Berry shrivel in Austria: symptoms observed with cultivar Zweigelt (*V. vinifera* L.)

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Berry shrivel (BS) is a physiological disorder affecting the grapevine berry development decreasing quantity and quality of fruits. The bundle of symptoms (water loss, decreased sugar accumulation, disturbed anthocyanin synthesis, high acid contents and low pH values) occur after veraison. To analyse the underlying mechanisms involved in BS detailed descriptions of the symptoms are essential. Three vineyards in the wine region Carnuntum in lower Austria were studied analysing 117 single Zweigelt/5BB vines, cordon-single arm trellised. Determined physiological and growth parameters are presented on a vine-, cluster- and berry-basis.

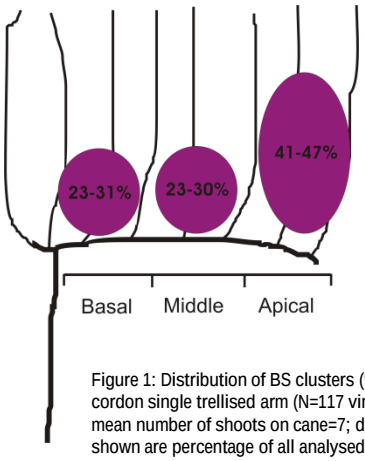

Figure 1: Distribution of BS clusters (%) within cordon single trellised arm (N=117 vines; mean number of shoots on cane=7; data shown are percentage of all analysed clusters)

Key results

- BS occured between 75-95 days after anthesis
- BS frequency among all clusters (N=5713) was 7, 15 and 24 percent (3 vineyards)
- Highest percentage (41-47%) of BS clusters at the apical position of cane (Fig. 1)
- Berry diameter (Fig. 2) and berry elasticity significantly reduced in BS berries
- Seed weight of BS berries reduced compared to seeds from healthy berries (Fig. 3)
- Soluble solids of BS berries significantly reduced (Fig. 4)
- Titrateable acid of BS berries significantly higher (Fig. 5)
- Healthy berries on BS vines show normal quality parameters (Fig. 4, 5)
- Reduced K-content of BS berries (Fig. 6), Non affected Mg-content (Fig. 7); Increased Ca-content (not shown)
- Color development of BS berries is disturbed; higher a values indicate more magenta color elements (Fig. 8, 9)

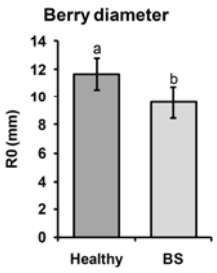

Figure 2: Berry diameter difference (healthy n=171 berries; BS n=303 berries; different letters indicate significant differences)

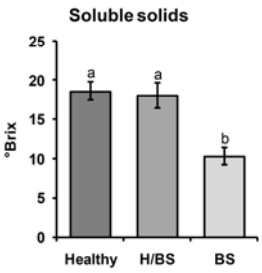

Figure 4: Soluble solids determined of healthy, healthy clusters on BS vines and BS clusters (H n=25; H/BS n= 44; BS n=44)

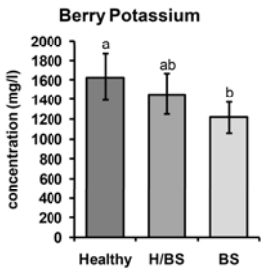

Figure 6: Potassium concentration in berries determined of healthy, healthy clusters on BS vines and BS clusters with IAA (H n=11; H/BS n= 19; BS n=19)

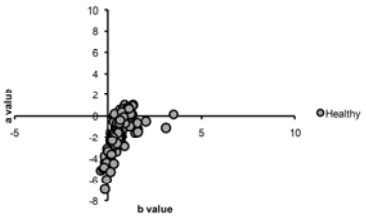

Figure 8: Color development of berries determined with chromameter (a=green to magenta; b=blue to yellow; N=171 berries)

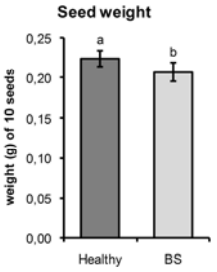

Figure 3: Seed weight of 10 seeds from 5 BS and 5 healthy clusters (n=25x10 seeds per grape)

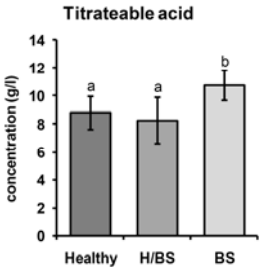

Figure 5: Titrateable solids determined of healthy, healthy clusters on BS vines and BS clusters (H n=25; H/BS n= 44; BS n=44)

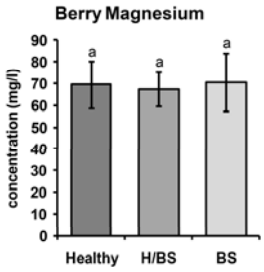

Figure 7: Mg concentration in berries determined of healthy, healthy clusters on BS vines and BS clusters with IAA (H n=11; H/BS n= 19; BS n=19)

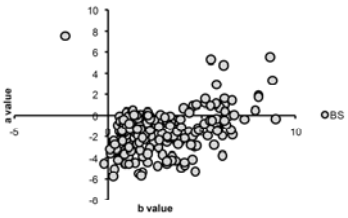

Figure 9: Color development of berries determined with chromameter (a=green to magenta; b=blue to yellow; n=1303 berries)

Conclusion

- The results indicate a trend for apical clusters to develop BS symptoms in Zweigelt
- The parameters berry diameter, berry elasticity and berry color development give significant differences and are therefore possible candidates to detect BS at early stages.
- The results are in accordance to previous studies (Krasnow et al 2009, Redl et al. 2008) pertaining the reduced berry diameter and firmness as well as reduces soluble solids, pH and higher content of titrateable acid
- The results differ in the fact of no reduced quality of healthy clusters on BS symptomatic vines and no partial symptomatic clusters were observed