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Schlup et al.

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(54) **CANNABIS PLANT NAMED ‘PG 1 19 0125 0002’**

(50) Latin Name: ***Cannabis* hybrid**
Varietal Denomination: **PG 1 19 0125 0002**

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(52) **U.S. Cl.**
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(58) **Field of Classification Search**

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See application file for complete search history.

(56) **References Cited**

PUBLICATIONS

International Code of Nomenclature for Cultivated Plants 2016 Ninth ed., 2 introductory pages, iii, iv, pp. 28-32. (Year: 2016).*

* cited by examiner

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(57) **ABSTRACT**

A new and distinct *Cannabis* cultivar named ‘PG 1 19 0125 0002’ is characterized by its dominant CBG chemotype, which is favorable for application as a medicinal product. Furthermore, it may be used for the industrial-scale extraction of CBG due to the minimal concentrations of contaminating cannabinoids which may otherwise complicate the extraction of this class of secondary metabolites.

16 Drawing Sheets

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Latin name of the genus claimed: *Cannabis* Hybrid.
Variety denomination: ‘PG 1 19 0125 0002’.

BACKGROUND AND SUMMARY OF THE INVENTION

A novel *Cannabis* hybrid cultivar, entitled ‘PG 1 19 0125 0002’ is provided. ‘PG 1 19 0125 0002’ is the result of a planned breeding program and originated from crosses between privately-owned cultivars. The new cultivar has been vegetatively reproduced by cloning using stem cuttings at Zeiningen, Switzerland. Vegetative clones of ‘PG 1 19 0125 0002’ were tested in controlled indoor growth facilities, greenhouses, and outdoors in open fields. The desired characteristics of each source cultivar are transferred by vegetative, asexual reproduction. ‘PG 1 19 0125 0002’ is stable and consistently true-to-type through multiple generations of vegetative reproduction.

Cannabis is a genus of flowering plants comprising three historically distinct subspecies based on phenotype and metabolite profiles—*Cannabis sativa*, *Cannabis indica*, and *Cannabis ruderalis*. However, decades of crossing and selection makes it impossible to absolutely characterize the resulting hybrid plants using phenotypic data. Most of the *Cannabis* varieties being sold for medicinal and recreational purposes contains characteristics of both *Cannabis sativa* and *Cannabis indica* subspecies. For this reason, ‘PG 1 19 0125 0002’, described herein, has been characterized both on the presented phenotype, as well as the genotype using a series of single nucleotide polymorphisms (SNP).

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Used herein, the terms “cultivar”, “variety”, “clone” and “strain” are used interchangeably.

Cannabis plants synthesize unique terpeno-phenolic compounds in varying concentrations. High genetic variability has resulted in the vast varieties of chemotypes with distinct characteristics available today. More than 500 unique compounds including cannabinoids, terpenoids, terpenes, flavonoids, amino acids, vitamins among many others, are secreted as a sticky resin by the glandular trichomes found on the floral calyxes of female plants. Cannabinoids and terpenes are the biologically active chemicals responsible for the pharmacological and psychoactive properties of *Cannabis* when consumed by humans. They often work together synergistically in what is commonly known as the “entourage effect” and as such, small differences in composition or concentration any of these compounds can have notable effects on the physiological effect of consumed or applied *Cannabis* in or on the human body.

Cannabinoids are produced at significant concentrations in *Cannabis*. Although over a hundred cannabinoids have been identified in *Cannabis*, the major cannabinoids include, Δ9-tetrahydrocannabinol (THC), cannabidiol (CBD), cannabigerol (CBG), cannabinol (CBN), cannabichromene (CBC), cannabinodiol (CBDL), cannabicyclol (CBL), cannabivarin (CBDV), cannabigerovarin (CBGV), cannabichromevarin (CBCV), tetrahydrocannabivarin (THCV), cannabidivarin (CBDV), cannabigerol monomethyl ether (CBGM), cannabilsoloin (CBE), cannabicitran (CBT), cannabinol propyl variant (CBNV), cannabitol (CBO), tetrahydrocannabinolic acid (THCA), tetrahydrocannabivarinic

TABLE 3

Reference chromosome (cs10)	Position in reference sequence	Reference nucleotide sequence	'PG 1 19 0125 0002' Sequence	State
NC_044370.1	2085232	AA	AT	homozygous
NC_044370.1	4838286	CGT	CGC	homozygous
NC_044370.1	36467493	C	T	homozygous
NC_044370.1	11271773	CA	CG	homozygous
NC_044370.1	11271954	CAG	AAG	homozygous
NC_044370.1	13526608	CAA	CTG	homozygous
NC_044379.1	57862779	C	T	homozygous
NC_044379.1	57863241	GGTAC	AAAGC	homozygous
NC_044379.1	57915145	TT	TC	homozygous
NC_044379.1	57954931	C	G	homozygous
NC_044379.1	58169058	GTG	CAA	homozygous
NC_044379.1	58292575	ATCCAA	GTCCCA	homozygous
NC_044379.1	58292927	T	C	homozygous
NC_044379.1	26744250	G	T	homozygous
NC_044379.1	61946066	A	G	homozygous
NC_044379.1	62821655	G	C	homozygous
NC_044371.1	3483276	ACG	ACA	homozygous
NC_044371.1	66149411	T	A	homozygous
NC_044371.1	75422669	TGA	CGT	homozygous
NC_044371.1	75974152	GCC	GTC	homozygous
NC_044371.1	81582801	TT	CT	homozygous
NC_044371.1	82218848	GAG	AGT	homozygous
NC_044371.1	82483522	GC	AA	homozygous
NC_044371.1	30915413	A	G	homozygous
NC_044372.1	2710529	T	C	homozygous
NC_044372.1	2710755	TG	CG	homozygous
NC_044372.1	80252454	G	T	homozygous
NC_044372.1	1890501	T	C	homozygous
NC_044373.1	7589246	CA	GA	homozygous
NC_044373.1	16326218	AA	GG	homozygous
NC_044373.1	18857773	T	G	homozygous
NC_044373.1	26968201	TCC	TCT	homozygous
NC_044373.1	29630917	G	A	homozygous
NC_044373.1	44999598	C	T	homozygous
NC_044373.1	46220665	CT	TG	homozygous
NC_044373.1	65997446	C	T	homozygous
NC_044373.1	65997630	A	G	homozygous
NC_044373.1	78468284	G	C	homozygous
NC_044373.1	90475592	AAGG	AAAA	homozygous
NC_044373.1	91302456	ATAA	CTAA	homozygous
NC_044374.1	721191	GC	CC	homozygous
NC_044374.1	2380328	T	A	homozygous
NC_044374.1	7842585	C	T	homozygous
NC_044374.1	46733863	T	A	homozygous
NC_044374.1	81289150	C	T	homozygous
NC_044374.1	87026417	CT	GT	homozygous
NC_044374.1	53042056	C	G	homozygous
NC_044374.1	75148552	C	T	homozygous
NC_044374.1	79606305	GCG	CTA	homozygous
NC_044374.1	40728787	A	G	homozygous
NC_044374.1	81665769	ATGC	ATGT	homozygous
NC_044375.1	93189088	A	G	homozygous
NC_044375.1	5028137	CGT	TGT	homozygous
NC_044375.1	5229457	TAT	CAT	homozygous
NC_044375.1	92418831	AGCC	AACC	homozygous
NC_044375.1	36259780	GA	GC	homozygous
NC_044375.1	27969778	GA	GG	homozygous
NC_044375.1	47220146	C	G	homozygous
NC_044376.1	3765575	CCT	TTT	homozygous
NC_044376.1	4038278	AGG	CAG	homozygous
NC_044376.1	35656963	TGG	CGA	homozygous
NC_044376.1	41113525	GACG	GTCG	homozygous
NC_044376.1	49690671	A	G	homozygous
NC_044376.1	57526518	TC	GC	homozygous
NC_044376.1	61093783	TA	AG	homozygous
NC_044377.1	491424	CTG	CAT	homozygous
NC_044377.1	570205	TCT	AAT	homozygous
NC_044377.1	22400517	A	G	homozygous
NC_044377.1	29225173	T	A	homozygous
NC_044377.1	36155194	AGG	CGG	homozygous
NC_044377.1	44377730	GG	CG	homozygous
NC_044377.1	53006255	A	T	homozygous
NC_044377.1	61322716	AGC	AAA	homozygous
NC_044377.1	72446888	G	A	homozygous

TABLE 3-continued

Reference chromosome (cs10)	Position in reference sequence	Reference nucleotide sequence	'PG 1 19 0125 0002' Sequence	State
NC_044377.1	78287396	TTGTC	GTGTC	homozygous
NC_044378.1	108801	TT	TC	homozygous
NC_044378.1	459898	TATA	TTCA	homozygous
NC_044378.1	19944962	GC	AG	homozygous
NC_044378.1	23972788	CT	CA	homozygous
NC_044378.1	29436763	CCCCC	ACCCTT	homozygous
NC_044378.1	46687062	GGCG	GGCA	homozygous
NC_044378.1	53550861	CAGG	TGGA	homozygous
NC_044378.1	63538044	GT	GA	homozygous
NC_044378.1	66753962	GGGT	GAGT	homozygous
NC_044370.1	72116963	CC	TT	heterozygous
NC_044370.1	104558715	AC	CC	heterozygous
NC_044371.1	42597265	TT	TC	heterozygous
NC_044372.1	35317415	CTC	GTC	heterozygous
NC_044372.1	63982910	GGCG	GGCG	heterozygous
NC_044375.1	69785254	GCG	TTA	heterozygous
NC_044379.1	12989226	CT	TC	heterozygous
NC_044379.1	41567327	CAAAC	ATTGC	heterozygous
End of Table 2.				

Based on the chemotype, past research shows that 'PG 1 19 0125 0002' may have medicinal applications in the treatment of certain cancer types, pain, infection and inflammation, Glaucoma and cardiovascular disease.

THE CLONING PROCESS FOR VEGETATIVE OR ASEXUAL REPRODUCTION

Asexual or vegetative propagation methods (also known as cloning) are well-known to those skilled in the art. 'PG 1 19 0125 0002' is cloned according the following method: Coco peat plugs are soaked in pH adjusted water and kept warm. Cuttings measuring 10-12 cm are taken 3 nodes from the branch distal meristem and trimmed of lower leaves. The cuttings are dipped in water and a commercial rooting agent and inserted into the warmed plugs. Trays are kept in continuous light conditions and high humidity for 7 to 15 days until rooted. Rooted plants may be transferred directly into the field for outdoor growth or used for indoor growth. The initial asexual propagation took place in Zeiningen, Switzerland.

It was observed that all of the desired characteristics of each clone are transferred by vegetative reproduction in a consistent and uniform fashion. The characteristics of 'PG 1 19 0125 0002' are stable and the variety remains true-to-type through multiple generations of vegetative reproduction.

GROWTH OF PLANTS IN INDOOR ENVIRONMENTS

Rooted clones are transferred to two-gallon pots containing growth medium consisting of a mixture of soil, peat and perlite in a ratio of 3:3:1. Plants are grown in an indoor growth hall under completely supplied artificial high-pressure sodium (HPS) lighting (E-Papillon, 1000W, 400V). The air in the room was circulated with a fan and the humidity was kept constant at 45-55%. Commercial fertilizer is applied at a dose of 70-80% of the amount recommended by the manufacturer (Plagron, NL). The plants are grown for 10 days with a light intensity between 700-800 $\mu\text{mol m}^{-2} \text{s}^{-1}$, 18 h light/6 h dark day-night photoperiod with a 24-25° C. day/18° C. night temperature. The photoperiod is then changed to a 12 h light/12 h dark day-night cycle and the light intensity increased by 100 $\mu\text{mol m}^{-2} \text{s}^{-1}$ per day for 7

seed was grown, and from this population 'PG 1 19 0125 0002' was selected. The selection criteria were based on the following characteristics: Maximal CBG content and minimal THC and CBD content in the mature flower, flower density, and a highly branched plant structure. The variety was first vegetatively reproduced on the 12th of April 2019 and the resultant plants screened for high total CBG production and selected based on production relevant phenotypes. The progeny with the most stable desirable chemotype was assigned the name, 'PG 1 19 0125 0002'. 'PG 1 19 0125 0002' continues to be vegetatively reproduced by cloning in Zeiningen, Switzerland.

When 'PG 1 19 0125 0002' is compared to the *Cannabis* variety 'Santhica 27' (UPOV grant number: 1004490), some similarities and many distinct characteristics become apparent. Both 'PG 1 19 0125 0002' and 'Santhica 27' present with CBG as the dominant cannabinoid, with extremely low THC and CBD levels. 'PG 1 19 0125 0002', however, displays a up to six times more CBG in dried flowers than 'Santhica 27'. Moreover, the 'PG 1 19 0125 0002' flowers develop into a significantly denser inflorescence. Morphologically, 'PG 1 19 0125 0002' is short and highly branched with large flowers on each branch, reaching a maximum height of approximately 1 meter, whereas 'Santhica 27' is tall and mostly unbranched with a dominant apical inflorescence, reaching a height of up to 2.5 meters. The characteristics listed above, including branching, flower density, and significantly more CBG per unit mass, results in the 'PG 1 19 0125 0002' variety presenting with a substantially higher harvest index than 'Santhica 27' with respect to CBG production.

'PG_1_Pre-19_0125_0004' is a close relative of 'PG 1 19 0125 0002' from the Pure *Cannabis* Research breeding program and displays an almost identical growth pattern and general phenotype. A clear difference between the two varieties can be seen in their cannabinoid profiles (See Table 1 above). The cannabinoid profile of the 'PG_1_Pre-19_0125_0004' flower is clearly CBD-dominant with significant THCA accumulation.

Below is a detailed description of the new variety 'PG 1 19 0125 0002' (See also Table 3, above). Unless otherwise stated measurements were taken from plants grown indoors at various stages of development up to 11 weeks after cloning.

The 'PG 1 19 0125 0002' cultivar is a mixed hybrid of the *Cannabis* sp. It is naturally obtained and not the result of any genetic modification techniques.

Plant:

Plant life form and growth habit.—An annual herbaceous plant described as broad, upright, tap-rooted.

Plant propagation.—Asexually propagated by cutting and cloning methods.

Propagation ease.—'PG 1 19 0125 0002' is easy to propagate.

Height.—Approximately 50 cm to 100 cm.

Width.—Approximately 30 cm to 50 cm.

Plant vigor.—Medium — 'PG 1 19 0125 0002' bears large flowers without the requirement for excessive growth.

Time to harvest.—From time of cloning the plant will take approximately 8 weeks to be harvest-ready.

Resistance to pathogens.—Partial resistance. It is known to be moderately susceptible to *Botrytis*.

Genetic modification.—It is naturally obtained and not the result of any genetic modification techniques.

Conditions of flowering.—'PG 1 19 0125 0002' flowers once the daylight period is reduced to 12 hours daylight.

Hardiness.—'PG 1 19 0125 0002' easily tolerates temperatures up to 26° C.

Breaking action.—This variety has a sturdy main stem with a "pithy" center. It is not highly flexible, but resistant to breaking. The flexible side branches are highly resistant to breaking.

Rooting behavior.—When propagated according to PureGene's standard operating procedures, it roots vigorously at a rate of 98% within 7-10 days.

Leaf:

Arrangement.—Alternating.

Shape.—Palmately compound.

Structure.—Leaflet blades are very elongated, elliptical, lanceolate with acute tips and bases.

Margins.—Serrated with teeth pointing toward the leaflet tips.

Hairs.—Extremely fine sericeous hairs pointing toward the leaf tips.

Mature leaf measurements.—Leaf length with petiole: Approximately 23 cm. Petiole length: Approximately 5 cm. Stipule length and shape: Approximately 0.4 cm to 1.5 cm linear with acute tip. Leaflet number: About 3 to 9. Middle leaflet length: width: Approximately 14:3. Teeth on middle leaflet: Approximately 15 to 30. Width of central leaflets: Approximately 30 mm to 35 mm for plants grown in indoors conditions.

Leaflet apex shape.—Acuminate acute.

Adaxial leaf trichomes (upper and lower surface).—capitate stalked, capitate sessile and cystolithic trichomes.

Abaxial leaf trichomes (upper and lower surface).—Capitate stalked, capitate sessile and cystolithic trichomes.

Abaxial petiole color range.—About Pantone 380-383 UP with gradual anthocyanin coloration of 7624 U and UP during flowering.

Adaxial petiole color range.—About Pantone 382-385 UP with gradual anthocyanin coloration of 7624 U and UP during flowering.

Stipule color range.—About Pantone 382-384 UP.

Leaf color of the adaxial surface.—About Pantone 347-349 UP, 7734-7745 UP (leaf color changes from very dark green to the yellow spectrum with age).

Leaf color of the abaxial surface.—Pantone 345-347 UP-7730 UP) The lower surface of the leaf changes from a dark green to light yellow spectrum with age.

Leaf glossiness.—Average, becoming more matt at the apical ends as flowers mature.

Midrib shape.—Prominent and continuous throughout each leaflet.

Midrib color.—The midrib is a dark green, similar in shade to a younger leaf. As the leaf lightens with maturity, the midrib remains a dark green color (Pantone 349 UP).

Aroma.—Earthy with citrus and fruit.

Stem:

Shape.—The stem is ribbed with a solid center.

Diameter.—Approximately 2 cm to 5 cm.

Color.—Varying shades of about light green depending on age (Pantone 7488 UP).