



Vigour You Can Measure

ADVICO Team at Otterkuil (Rootstock demo), July 2025

Cane mass as a lens on rootstock performance

As the ADVICO team is currently engaged in pruning and collecting seasonal measurements across 16 vineyard sites, cane mass continues to be an important indicator of vine performance. Although yield data provides insight into production, cane mass helps explain how the grapevine achieved that production, offering valuable information on vine balance and vegetative growth.

At the Otterkuil, Agter-Paarl rootstock demo site, cane mass has been recorded over several seasons alongside harvest and phenology data to evaluate the performance of 10 rootstock combinations on Chenin Blanc clones SN9 and SN550. The resulting dataset provides valuable insight into how different rootstock–clone combinations perform under dryland conditions, potentially helping growers identify combinations that are better suited to specific production objectives and more resilient to seasonal variation.

Comparing rootstock performance

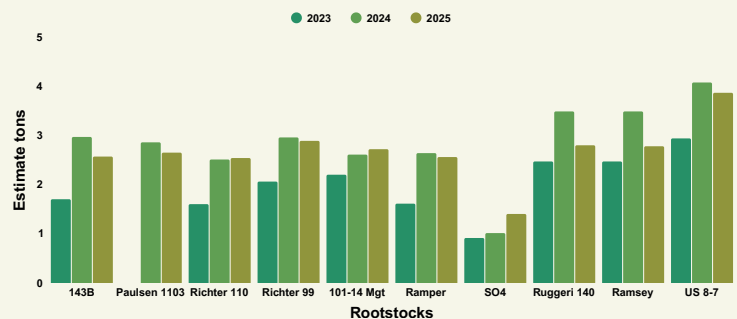
Graphs 1 and 2 compare average cane mass across rootstock–clone combinations over three seasons, illustrating how vegetative growth varied over time and how different combinations responded to seasonal conditions. US8-7 produced the highest cane mass across both Chenin Blanc clones. Overall, SN9 exhibited higher cane mass than SN550 across most rootstocks, indicating a more vigorous growth response under dryland conditions. Ruggeri 140 and Ramsey also showed relatively high cane mass in SN550, while most other rootstocks were closer to the trial average. SO4 produced lower cane mass across both clones and seasons, reflecting a less vigorous growth response under these conditions.

As SO4 is typically considered best adapted to moderately fertile, moist, acidic to moderately calcareous soils and exhibits moderate drought tolerance, its reduced vegetative growth in the present study may reflect the comparatively dryland conditions

of the site, given that SO4 is generally considered better adapted to moderately fertile soils with higher moisture availability.

The data also highlight clear seasonal variation, with cane mass generally lower across all rootstocks in 2023 compared with 2024 and 2025. This demonstrates the strong influence of seasonal conditions on vegetative growth, as grapevine vigour is closely linked to water availability, temperature, and overall growing season conditions. It also reinforces the importance of evaluating rootstock performance over multiple years to account for seasonal variability.

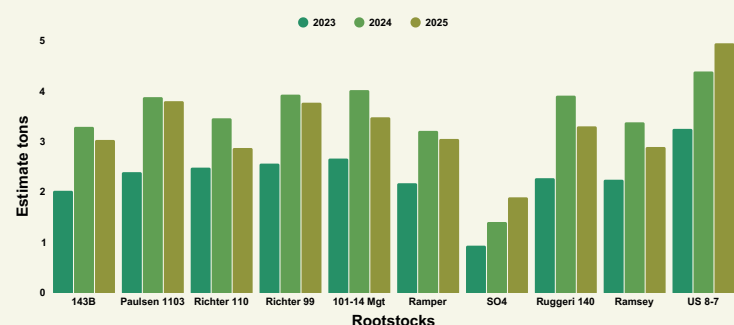
Estimate cane ton/ha measured from seasons 2023–2025 for Chenin Blanc SN 550



Graph 1: Average cane mass (ton/ha) measured during winter pruning from 2023–2025 for 10 rootstock combinations grafted to Chenin Blanc SN 550.

Note: data for rootstock P1103 in 2023 are missing for this parameter

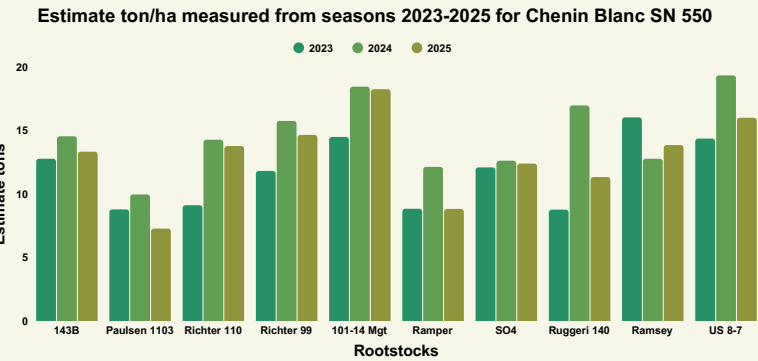
Estimate cane ton/ha measured from seasons 2023–2025 for Chenin Blanc SN 9



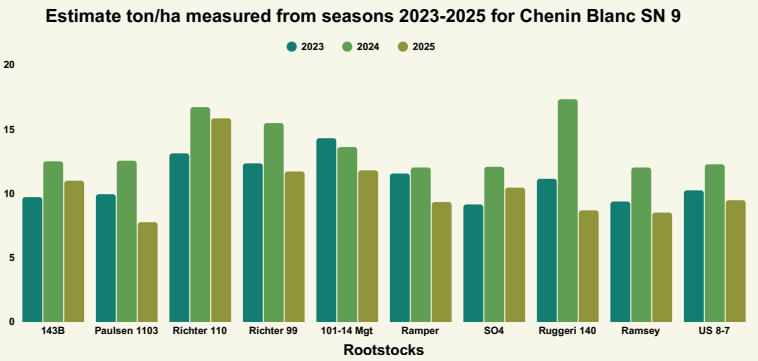
Graph 2: Average cane mass (ton/ha) measured during winter pruning from 2023–2025 for 10 rootstock combinations grafted to Chenin Blanc SN9.

While cane mass provides insight into vegetative growth, production data reveal how effectively this growth was translated into production. **Graphs 3 and 4**

compare average production across rootstock–clone combinations over three seasons. Across the three seasons, 101-14 Mgt consistently produced among the highest yields, followed by Richter 110 and Richter 99, suggesting that these rootstocks may be particularly well-suited to sustaining production under dryland conditions. This field performance aligns with literature indicating that R110 and R99 exhibit high physiological drought tolerance (Labarga *et al.*, 2023), characteristics that inherently help buffer the vine and stabilize yield in the field. Although US8-7 achieved high production for SN550, it also produced the highest cane mass, indicating a more vigorous growth habit relative to yield.



Graph 3: Average production (ton/ha) measured during from 2023–2025 for 10 rootstock combinations grafted to Chenin Blanc SN9.



Graph 4: Average production (ton/ha) measured from 2023–2025 for 10 rootstock combinations grafted to Chenin Blanc SN9.

While cane mass and production data each provide valuable insight on their own, they only present part of the picture of vine performance. To more accurately assess vine balance, cane mass and yield were combined to calculate the Ravaz Index. An optimal Ravaz Index ranges from 5 to 10 (Kliwer and Dokoozlian, 2001), with lower values indicating excessive vegetative growth relative to crop load and higher values indicating a potential risk of overcropping. As a measure of crop load relative to vegetative growth, the Ravaz Index provides a useful framework for interpreting rootstock performance beyond vigour or yield alone. **Table 1** summarises the calculated Ravaz Index values for each rootstock–clone combination across the three seasons. Clear differences in vine balance were observed between the two clones.

Table 1: Calculated Ravaz Index values across rootstock-clone combinations over three seasons.

SN 550	2023	2024	2025	SN 9	2023	2024	2025
143B	8	5	5	143B	5	3	3
P1103	*	3	3	P1103	5	3	2
R110	6	6	5	R110	5	5	6
R99	6	5	5	R99	5	4	3
101-14 MGT	7	7	7	101-14 MGT	5	3	3
RAMP	5	5	3	RAMP	5	4	3
SO4	13	13	9	SO4	10	9	6
RUG	4	5	4	RUG	5	4	3
SC	7	4	5	SC	4	4	3
US 8-7	5	5	4	US 8-7	3	3	2

*Note: data for rootstock P1103 in 2023 are missing to calculate Ravaz Index value

For clone SN550, most rootstocks produced Ravaz Index values within the optimal range of 5–10, with averages generally between 5 and 7, indicating well-balanced vines. Exceptions were Paulsen 1103, which consistently showed low values suggestive of greater vegetative growth relative to yield, and SO4, which produced higher values, indicating a comparatively larger crop load in relation to canopy growth. Although Paulsen 1103 exhibited a lower Ravaz Index, cane mass production remained moderate and vines maintained a relatively upright growth habit at this site.

In contrast, the highly vigorous rootstocks Ruggeri 140, Ramsey and Ramper were observed during the season to develop a more sprawling and flattened canopy structure, with shoots tending to fall open in the bushvine system. At this site, these observations suggest that highly vigorous rootstocks may require greater canopy management inputs in bushvine systems to maintain bunch protection and vine form.

SN9 generally produced lower Ravaz Index values, with most rootstocks averaging around 4, reflecting a tendency towards greater vegetative growth. Paulsen 1103 and US8-7 exhibited particularly low values, whereas SO4 averaged around 8, placing it at the upper end of the recommended range. Seasonal variation was also more pronounced for SN9, emphasising the influence of environmental conditions on vine balance.

Collectively, these results demonstrate that rootstock and clone combinations can be used to fine-tune vine performance according to specific production goals while also influencing vineyard management requirements. Ultimately, the most suitable rootstock is not necessarily the one that produces the highest yield or greatest vigour, but the one that consistently delivers the desired balance between growth, production and manageability under a site's specific conditions. Multi-season evaluation remains essential for identifying combinations best suited to individual vineyard sites and production systems.