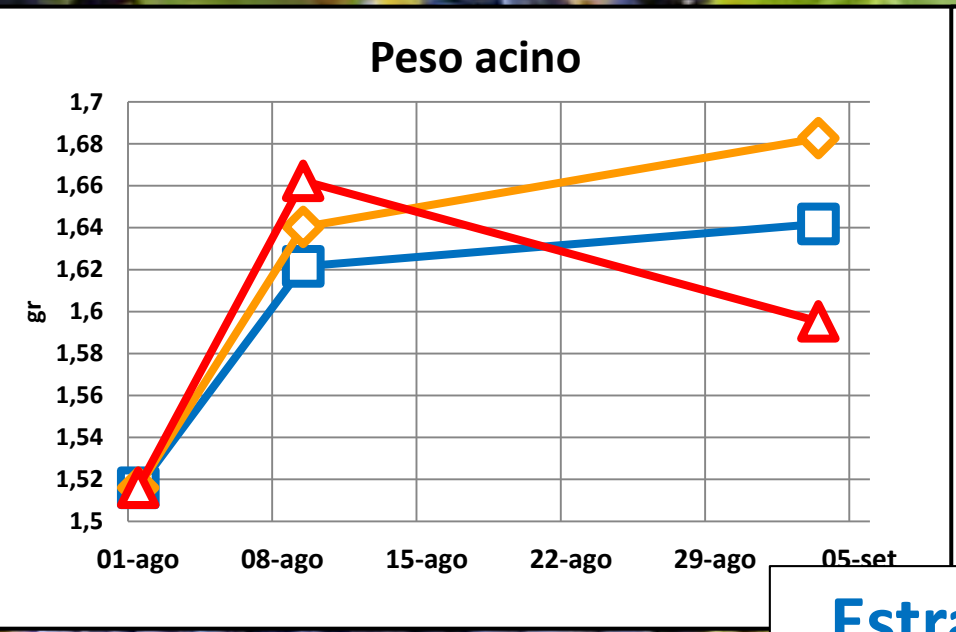

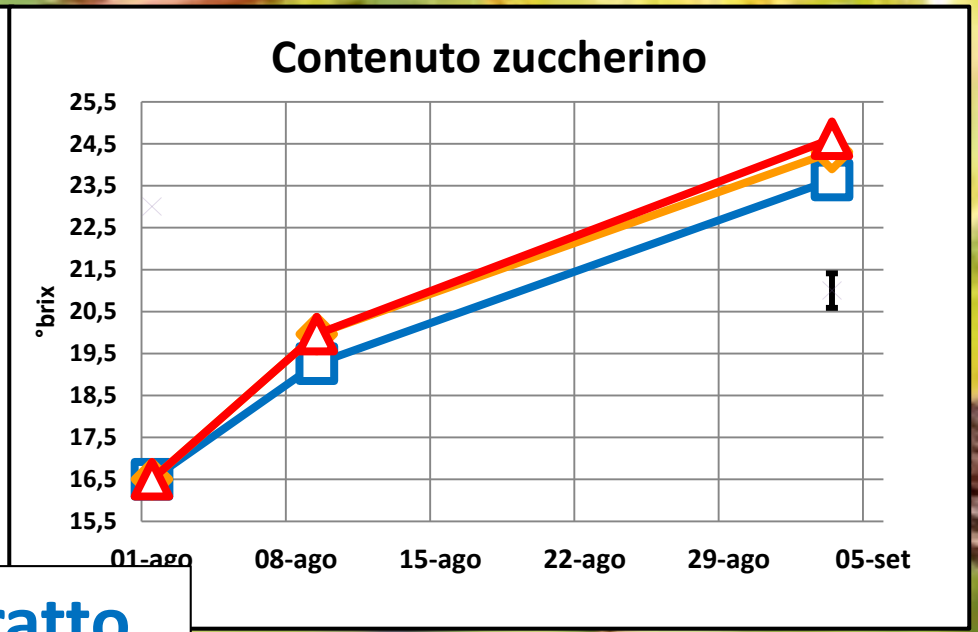

Estratto

Idrolizzato

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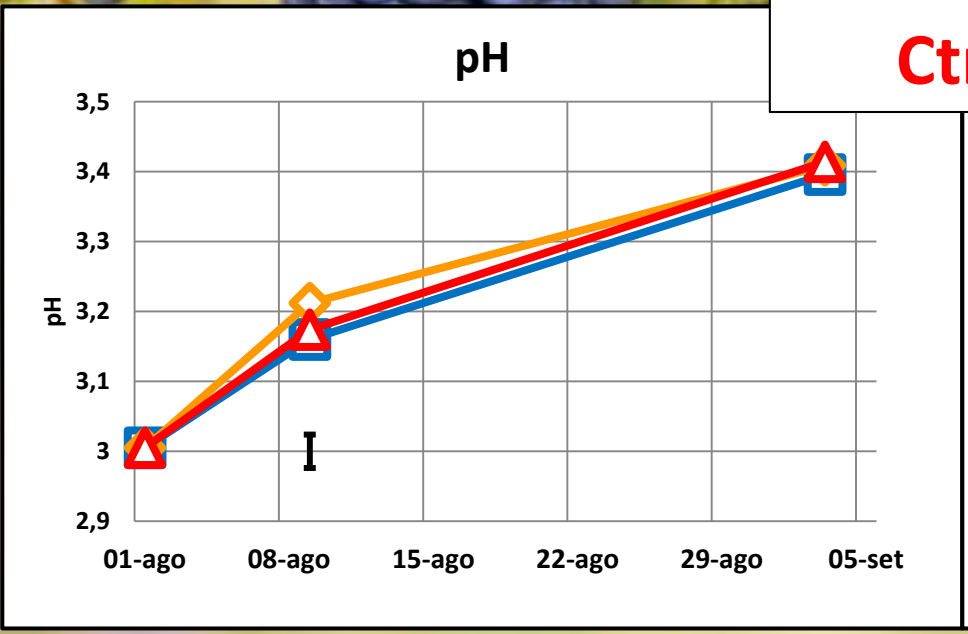

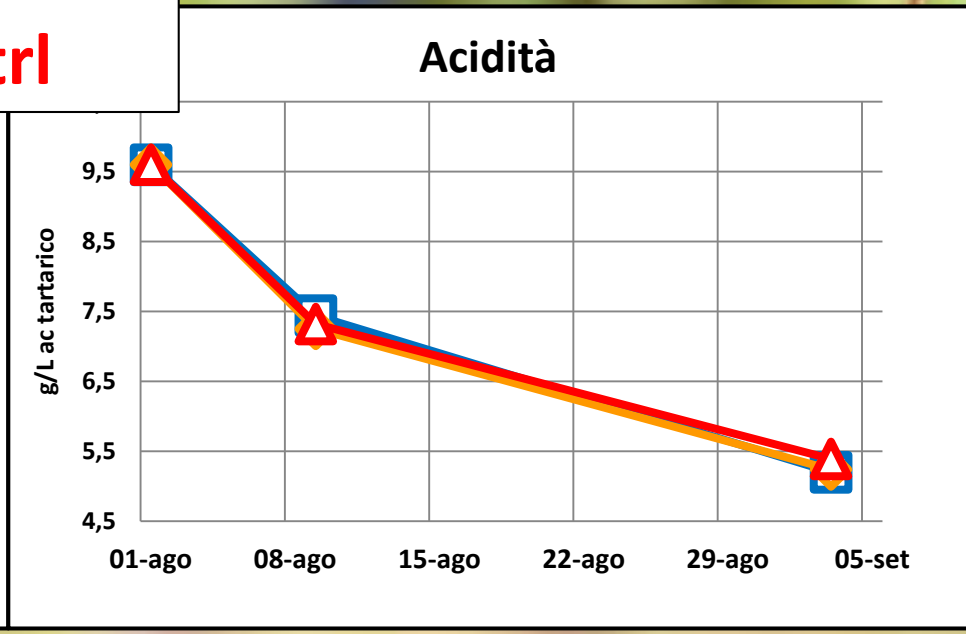

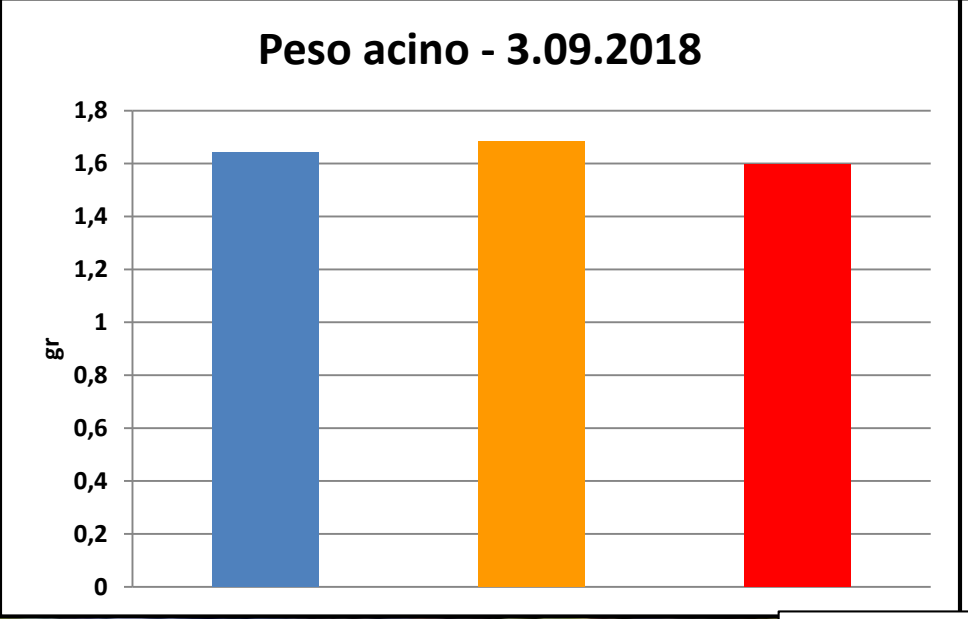

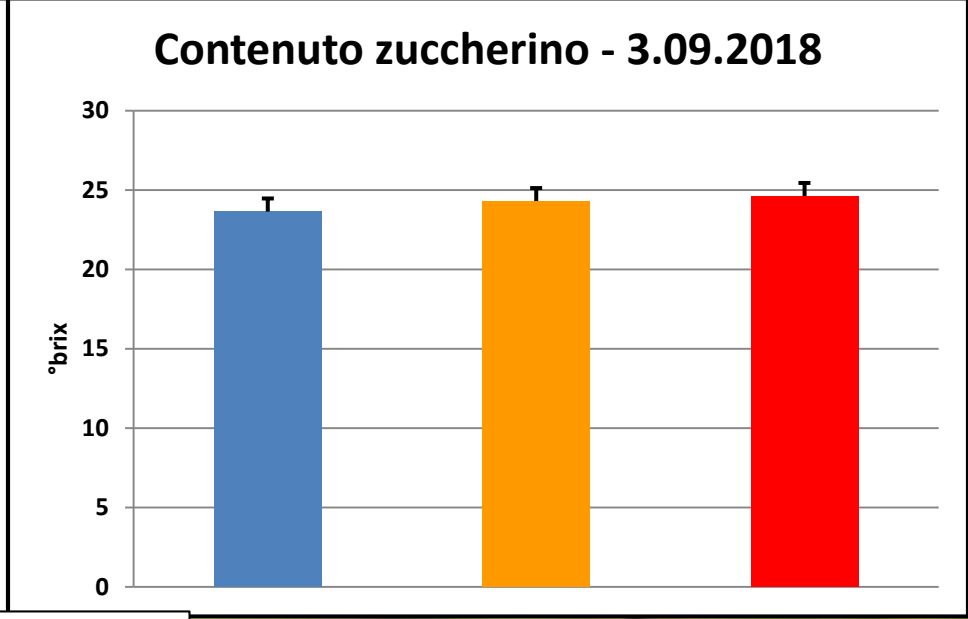

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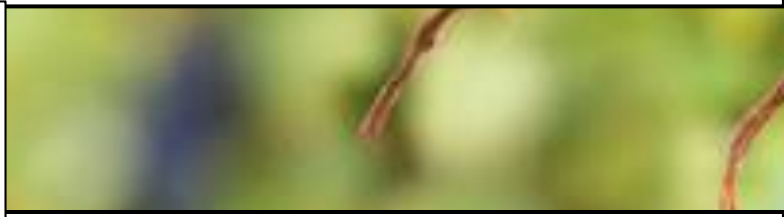

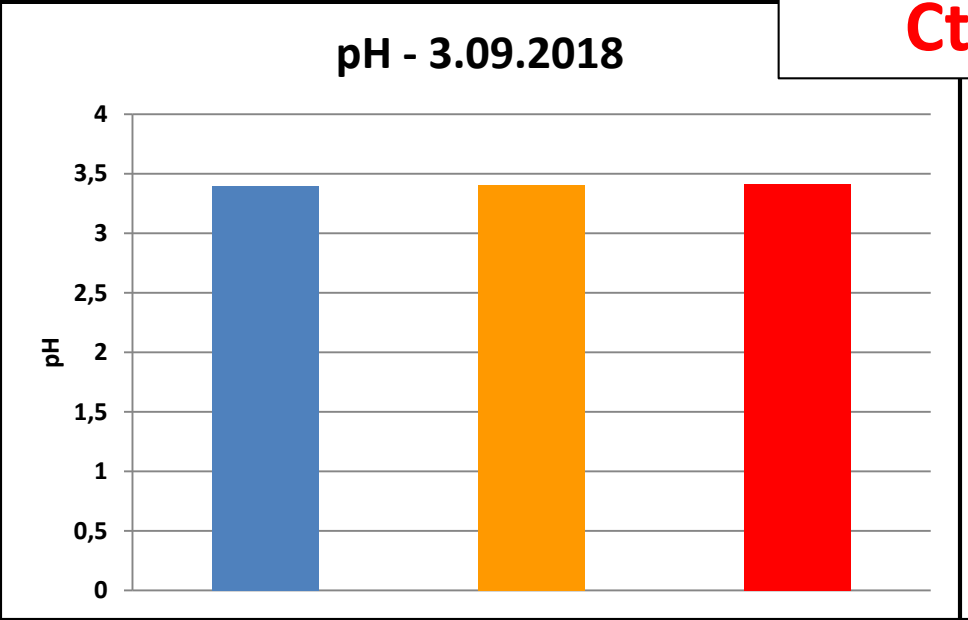

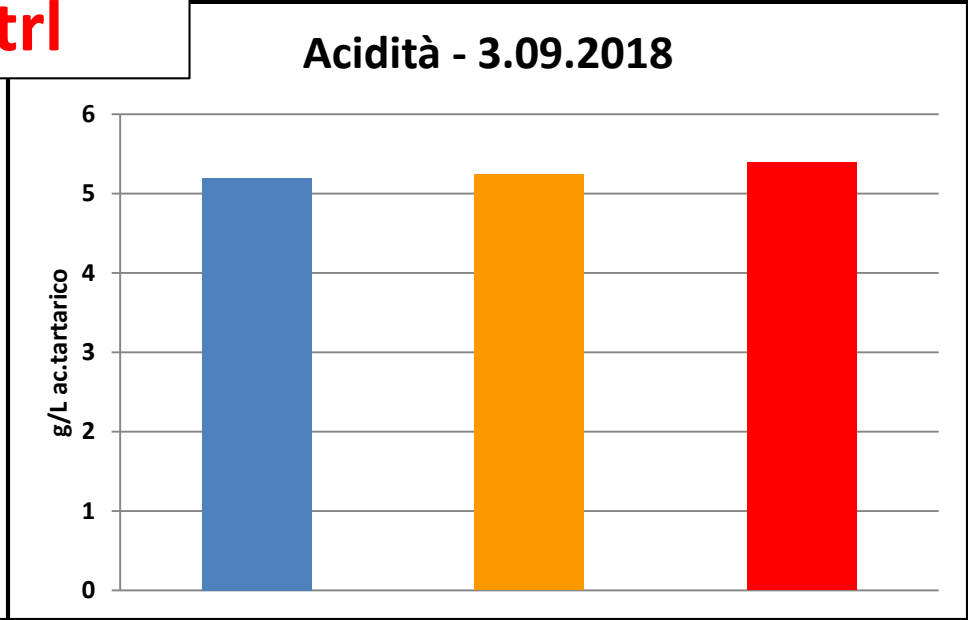

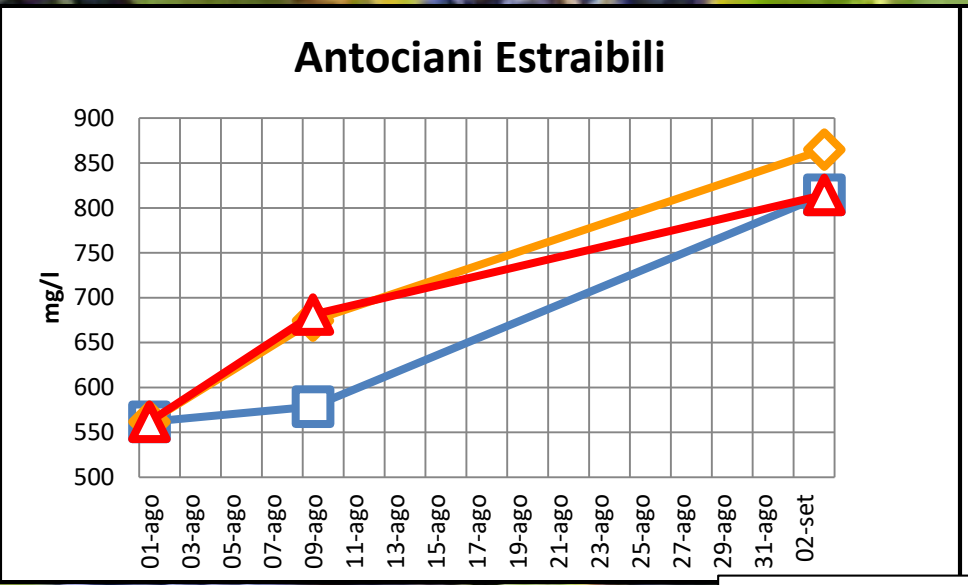

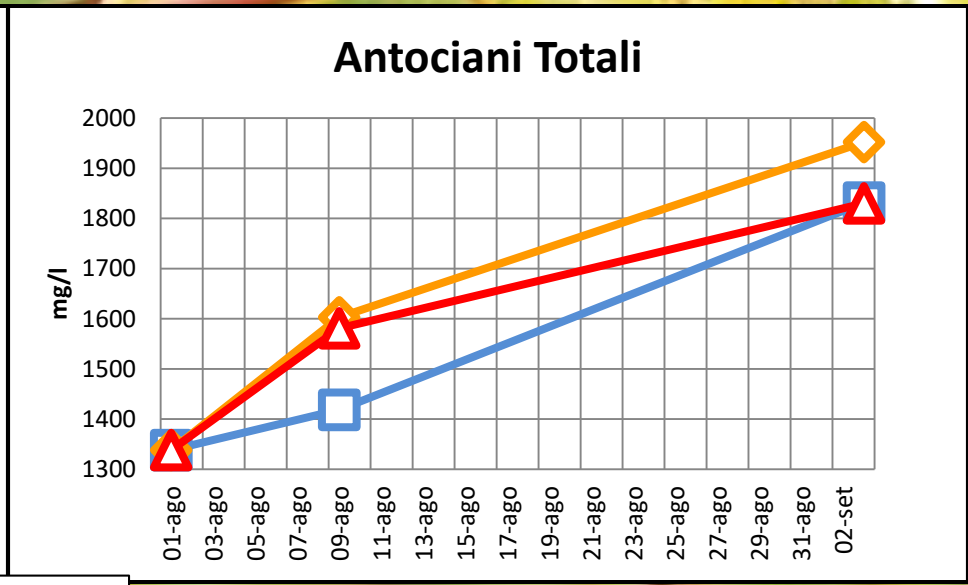

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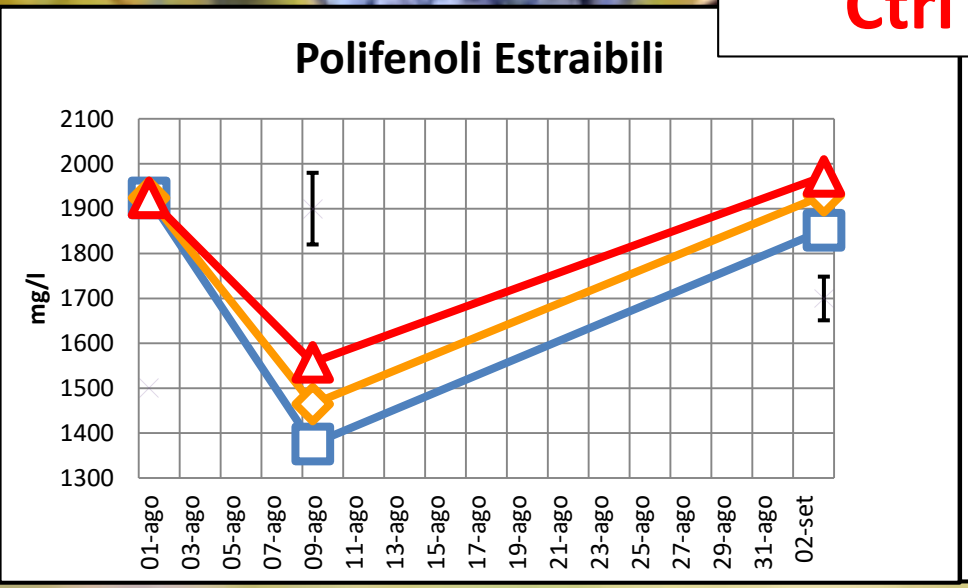

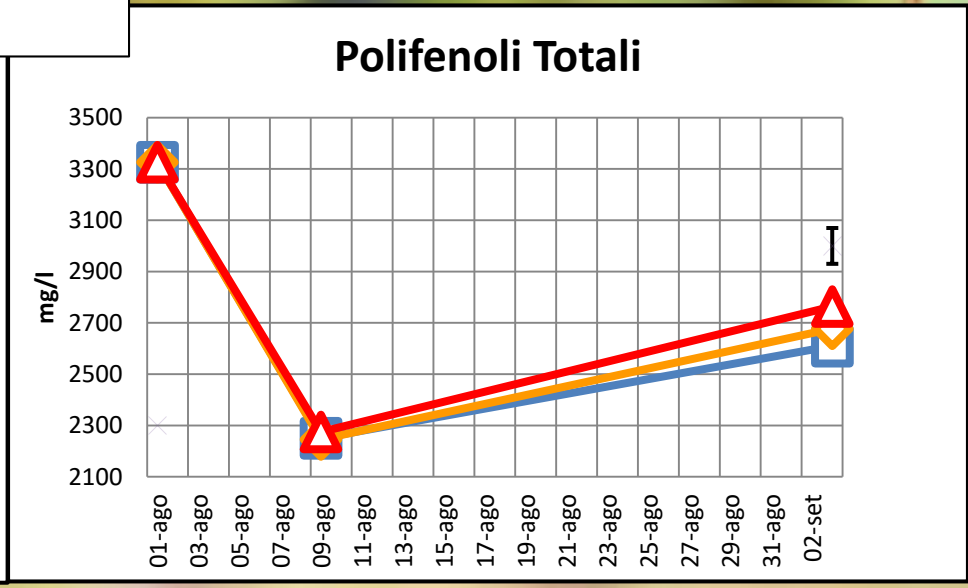

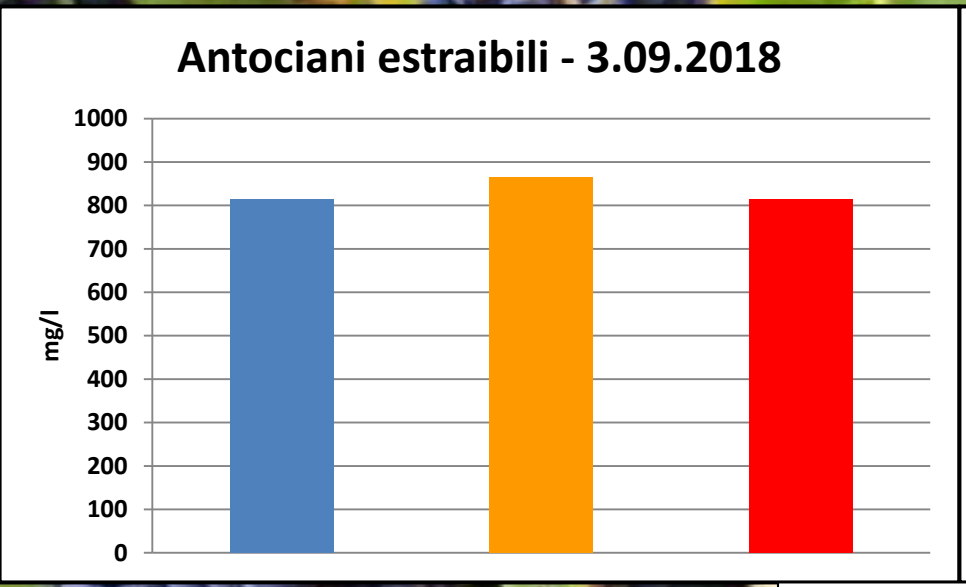

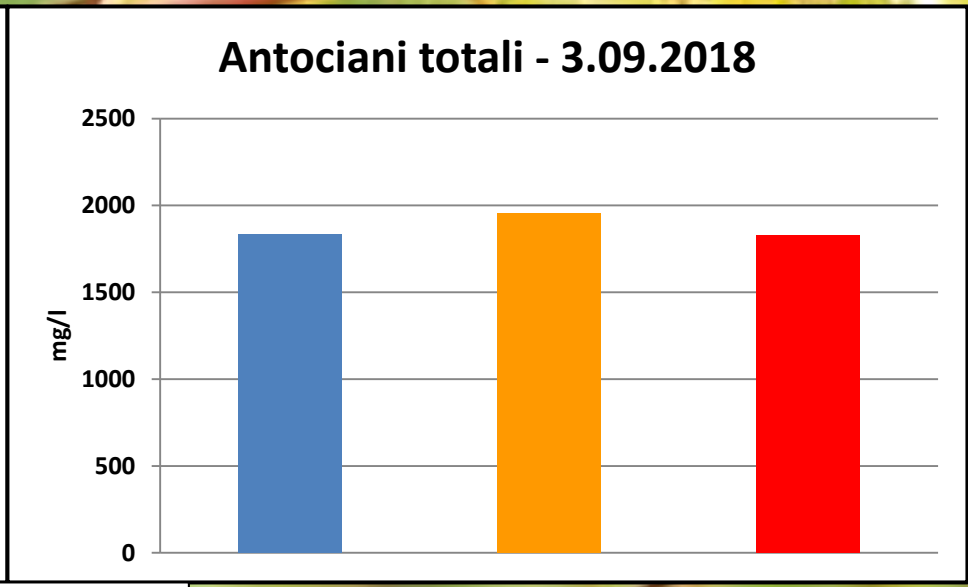

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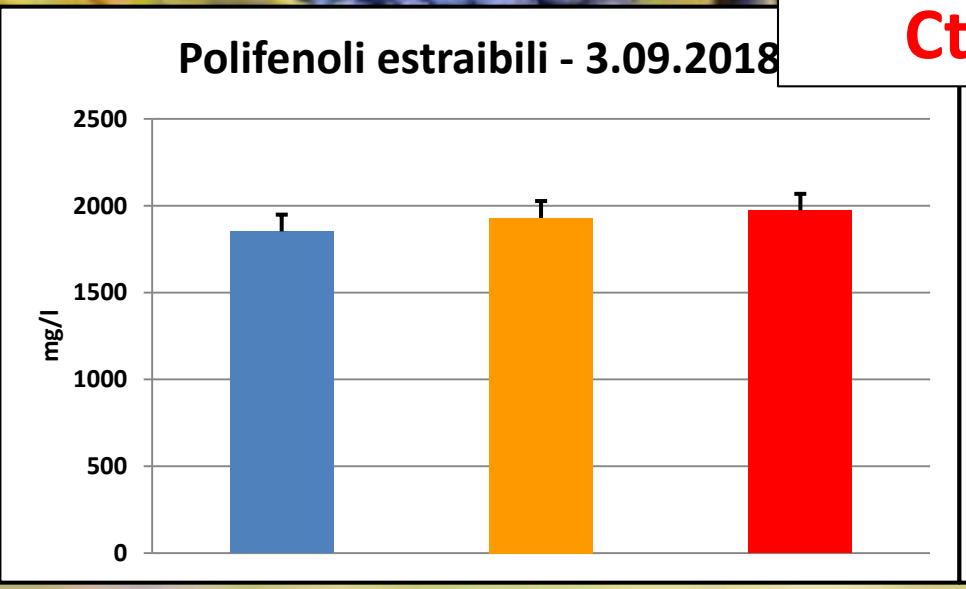

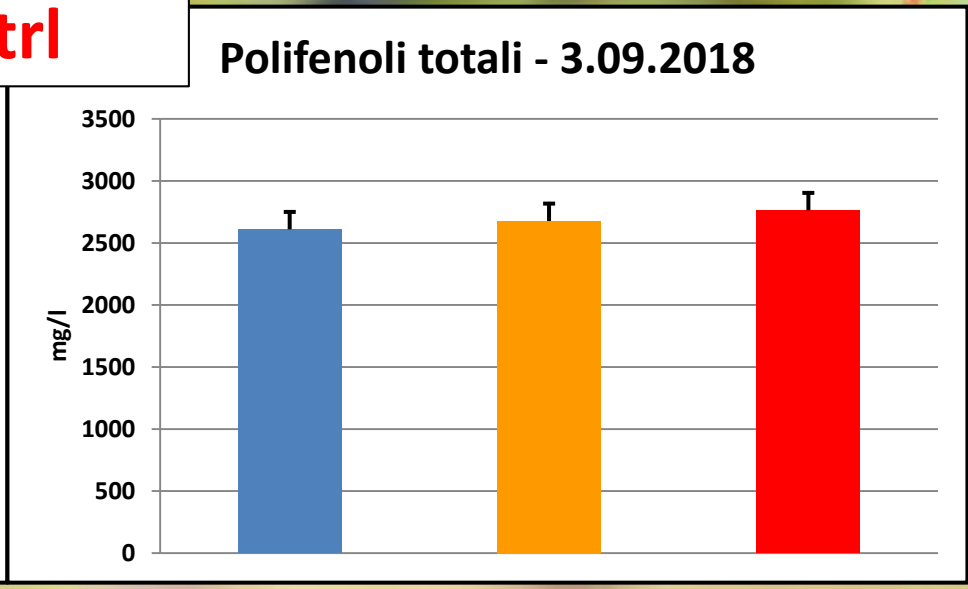

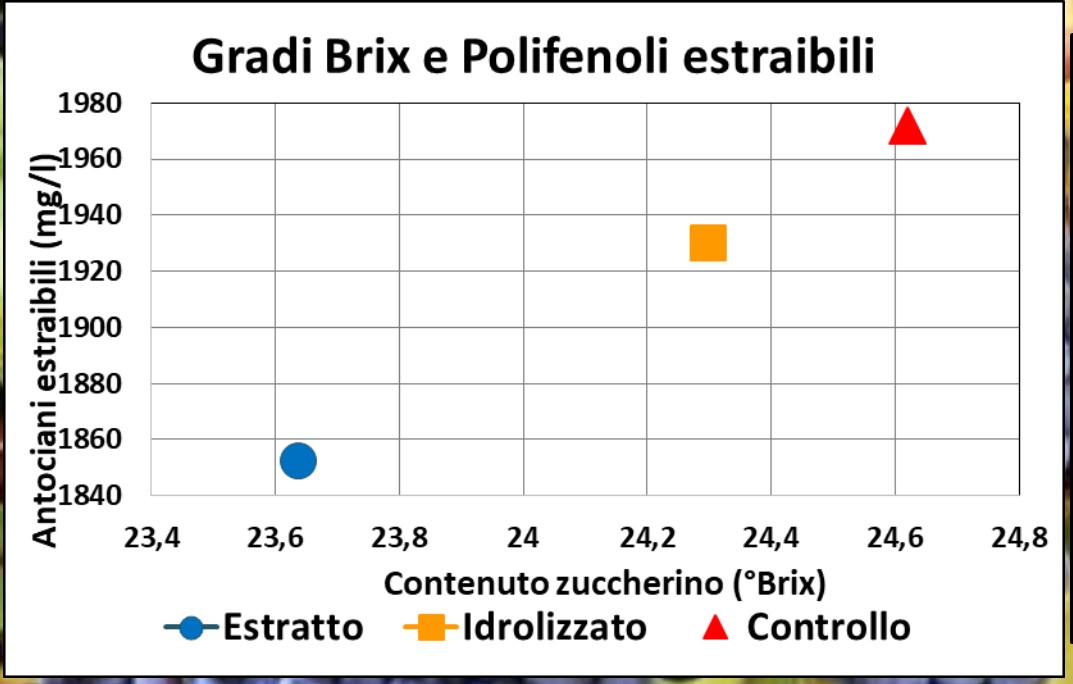

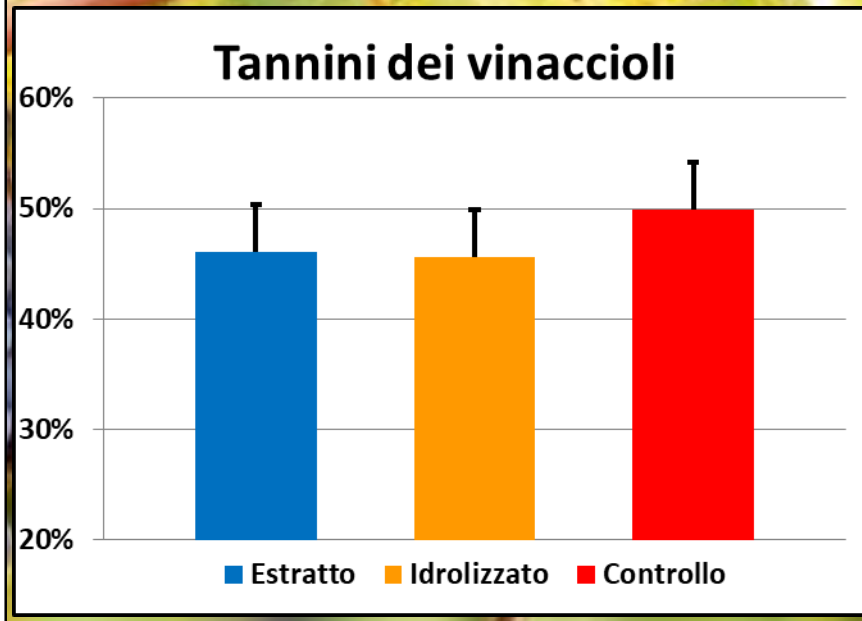

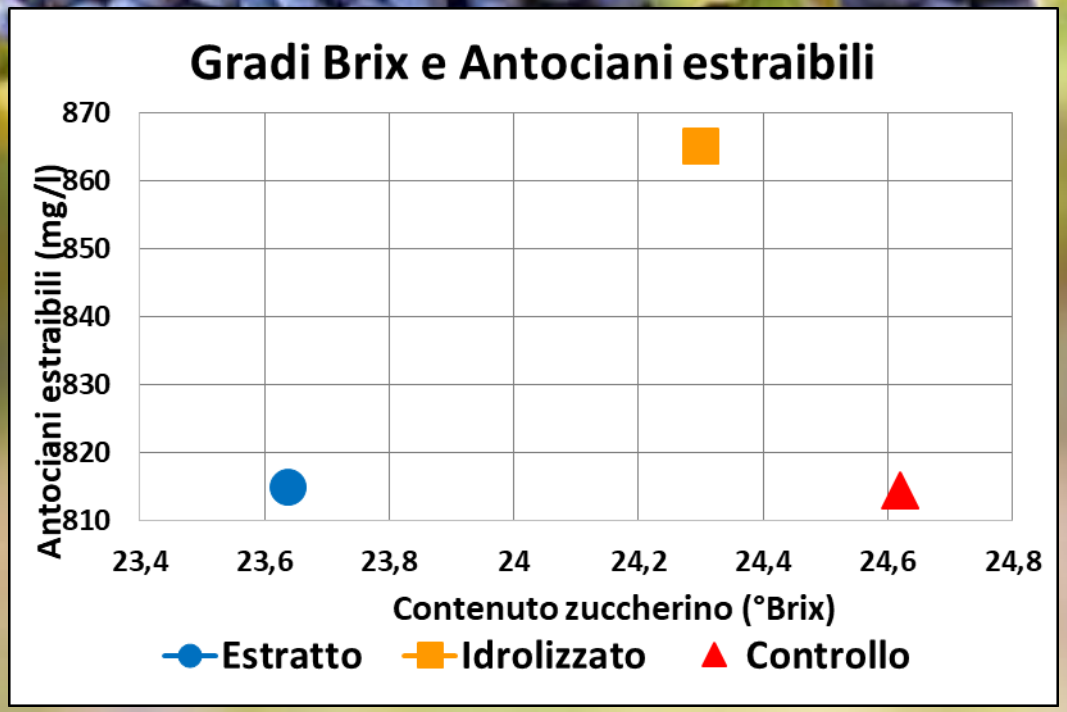

Biostimulant Products act by decreasing the contents of tannins in grape seeds and sugar content

Better phenolic maturity and greater contemporaneity with technological maturity

Production of less astringent, less alcoholic and more balanced wines