CTH251 flue-cured tobacco F1 hybrid

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Cultivar description

CTH251 flue-cured tobacco F_1 hybrid

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Abstract

CTH251 is a high yielding flue-cured tobacco with improved leaf quality and is comparable to the check, CTH14. It has comparatively lower percentage total alkaloids than the check. Ground sucker (basal tillers) weight for CTH251 tended to be slightly lower than for the check, which may be more of an advantage for growers when controlling suckers during early season.

Key words: *Nicotiana tabacum* L., hybrid, cultivar description

Résumé

CTH251 est une variété de tabac jaune à haut rendement et aux feuilles de qualité supérieure comparable au témoin CTH14. La proportion d'alcaloïdes totaux est plus faible que celle de la variété témoin. Le poids des drageons au ras du sol (talles de la base) de CTH251 a tendance à être légèrement plus faible que celui du cultivar témoin, ce qui pourrait constituer un avantage pour les cultivateurs quand ils suppriment les drageons en début de saison. [Traduit par la Rédaction]

Mots-clés : *Nicotiana tabacum* L., hybride, description de cultivar

Introduction

CTH251 is a new flue-cured tobacco (*Nicotiana tabacum* L.) hybrid developed by the Canadian Tobacco Research Foundation. It has been recommended for registration by the Ontario Recommending Committee for Flue-Cured Tobacco (ORCFCT), based on trials conducted in 2019 and 2020 at three locations (Aylmer, Delhi, and Simcoe) each year, in the tobacco growing regions of Southwestern Ontario. The Canadian Food Inspection Agency, Seed Division, Variety Registration Office issued the registration number 9480 for CTH251 on 10 December 2021.

Pedigree and breeding

CTH251 is a cytoplasmic male-sterile (cms) flue-cured tobacco hybrid developed in 2017 from crossing a male-sterile inbred parent with a normal fertile breeding line. The resulting F_1 hybrid (designated as CTH251) was subsequently evaluated in field trials for physical, agronomic, and chemical characteristics.

The female parent of CTH251 is a cms breeding line (16N93) with a *Nicotiana glauca* Graham source of cytoplasmic male sterility and has improved leaf quality. The male parent of CTH251 is a breeding line designated 93CV137-1, which originated from the cross "Delliot/K326", made in 1990 at the former Delhi Research station. Delliot was registered in Canada in 1986 and K326 is a popular variety in the USA. The records available indicate that 93CV137-1 is an F_4 derived line. In 2014, the $F_{4:6}$ seed of the line was grown at Tillsonburg, Ontario, for observation and to improve seed viability of the line for replicated trials, which were conducted in 2016 (F_7) and 2017 (F_8), in which it was found to have good physical, agronomic, and chemical characteristics for breeding purposes.

The F_1 hybrid CTH251 was first grown in a replicated strain trial at Delhi, Ontario, in 2018 and was examined for agronomic and chemical characteristics. In 2019 and 2020, CTH251 entered in a multilocation registration trial conducted at three locations (Delhi, Simcoe, and Aylmer) and was assessed for agronomic, economic, and chemical traits. The crop was harvested over a period of 5–7 weeks. In each year of field testing, CTH251 was also assessed for reaction to the disease Black Root Rot (BRR) caused by the soilborne fungus *Chalara elegans* (Nag Rag & Kendrick), under controlled conditions in trays using a system adapted from Litton (1983).

Results from the two years of multilocation testing (Tables 1 and 2) show that the yield of CTH251 was comparable to check. Yield and leaf quality in 2019 were based on all three locations but in 2020 the final harvest at Delhi, Ontario, could not be done due to frost damage that occurred on 19 September; therefore, two locations were used for yield and quality assessment that year. CTH251 provided 3652 kg/ha in 2019 and 3514 kg/ha in 2020, while CTH14 yielded 3670 kg/ha in 2019 and 3347 kg/ha in 2020. Grade index and grade index return for CTH251 were comparable to the check each year.

Table 1. Economic characteristics of CTH251 compared to CTH14 in the 2019 and 2020 tobacco registration trial conducted at three locations, Ontario.

Characteristics	Cultivar		$LSD_{(0.05)}$
	CTH14	CTH251	
2019			
Grade index[a]	69	69	11.3
Yield (kg/ha)	3670	3652	354
Grade index returns[b]	2542	2530	651
No. of tests	3	3	
2020[c]			
Grade index[a]	77	77	12.7
Yield (kg/ha)	3347	3514	403
Grade index returns[b]	2596	2715	209
No. of tests	2	2	

[a]Grade index is based on a scale of 0–100 (higher the number = more desirable/marketable grades).
[b](Grade index × Yield per hectare)/100. (Higher value likely to provide greater economic returns).
[c]Based on values from two locations since the final harvest at one location was adversely affected by frost.

Table 2. Characteristics of CTH251 compared to CTH14 in the 2019 and 2020 tobacco registration trial conducted at three locations, Ontario.

Characteristics	Cultivar		$LSD_{(0.05)}$
	CTH14	CTH251	
Agronomic			
Days to topping	63	63	3.4
Topping height (cm)	105.4	103.6	12.67
No. of ground suckers	0.5	0.4	0.5
Ground suckers (kg/ha)	45.4	29.2	88.4
Number of leaves	18.8	18.7	0.80
Width 8th leaf (cm)	30	29	3.6
Length 8th Leaf (cm)	61	62	6.6
Area 8th leaf (cm^2)	1242	1241	253.1
Width 3 tip leaves (cm)	28	27	3.3
Length 3 tip leaves (cm)	61	60	6.1
Area 3 tip leaves (cm^2)	1175	1088	244.7
% Overturned leaves	1.3	0.7	1.54
Lead drop	0.0	0.0	0.0
Leaf spacing (cm)	5.6	5.5	0.48
Chemical			
% Total alkaloids (TA)	2.53	2.40	0.40
% Reducing sugars (RS)	18.46	17.79	4.65
Ratio (RS/TA)	7.59	7.69	3.66
Physical			
% Lamina	69.9	66.3	3.39
Black Root Rot rating[a]	S	S	–
Company visual ratings[b]	76	76	3.4

Note: The number of tests conducted was 6 for data under agronomic characteristics and 5 for data under chemical and physical characteristics, except for Black Root Rot test, which was 2.
[a]Black Root Rot; S, susceptible; R, resistant.
[b]Scale 0–100, where 0 = unusable and 100 = excellent.

Company ratings based on a scale of 0 to 100 (0 = unusable and 100 = excellent) averaged 76, which was identical to the check.

CTH251 averaged 2.40% for total alkaloids and 17.79% for reducing sugars, while CTH14 averaged 2.53% for total alkaloids and 18.46% for reducing sugars. Days to topping were 63 days for both CTH251 and the check. Ground sucker (tillers at the base of the plant) number and weight for CTH251 tended to be smaller than CTH14. This is desirable as growers typically control ground suckers manually or with cultivation in early season. On average, the dimensions of both the eighth leaf and the tip leaves were not different. CTH251 does not possess resistance to BRR and is similar to the check. ORCFCT recommended CTH251 for registration on 23 February 2021.

Pedigree seed stocks

The two inbred parents of CTH251 will be maintained by the Canadian Tobacco Research Foundation (CTRF), P.O. Box 322, Unit #3, 500 Highway #3, Tillsonburg, ON N4G 4H5, Canada. Certified seed growers can obtain breeder seed of the parental lines from CTRF for hybrid seed increase and distribution to farmers.

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