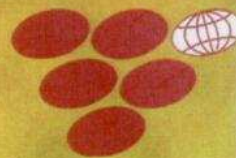


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(early ripening), Autumn Royal (medium-late ripening) and Crimson Seedless (late ripening). Moreover, the seeded cv Black Pearl was included in the study as a reference. It was evident that the two cultivars with darker berry skin color (Black Emerald and Black Pearl) accumulated a higher amount of phenols per gram of fresh berry, while the cultivar with lighter (red) skin color (Crimson Seedless) performed at the opposite; the cultivar with dark blue skin color (Autumn Royal) performed intermediately. However, the difference in phenol amounts was not limited to anthocyanins, but concerned also others phenol compounds. Autumn Royal and Crimson Seedless were also tested to evaluate phenol differences in grapes produced by "normally irrigated" and "deficit-irrigated" vines. By comparing the phenol accumulation as related to the irrigation level, a genotype-irrigation interaction was noticed: grapes from deficit-irrigated Autumn Royal vines showed a moderate decrease in berry weight but a high increase in phenol amount per kilogram of grape, while Crimson Seedless, in this trial, did not show a relevant difference of berry skin phenols related to the irrigation level.

Les raisins à peau noire ou rouge sont riches en polyphénols, composés que plusieurs études cliniques ont montré les bienfaits sur la santé humaine par la réduction des risques de maladies dégénératives. La richesse en polyphénols est déterminée génétiquement, mais elle est également grandement influencée par le terroir, le stade de maturité et les pratiques culturales. Une étude a été menée en Italie du sud pour déterminer la richesse en polyphénols, a maturité équivalente (exprimée par le degré Brix) chez quatre variétés de raisin de table sans pépins : Black Emerald (maturité précoce), Autumn Royal (maturité moyenne) et Crimson Seedless (maturité tardive). La variété Black Pearl, avec pépins, a été indiquée comme référence. Cette étude a aussi permis de déterminer l'effet de l'irrigation déficitaire sur la richesse en polyphénols par comparaison à une irrigation classique chez les deux cépages Autumn Royal et Crimson Seedless. Il apparaît donc que cette teneur est « proportionnelle » à l'intensité de la couleur de la peau du raisin. Cette différence de teneur en phénols n'a pas concerné uniquement les anthocyanes mais également autres paramètres mesurés. La teneur en phénols des raisins semble être dépendante de l'interaction génotype/irrigation. En effet, pour le cépage Autumn Royal, l'irrigation déficitaire a donné des baies plus petites mais avec une teneur en phénols plus élevée, alors que chez le cépage Crimson Seedless, il n'y a pas eu d'effets visibles en phénols.

EXPERIMENTAL ASSESSMENT OF MOLECULAR MARKERS EFFICIENCY (VvAGL11) IN MAS FOR TABLE GRAPE BREEDING

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¹**CENTRO DI RICERCA PER LA VITICOLTURA**

²**CENTRO RICERCA E INNOVAZIONE, FONDAZIONE EDMUND MACH**

Stenospermocarp is highly appreciated in table grape cultivars. The availability of efficient molecular markers would help an efficient pre-selection of seedless seedlings, lowering times and costs of selection. Under the genetic point of view, stenospermocarp is a quantitative and complex trait. The most popular theory hypothesizes a dominant regulatory gene (SDI, Seed Development Inhibitor) located on LG 18 plus three independent and recessive genes, controlled by SDI and not yet identified. A key candidate for SDI is VvAGL11 gene and in the present work we assessed the efficiency of three microsatellite markers (p3_VvAGL11, VvP18B20 and VMC7F2) developed by Mejia et al. (2011) on this gene to evaluate their usefulness on our grapes. We analyzed 235 genotypes: 113 table grape cultivars, 66 seeded and 49 seedless, 11 wine grape cultivars (seeded) and 111 plants (13 seedless) obtained by crossing 'Raboso veronese' x 'Sultanina'. The results on the 124 cultivars confirmed that p3_VvAGL11 marker (allele 196) is the most significant for seedlessness. The most important allelic series in seedless grapes corresponds to the seedless haplotype of 'Sultanina'. The results on F1 plants show that the allelic combinations found in the F1 are, as expected, four. The distribution of the genotypes inside each class does not show statistically significant deviations. The seedless seedlings fall in one of the two classes with seedless haplotype and therefore have the same allelic combination evidenced by the previous analysis on the 124 cultivars. Nevertheless, the seedlessness in each of these two groups regards only a low number of individuals. It appears evident that the analysis of AGL11 gene is not enough to select potentially seedless genotypes in a population obtained by cross, while it seems to be very useful to discard (negative selection) the seeded seedlings. From here the need to continue the search on the genes located on minor QTLs for seedlessness, which have been mapped on chromosomes different from LG18, in agreement with the theoretical existence of three recessive and independent alleles.

La stenospermocarpia è molto ricercata nelle uve da tavola. La disponibilità di efficienti marcatori molecolari da applicare nel breeding per una efficace preselezione dei semenzali apireni, ridurrebbe significativamente tempi e costi della selezione. Dal punto di vista genetico, la stenospermocarpia è un carattere quantitativo complesso e la teoria più accreditata ipotizza un gene regolatore dominante (SDI, Seed Development Inhibitor) localizzato sul cromosoma 18 ed altri tre geni indipendenti e recessivi, controllati da SDI e non ancora individuati. Un importante candidato per SDI è il gene VvAGL11 e nel presente lavoro abbiamo utilizzato i tre marcatori microsatellite (p3_VvAGL11, P18B20 e VMC7F2) individuati da Mejia et al. (2011) su questo gene, per valutarne l'utilità sui nostri materiali viticoli. Abbiamo analizzato 235 genotipi: 113 cultivar di uva da tavola, 66 con semi e 49 apirene, 11 cultivar di uva da vino (tutte con semi) e 111 individui (13 apireni) di una popolazione da incrocio 'Raboso veronese' x 'Sultanina'. I risultati dell'analisi sulle 124 varietà confermano che il marcatore p3_VvAGL11 (allele 196) è il più significativo per l'apirenia e che la serie allelica più importante per le uve apirene corrisponde all'aplotipo apirene della 'Sultanina'. I risultati dell'analisi della F1 mostrano che le combinazioni alleliche sono, come atteso, quattro.

La distribuzione degli individui in ciascuna classe non mostra scostamenti statisticamente significativi ed in due di esse si ritrova l'aplotipo della 'Sultanina' responsabile dell'apirenia. I semenzali apireni cadono nelle due classi con aplotipo apirene e quindi hanno la stessa combinazione allelica evidenziata dall'analisi precedente sulle 124 varietà. Tuttavia, l'apirenia in ciascuno di questi due gruppi genotipici riguarda solo una modesta parte delle piante. E' evidente che l'analisi di AGL11 è insufficiente per selezionare i genotipi potenzialmente apireni in una popolazione da incrocio, mentre sembra molto utile per scartare (selezione negativa) i semenzali che sicuramente apireni non sono. Da qui la necessità di svolgere approfondimenti sui geni localizzati nei QTL minori per l'apirenia, che sono stati mappati in cromosomi diversi da LG18, particolare che concorda con la teoria dell'esistenza di tre geni recessivi indipendenti.

YIELD, BIOMASS ACCUMULATION, LEVELS AND EXTRACTION OF NUTRIENTS ON GRAPEVINE 'NIAGARA ROSADA': THE INFLUENCE OF ROOTSTOCKS AND PRUNING TIME

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The influence of rootstocks 'IAC 766', 'IAC 572', 'IAC 313', 'IAC 571-6' e '106-8Mgt' was determined on yield, biomass accumulation, the levels and nutrient uptake of the branches removed by pruning and the harvest of bunches from grapevine 'Niagara Rosada', cultivated in Louveira, 23°04'S and 46°55'W, in the São Paulo State, Brazil. At the time of pruning, we evaluated the fresh and dry mass of branches of the grape. On harvest, yield was estimated by weight of bunches/plant and number of plants/ha. Branches were sampled at the time of pruning and bunches were sampled at harvest, when nutrient content was analyzed. In three cycles, we obtained with 'Niagara Rosada' grafted on 'IAC 572' a yield of 18,7 ton ha⁻¹, differing only from 'IAC 313'. The rootstocks 'IAC 572' and 'IAC 313' provided, on average, higher accumulation of fresh and dry weight of the branches of 'Niagara Rosada', being, respectively, 2496 kg ha⁻¹ and 1167 kg ha⁻¹. Referring to pruning times, we obtained in the winter pruning, yield average of 15.3 and 25.7 ton ha⁻¹, being significantly higher than the average obtained in summer pruning with 8.3 ton ha⁻¹. There was significant influence of rootstocks and cycles on content of N, K, P, Mg and Zn in the branches and content of K, P, S, Cu, Fe and Zn in the bunches of grapevine 'Niagara Rosada'. There were significant influence of rootstocks and production cycles in the extraction of N, K, Ca, Mg, S, B and Zn in the branches and extraction of Cu and K in the bunches of 'Niagara Rosada', obtaining with the rootstock 'IAC 572' higher values.

Evaluaron la influencia de los portainjertos 'IAC 766', 'IAC 572', 'IAC 313', 'IAC 571-6' y '106-8Mgt' en la productividad, la acumulación de biomasa, los tenores y en la extracción de nutrientes por las ramas extraídas por la poda y la cosecha de los racimos de la vid 'Niagara Rosada', en cultivo en Louveira, 23°04'S. 46°55'O, Estado São Paulo, Brasil. En el momento de la poda, se evaluó la masa fresca y seca de las ramas, para estimar la acumulación de biomasa por las ramas de la vid. En la cosecha, estimó la productividad por la pesage de los racimos/planta y del número de plantas por hectárea. Se tomaron muestras de ramas en el momento de la poda y racimos durante la cosecha, para análisis de los tenores de nutrientes. En el promedio de tres ciclos de producción se obtuvieron con el cv Niagara Rosada injertado en el patrón 'IAC 572', el rendimiento de 18,7 ton ha⁻¹, difiriendo significativamente del patrón 'IAC 313'. Los portainjertos 'IAC 572' y 'IAC 313' indujeron, en promedio, una mayor acumulación de peso fresco y seco de las ramas de 'Niagara Rosada', siendo, respectivamente, 2496 kg ha⁻¹ y 1167 kg ha⁻¹. En relación a las épocas de poda, se obtuvo en las podas de invierno, el rendimiento promedio de 15,3 y 25,7 ton ha⁻¹ siendo significativamente superior a la media obtenida en la poda de verano, de 8,3 t ha⁻¹. Hubo una influencia significativa de los patrones y ciclos de producción en los tenores de N, K, P, Mg y Zn en las ramas y en los tenores de K, P, S, Cu, Fe y Zn en los racimos de 'Niagara Rosada'. Hubo una influencia significativa de los patrones y ciclos de producción en la extracción de N, K, P, Ca, Mg, S, B y Zn por las ramas, y en la extracción de K y Cu por los racimos de la vid 'Niagara Rosada', obteniendo con el portainjerto 'IAC 572' los valores más elevados.

EFFECT OF NAPHTHALENE ACETIC ACID IN REDUCING POSTHARVEST LOSSES OF CENTENNIAL SEEDLESS GRAPEVINES
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It was evaluated the effect of the use of naphthalene acetic acid (NAA) on Centennial Seedless grapevines in order to reduce post-harvest losses caused by rot and berry drop. The experiment was carried out in vineyard in Jales, 20°16'08"S. and 50°32'45"W, State of São Paulo, Brazil, in 2011, using five dosis of NAA (0; 50; 100; 150 and 200 mg. L⁻¹).