SCS208 Cronos: black bean cultivar with high grain yield stability and adaptability, excellent grain quality and sanity, for Southern Brazil

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Abstract - SCS208 Cronos is a new common bean cultivar, it belongs to the black seed group and is developed by the Agricultural Research and Rural Extension Company of Santa Catarina (Epagri). This cultivar shows high grain yield combined with stability and adaptability across the state of Santa Catarina. It features excellent plant health, particularly with resistance to anthracnose (*Colletotrichum lindemuthianum*), which is a disease that affects pods. The plants have a semi-erect architecture and an indeterminate growth habit, which makes them well-suited for mechanical harvesting. The grains are typical of the black bean group, with a dull background and full elliptical shape. Cultivation is recommended throughout the southern region of Brazil during both the main and off-season crops.

Keywords: *Phaseolus vulgaris*; yield trials; anthracnose resistance; plant breeding; cultivar description; seed production.

SCS208 Cronos: cultivar de feijão preto de maior estabilidade e adaptabilidade ao rendimento de grãos, com ótimo cozimento e alta sanidade de plantas recomendado para todo o Sul do Brasil

Resumo - SCS208 Cronos é o novo cultivar de feijão comum, do grupo de sementes preto, desenvolvido pela Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina (Epagri). Este cultivar apresenta alto rendimento de grãos associado a estabilidade e adaptabilidade para todo o estado de Santa Catarina, possui elevada sanidade de plantas, especialmente com resistência à antracnose (*Colletotrichum lindemuthianum*) causadora de doenças nas vagens. As plantas possuem arquitetura semi-ereta com hábito de crescimento indeterminado, sendo adaptadas à colheita mecanizada. Seus grãos são característicos do grupo preto, com fundo opaco e de forma elíptica cheia. É indicado seu cultivo em toda a região Sul-brasileira nos períodos de safra e de safrinha.

Palavras-chave: Phaseolus vulgaris; ensaios de competição; resistência à antracnose; melhoramento genético; descrição de cultivares; produção de sementes.

Introduction

Common bean (*Phaseolus vulgaris*) is widely cultivated and consumed throughout Brazil, it accounts for 80% of the national consumption, while the remaining 20% corresponds to cowpea (*Vigna unguiculata*). Within the common bean group, the carioca type is the most consumed, representing 56% of demand, followed by black beans at 21%, and special varieties, which account for 3% (Embrapa, 2025).

Black beans hold even greater significance in the Southern Region and is the most consumed type due to culinary tradition, historical, and cultural influence, as well as local production and wide availability in the area.

The Bean Breeding Program (PMGF) of the Research Center for Family Agriculture (Cepaf) develops, evaluates, and disseminates new cultivars that promote increased and stable production aiming to develop high yielding cultivars with disease resistance, thereby providing greater profitability for farmers.

SCS208 Cronos stands out for its agronomic performance, high grain yield potential, resilience, and stability. The success of the crop depends on several factors, such as climatic conditions, availability of water and nutrients, and effective control of pest and disease. However, the selection of an agronomically superior cultivar is a key factor in achieving high productivity in the field.

According to Costa *et al.* (1999), stability refers to the ability of genotypes to show a highly predictable behavior in response to environmental stimuli. This trait is highly valued by farmers, because a stable cultivar ensures greater predictability and maintains good performance even under unfavorable environmental conditions, which reduces the risk of compromising both yield and profitability.

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The high yield stability and resilience of this cultivar provides it with agronomically superior performance regarding both plant health and grain yield. SCS208 Cronos shows greater resistance to diseases due to its resilience, particularly anthracnose, which is the main threat to the crop. This disease affects the pods and damages the grains, potentially causing irreversible harm during the early stages of development and flowering of the bean plant.

To develop common bean cultivars, EPAGRI conducts around 40 cross combinations each year and evaluates nearly 1,000 segregating families for each generation. Phenotypic selection, Value for Cultivation and Use (VCU) tests, and tests for disease resistance, grain quality, and drought tolerance (Kavalco *et al.*, 2024) are also performed.

Bean cultivation

Brazil ranks second in global bean production, behind India, and the estimated production is approximately 3.3 million tons in the growing season of 2024/25, cultivated over an area of 2.8 million hectares (FAO, 2025; CONAB, 2025). However, there has been a declining trend in the planted area over recent years. Beans were cultivated on approximately 3.9 million hectares in the 2004/05 season, which represents a reduction of nearly 28% over a 20-year period. Despite this, beans remain a staple food in the Brazilian diet, with around 92% of production intended for domestic consumption and only 5% destined for export (CONAB, 2025).

The cultivation of this legume is feasible during three growing seasons in Brazil. In the South Region, the first season, also known as "águas" (rainy season), is sown between August and November, while the second season, commonly referred to as "safrinha" or "dry season," is sown between January and February. The third season, "autumn-winter," is sown from May to June and is predominant in some states of the Central-West, Southeast, and Northeast regions, where winters are mild and frost does not occur. In these cases, irrigation systems are necessary due to low rainfall during this period (CTSBF, 2012; Embrapa, 2025). The Brazilian production in the 2024/25 season is estimated to be distributed as follows: 32.51% from the first season, 43.84% from the second season, and 23.65% from the third season (CONAB, 2025).

Approximately 32% of 'the Brazilian national bean production comes from the South Region, which has around 610 thousand hectares planted with this crop. Currently, Santa Catarina has the highest productivity among the three south states, with a mean yield of 1,966Kg ha^{-1}, followed by Paraná with a mean of 1,748.31Kg ha^{-1}, and Rio Grande do Sul with 1,585.57Kg ha^{-1}. All three states report yields above the national mean, which is approximately 1,154.06Kg ha^{-1} (CONAB, 2025).

Santa Catarina planted 63.2 thousand hectares with beans in the 2023/24 growing season, resulting in a production of 113,067 tons. Of this total, 42.46% of the production came from the first season, and 57.54% from the second season (safrinha). For the 2024/25 cycle, there is a 25.82% increase in the planted area for the first season and a 6.30% reduction in the planted area for the second season. This scenario indicates a shift in the trend observed in recent years, as it is estimated that for 2024/25, most of the state's bean production will come from the first season (54.94%), while the second season is expected to account for 46.05% of the total production.

The occurrence of diseases, of which anthracnose stands out, is an obstacle for a cultivar to express its full production potential. This fungal disease, caused by the agent *Colletotrichum lindemuthianum* (Sacc. & Magnus), is the primary threat to this legume and can lead to total crop loss when it infects plants in the early stages of development. The plant shows symptoms on the underside of the leaf along the veins when infected, and the petioles and stems may develop cankers. On the pods, the lesions are rounded and sunken, brown in color, with dark, raised edges, surrounded by a reddish-brown ring (Canale *et al.*, 2020).

The fungus is widely spread in Santa Catarina due to favorable climatic conditions and can be transmitted through infected seeds, rain accompanied by wind, insects, agricultural equipment, and can also survive in crop residues, seeds, and other leguminous species (CTSBF, 2012). *C. lindemuthianum* also shows significant genetic variability, leading to the occurrence of different pathogen types. Gonçalves-Vidigal *et al.* (2008) reported the presence of 13 distinct types in Santa Catarina, which were 65, 67, 73, 75, 81, 83, 89, 95, 101, 103, 105, 121, and 581. However, there is no survey to indicate which are present in the producing regions of the state.

The most appropriate alternative for controlling anthracnose may be through the selection of resistant cultivars, which is also efficient from both economic and ecological perspective. Regarding disease resistance, resilience is a highly valued characteristic by farmers, so it is essential for ensuring the efficiency of agricultural production. This is due to the ability of these materials to maintain their productive potential even under pathogen pressure, which results in reduced dependence on fungicides. This choice also leads to a reduction in production costs, adds value to the product, and promotes sustainability by minimizing environmental impacts.

Breeding method

Hybrid seeds were obtained by the hybridization of BRS Campeiro (black seeds) and IPR Uirapuru (black seeds), which was conducted during the 2000/01 season (Figure 1). A generation advance was conducted in 2001 to obtain the F2 generation. Three generations were advanced during the 2002/03, 2003/04, and 2004/05 growing seasons, reaching the F4, which was grown in the field, where a diallel trial was conducted to evaluate yield and to obtain the CHP 01-182 population. A first Intermediate Black Bean Trial was conducted for line comparison without applying plant section in the 2006/07 growing season. In the following three seasons (2007/08, 2008/09, and 2009/10), the State Trial of Black Bean Lines and Cultivars was conducted to compare lines and select the superior

ones. However, at the end of this phase, the population from the cross was still segregating, and a decision was made to initiate plant selection in 80-meter-long plots, resulting in several lines denominated CHP 01-182-n, where 'n' corresponds to each selected plant.

In the 2011/12 season, after plant selection in the previous generation, lines were sown and F9 lines were selected to compose the Black Bean Family Trial conducted in 2012/13 (Figure 1), involving line comparisons and selection of the best-performing ones. Several lines from this cross were selected and continued under field evaluation. In the F11 generation and during the 2013/14 season, a Preliminary Black Bean Trial was conducted with multiple lines from this and other crosses, and superior lines were selected based on plant architecture, yield, disease resistance, and grain quality. The Intermediate Black Bean Trial was conducted in 2014/15 to assess and select lines for productive performance, grain quality, and plant health.

The F13, F14, and F15 generations were evaluated during the main and off-seasons of 2015/16, 2016/17, and 2017/18 via VCU (Value for Cultivation and Use) trials, focusing on grain color, size, uniformity, and yield. Trials were conducted in randomized complete blocks with four replications of plots composed of four 4-meter rows. Two promising lines from the same cross were identified: CHP 01-182-48 and CHP 01-182-12. Both lines were maintained in the subsequent generations (F16, F17, F18, and F19), one in VCU trials and the other in comparative trials with cultivars across the same locations and main/off-season periods of 2018/19, 2019/20, 2020/21, and 2021/22. All selection cycles (Figure 1) were conducted in Chapecó, SC (27°05'24" S, 52°39'05" W, at an altitude of 668 m).

After evaluation in Value for Cultivation and Use (VCU) trials conducted during both the main and off-seasons from 2015 to 2022, the line CHP 01-182-48 demonstrated superior agronomic performance compared to other lines in terms of plant architecture, disease resistance, grain color, size, uniformity, and yield. These results

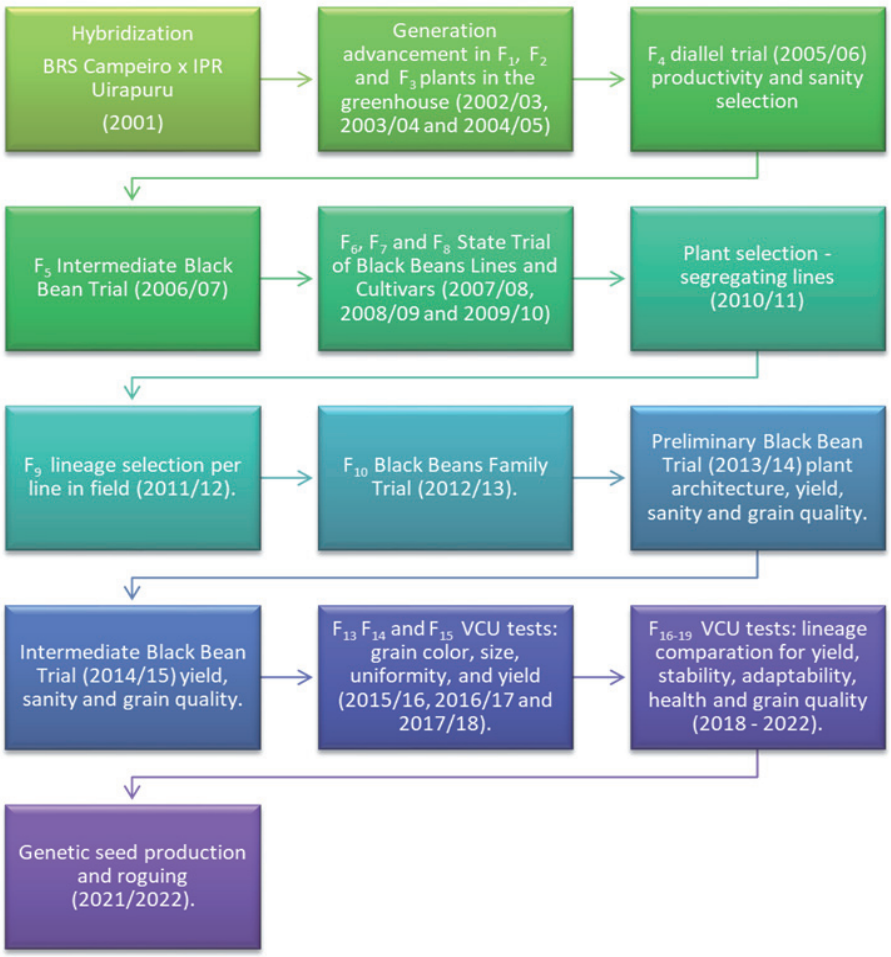

Figure 1. Breeding methodology and selection cycles of the new common-bean cultivar of SCS208 Cronos. Epagri/CEPAF – Chapecó, 2025
Source: Elaborated by the Authors (2025)
Figura 1. Metodologia de melhoramento e ciclos de seleção da nova cultivar de feijão comum SCS208 Cronos. Epagri/CEPAF – Chapecó, 2025
Fonte: Elaborado pelos autores (2025)

justified its registration in the National Cultivar Registry and in the National Plant Variety Protection Service, under the denomination SCS208 Cronos. Starting from the 2023/24 season, this cultivar is recommended for cultivation during both sowing periods in the states of Santa Catarina, Paraná, and Rio Grande do Sul, in accordance with the Agricultural Zoning for Climate Risk established by the Ministry of Agriculture, Livestock, and Supply.

Yield potential of SCS208 Cronos

SCS208 Cronos showed superior agronomic performance in terms of grain yield compared to the control cultivars across all evaluated locations during three consecutive growing seasons (2015/16, 2016/17, and 2017/18). When compared to BRS Campeiro and IPR Uirapuru, SCS208 Cronos achieved a mean grain yield 119% higher across both the main and second growing seasons (Table 1). Specifically, yield was 113.74% higher than BRS Campeiro and 125.09% higher than IPR Uirapuru over the same period.

Compared to the cultivars BRS Campeiro and IPR Tuiuiú, SCS208 Cronos showed a mean grain yield 112.83% higher during the 2018/19 and 2019/20 growing seasons (Table 2), outperforming both controls in both the main and second cropping seasons. Specifically, its yield was 111.35% higher than BRS Campeiro and 114.35% higher than IPR Tuiuiú.

In Ponte Serrada, during the main

growing season of 2016/17, the mean grain yield reached 5,261.9kg ha^{-1}, representing the highest performance recorded among all locations evaluated in the Value for Cultivation and Use (VCU) trials over the five-year assessment period (Table 1 and 2).

SCS208 Cronos has a production potential of 5,300kg ha^{-1}, with a mean yield of 3,900kg ha^{-1} in the main growing season and 2,500kg ha^{-1} in the second season in the state of Santa Catarina based on the results obtained during the evaluation period of Value for Cultivation and Use (VCU), under different cultivation environments, with varying soil characteristics, crop cycles, and the occurrence of biotic and abiotic stresses across different years and growing seasons (Table 3).

Other characteristics

The main phenotypic traits of SCS208 Cronos include the presence of anthocyanin in the hypocotyl and stem, an indeterminate type II growth habit, semi-erect architecture, green leaves at the fourth node, violet flowers, and black seeds. The cultivar is adapted to mechanical harvesting, has a crop cycle of approximately 85 days, and shows moderate resistance to anthracnose and angular leaf spot (Table 4).

Grain quality evaluations, which were conducted according to the methodology of Proctor and Watts (1987) using samples harvested during the 2016/2017 and 2017/2018 seasons, revealed a cooking time of 26 minutes for SCS208 Cronos and a protein content of 21%. In comparison, the control cultivars BRS Campeiro and IPR Uirapuru had cooking times of 29 minutes and 30 seconds and 28 minutes and 30 seconds, with protein contents of 21.5% and 22%, respectively.

SCS208 Cronos has a superior grain yield potential, exceeding 5,300kg ha^{-1}. The cultivar shows resistance to types 83 and 337 of the *Colletotrichum lindemuthianum* pathogen and shows an intermediate reaction to types 65, 73, 81, 89, and 337, as evaluated according to the scale proposed by Pastor-Corrales *et al.* (1995).

Technical recommendations and seed production

SCS208 Cronos has been officially registered with the Brazilian Ministry of Agriculture, Livestock and Food Supply (registration no. 52,197), is protected under the National Plant Variety Protection Service (SNPC no. 21806.000228/2022), and it is produced by the Common Bean Breeding Program of EPAGRI.

SCS208 Cronos is recommended for cultivation during both the main and second sowing seasons in the states of Santa Catarina, Paraná, and Rio Grande do Sul because of its high yield potential, adaptability, and stability.

Author contributions

Sydney Antonio Frehner Kavalco: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Supervision, Validation, Visualization; **Thaila Rayssa Potrich Prezotto:** Data curation, Writing – original draft, Writing – review & editing; **Diego Henrique Pilatti Toniolo:** Data curation, Writing – original draft, Writing – review & editing

Conflict of interest

The authors declare no conflict of interest in this work.

Research data

Data will be made available by the author upon request.

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References

CANALE, M.C. RIBEIRO, L.P. CASTILHOS, R.V. WORDELL FILHO, J.A. **Pragas e doenças do feijão: diagnose, danos e estratégias de manejo.** Florianópolis: Epagri, 2020. 98p. (Epagri. Boletim Técnico 197).

COMISSÃO TÉCNICA SUL-BRASILEIRA DE FEIJÃO. **Informações técnicas para o cultivo de feijão na Região Sul brasileira.** 2.ed. Florianópolis: Epagri, 2012. 157p.

CONAB, COMPANHIA NACIONAL DE ABASTECIMENTO. **Portal de Informações Agropecuárias.** Disponível em: https://portaldeinformacoes.conab.gov.br/safra-serie-historica-graos.html. Acesso em: abril de 2025.

COSTA, J.G. MARINHO, J.D.S. PEREIRA, R. LEDO, F.D.S. & MORAES, R.D.S. Adaptabilidade e estabilidade da produção de cultivares de milho recomendadas para o estado do Acre. **Ciência e Agrotecnologia**, Lavras, v.23, n.1, p.7-11, 1999.

EMPRESA BRASILEIRA DE PESQUISA AGROPECUÁRIA (EMBRAPA). Consumo de Feijão. Disponível em: https://www.embrapa.br/en/agencia-de-informacao-tecnologica/cultivos/feijao. Acesso em: fevereiro de 2025.

FAO – Food and Agriculture Organization of the United Nations. **FAOSTAT – Rankings: Countries by Commodity.** Disponível em: https://www.fao.org/faostat/en/#rankings/countries_by_commodity. Acesso em: abril de 2025.

GONÇALVES-VIDIGAL, M.C. THOMAZELLA, C. FILHO, P.S.V. KVITSCHAL, M.V. ELIAS, H.T. Characterization of Colletotrichum lindemuthianum isolates using differential cultivars of common bean in Santa Catarina state, Brazil. **Brazilian Archieves of Biology and Technology**, v. 55, p. 883-888, 2008.

KAVALCO, S.A.F. NICKNICH, W. PREZOTTO. T.R.P. TONIOLO, D.H.P. SCS207 Querência: a high-yield carioca bean cultivar with superior grain size, color, and health attributes for southern Brazil. **Agropecuária Catarinense**, Florianópolis, v.37, n.3, p.34-39, 2024.

PASTOR-CORRALES, M.A. OTOYA, M.M. MOLINA, A. SINGH, S.P. Resistance to *Colletotrichum lindemuthianum* isolates from middle America and Andean South America in different common bean races. **Plant Disease**, n. 79, p. 63-67, 1995.

PROCTOR, J.R. WATTS, B.M. Development of a modified Mattson bean cooker procedure based on sensory panel cookability evaluation. **Canadian Institute of Food Science and Technology Journal**, Ottawa, v. 20, p. 9-14, 1987.

Table 1. VCU performed in Santa Catarina, Brazil, in the 2015/2016, 2016/2017 and 2017/2018 crop years during the first and second sowing seasons for SCS208 Cronos (CHP 01-182-48) compared with BRS Campeiro and IPR Uirapuru cultivars

Tabela 1. VCU realizado em Santa Catarina, Brasil nas safras de 2015/2016, 2016/2017 e 2017/2018, durante a primeira e segunda safra, para a cultivar SCS208 Cronos (CHP 01-182-48), em comparação com as cultivares BRS Campeiro and IPR Uirapuru

Location	Crop Season	Year	SCS208 Cronos (kg ha^{-1})	Control cultivar (kg ha^{-1})		Comparison cultivars Mean	CV (%)
				BRS Campeiro	IPR Uirapuru		
Santa Catarina							
Canoinhas	First	2015/16	4,453.68	3,700.75	3,655.92	3,678.34	12.2
Chapecó	First	2015/16	3,407.44	3,401.4	2,191.63	2,796.52	14.17
Ponte Serrada	First	2015/16	3,337.75	1,495.94	1,416.19	1,456.07	26.89
Canoinhas	Second	2015/16	1,175.6	1,323.6	1,064.6	1,194.1	14.91
Chapecó	Second	2015/16	3,071.41	2,806.53	2,609.24	2,707.89	9.53
Ituporanga	Second	2015/16	1,434.4	1,300.7	1,352.6	1,326.65	13.31
Canoinhas	First	2016/17	3,896.2	2,962.6	3,555.8	3,259.2	16.07
Chapecó	First	2016/17	4,674.5	3,812.7	3,452.4	3,632.55	10.39
Ponte Serrada	First	2016/17	5,261.9	4,450.1	4,502.2	4,476.15	13.58
Chapecó	Second	2016/17	2,907	2,571.8	2,600.4	2,586.1	10.43
Ituporanga	Second	2016/17	2,506	2,435.3	2,048.5	2,241.9	18.47
Xanxerê	Second	2016/17	3,147.5	3,061	2,542	2,801.5	14.6
Ponte Serrada	First	2017/18	4,517.06	4,178.91	3,890.28	4,034.6	10.92
Chapecó	First	2017/18	3,609.5	3,019.2	2,179.9	2,599.55	11.97
Campos Novos	First	2017/18	4,337.75	4,333.56	4,108.81	4,221.19	9.88
Ituporanga	Second	2017/18	1,885	1,873.5	1,162.1	1,517.8	14.8
Chapecó	Second	2017/18	3,477.73	3,305.03	2,858.99	3,082.01	19.18
Xanxerê	Second	2017/18	2,871.3	2,695.6	2,750.4	2,723	8.37
Mean			3,331.76	2,929.35	2,663.44	2,796.39	
Relation (%)				113.74	125.09	119.14	

Source: Elaborated by the Authors (2025)

Fonte: Elaborado pelos autores (2025)

Table 2. VCU performed in Santa Catarina, Brazil, in the 2018/2019 and 2019/2020 crop years during the first and second sowing seasons for SCS208 Cronos (CHP 01-182-48) compared with BRS Campeiro and IPR Tuiuiú cultivars

Tabela 2. VCU realizado em Santa Catarina, Brasil nas safras de 2018/2019 e 2019/2020, durante a primeira e segunda safra, para a cultivar SCS208 Cronos (CHP 01-182-48), em comparação com as cultivares BRS Campeiro and IPR Tuiuiú

Location	Crop Season	Year	SCS208 Cronos (kg ha^{-1})	Control cultivars (kg ha^{-1})		Comparison cultivars Mean	CV (%)
				BRS Campeiro	IPR Tuiuiú		
Xanxerê	First	2018/19	3,403.3	3,272.7	3,272.5	3,272.6	10.93
Canoinhas	First	2018/19	2,927.9	2,163.8	2,564.4	2,364.1	12.38
Campos Novos	First	2018/19	4,379.4	3,436	3,183.1	3,309.55	19.93
Ituporanga	Second	2018/19	1,793.1	1,549.6	1,606.5	1,578.05	14.32
Chapecó	Second	2018/19	3,207	3,141.9	2,325.5	2,733.7	10.75
Xanxerê	Second	2018/19	2,653.4	2,283.6	2,493.3	2,388.45	14.14
Chapecó	First	2019/20	2,062.1	1,732.98	1,834.87	1,783.93	15.99
Campos Novos	First	2019/20	4,836.69	4,232.16	4,125.22	4,178.69	8.06
Xanxerê	First	2019/20	3,795.54	4,220.33	3,826.13	4,023.23	9.27
Ituporanga	Second	2019/20	2,997.26	2,582.63	2,679.98	2,631.31	8.32
Chapecó	Second	2019/20	1,190.13	1,005.17	1,213.09	1,109.13	23.08
Xanxerê	Second	2019/20	2,312.34	2,312.66	1,970.65	2,141.66	14.18
Mean			2,963.18	2,661.13	2,591.27	2,626.2	
Relation (%)				111.35	114.35	112.83	

Source: Elaborated by the Authors (2025)

Fonte: Elaborado pelos autores (2025)

Table 3. Characteristics of the VCU trial locations conducted in Santa Catarina from 2015 to 2020 and number of days from emergence to flowering, physiological maturity, and harvest of each location, year, and crop season for the SCS208 Cronos (CHP 01-182-48) cultivar
Tabela 3. Características dos locais de experimentação de VCU conduzidos em Santa Catarina de 2015 a 2020 e o número de dias da emergência ao florescimento, à maturação fisiológica e à colheita para cada local, ano e safra da cultivar SCS208 Cronos (CHP 01-182-48)

Location	Crop Season	Year	Days from emergence to			Soil type	Factors
			Flowering	Maturation	Harvest		
Santa Catarina							
Canoinhas/ Papanduva	First	2015/16	40	88	95	Nitossolo/ cambissolo	Occurrence of anthracnose and drought periods in first season
Canoinhas/ Papanduva	Second	2015/16	39	81	90	Nitossolo/ cambissolo	
Chapecó	First	2015/16	35	82	88	Nitossolo/ cambissolo	
Chapecó	Second	2015/16	35	78	85	Cambissolo/ latossolo	Occurrence of angular leaf spot in first season and frost in the second season
Ituporanga	Second	2015/16	37	85	92	Cambissolo/ latossolo	
Ponte Serrada	First	2015/16	38	85	90	Cambissolo/ latossolo	
Canoinhas/ Papanduva	First	2016/17	42	87	96	Cambissolo/ latossolo	
Chapecó	First	2016/17	38	88	95	Latossolo/ cambissoloe	Occurrence of anthracnose and bacteriosis with drought periods in first season
Chapecó	Second	2016/17	30	83	90	Latossolo/ cambissolo	
Ituporanga	Second	2016/17	38	87	92	Latossolo/ cambissolo	
Ponte Serrada	First	2016/17	40	89	99	Latossolo/ cambissolo	
Xanxerê	Second	2016/17	39	88	95	Latossolo/ cambissolo	
Campos Novos	First	2017/18	45	90	98	Latossolo/ cambissolo	
Chapecó	First	2017/18	39	83	88	Latossolo/ cambissolo	
Chapecó	Second	2017/18	33	81	88	Latossolo/ cambissolo	
Ituporanga	Second	2017/18	48	88	98	Latossolo/ cambissolo	
Ponte Serrada	First	2017/18	38	90	99	Cambissolo/ argissolo	Occurrence of angular leaf spot in first season and frost in the second season
Xanxerê	Second	2017/18	37	83	90	Cambissolo/ argissolo	
Campos Novos	First	2018/19	39	89	95	Cambissolo/ argissolo	
Canoinhas/ Papanduva	First	2018/19	38	84	90	Cambissolo/ argissolo	
Chapecó	Second	2018/19	36	85	89	Cambissolo/ argissolo	
Ituporanga	Second	2018/19	37	81	88	Cambissolo/ nitossolo	Occurrence of anthracnose and high rainfall in first season
Xanxerê	First	2018/19	50	88	92	Cambissolo/ nitossolo	
Xanxerê	Second	2018/19	43	85	89	Cambissolo/ nitossolo	

Table 4. Phenotypic and biological characteristics of common bean cultivar of SCS208 Cronos
Tabela 4. Características fenotípicas e biológicas da cultivar de feijão comum SCS208 Cronos

CHARACTERISTIC		**SCS208 CRONOS**
Plant		
	Hypocotyl color	With anthocianin
	Plant structure	Semi erect
	Growth habit	Undetermined type II
	Guide length	Medium
	Stem	With anthocianin
	Leaf color (4th node)	Medium green
	Mean cycle of emergency to flowering	39 days
	Mean cycle of emergency to harvest	85 days
	Adaptation to mechanical harvesting	Adapted
Grain		
	Grain color	Black
	Flower color	Violet
	Grain shape	Eliptical
	Degree of flatness	Full
	Weight of thousand grains	220 grams
	Mean time of cooking	26 minutes
	Mean protein grain content	21,00%
Desease reaction		
	Anthracnose (*C. lindemutianum*)	MR
	Angular leaf spot (*Isariopsis griseola*)	MR
	Bacterial blight (*X. campestris pv. phaseoli*)	MS
	Fusarium wilt (*F. oxysporum*)	MR
Indicated growing region		SC, PR and RS

Source: Elaborated by the Authors (2025)
Fonte: Elaborado pelos autores (2025)