Light spectrum trials
at Puregene

Technology - Delivering the best cannabis genetics.

In cooperation with

puregene

Felbridge

www.felbridge.co.za

puregene

In collaboration with:

ETH zürich

nrgene

UNIVERSITEIT STELLENBOSCH UNIVERSITY

A company of the:

pure holding ag

MADE IN SWITZERLAND

Investing into the future of cannabis.

Puregene was the result of a joint academic project based on molecular breeding between Pure Holding AG and the ETH-Zürich, Europe's highest ranking research university. As Pure Holding AG grew into the largest cannabis producer in Europe, it was clear that in the rapidly changing cannabis market new genetics had to be continuously integrated. As a vertically integrated company that innovates at the forefront of low-THC cannabis breeding, cultivation, processing, extraction, pharmaceutical formulations and international sales, Pure Holding AG made the decision in 2018, to incorporate Puregene AG under its umbrella and invest substantial sums into the research and development of cannabis.

> *Our substantial investment into improving cannabis genetics is a long-term commitment for the future of the industry, innovating and creating the best new varieties worldwide.*
>
> Stevens Senn, CEO of Pure Holding AG

In less than two years, Puregene has established an extensive research network with academic and industry partners. Puregene has assembled the best and brightest minds from molecular genetics, crop breeding, biochemistry, and agriculture-technology industries to drive its next-generation breeding program.

www.puregene.com

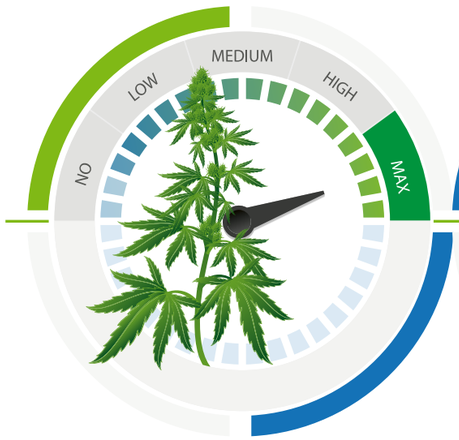
Stevens Senn
CEO of Pure Holding AG

Yannik Schlup
CBO of Puregene AG

Puregene provides reliable yields and a secure harvest, minimizing risk.

Puregene breeds the highest quality cannabis, guaranteeing maximum yield and a secure harvest. We provide you with a competitive advantage, ensuring your crop investment is based on extensive reliable data. Furthermore we provide a secure development pipeline of high value novel cannabinoids, fully compliant with local as well as international regulations. As a pioneer, we are redefining cannabis cultivation with our state-of-the-art and elite breeding program.

YIELD

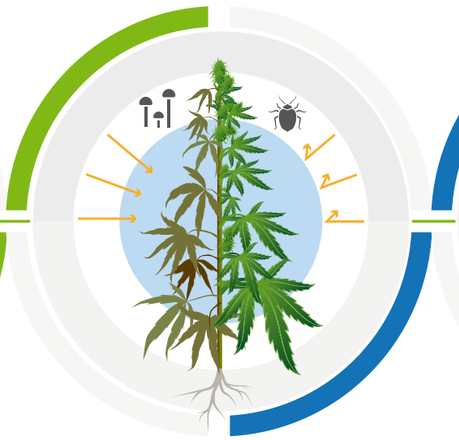


Puregene genetics increase your yields resulting in a larger revenue.

PROFIT

Our development pipeline of novel cannabinoids and varieties guarantee a high value product.

SECURITY



Due to greater resistance to pests and diseases your production will be secured.

COMPLIANCE

Our varieties are tailored according to your needs and in compliance with your regulations.

QUALITY

High Swiss standards, field and market tested.

> *We are committed to our clients by continuously bringing improved versions and chemistries of our varieties, ultimately solving the challenges the industry is facing.*
>
> Yannik Schlup, CBO of Puregene AG

Our elite genetics give our clients the competitive and financial edge to grow.

Switzerland is renowned for its quality and attention to detail. The Swiss philosophy is at the heart of every cross, selection, and experiment we carry out. Moreover, Switzerland has one of the most mature hemp markets in the world. Puregene combines Swiss quality and cannabis experience with state of the art breeding technologies to innovate the best and most novel cannabis genetics in the industry.

Preparation for international in vitro shipment

Our Vision

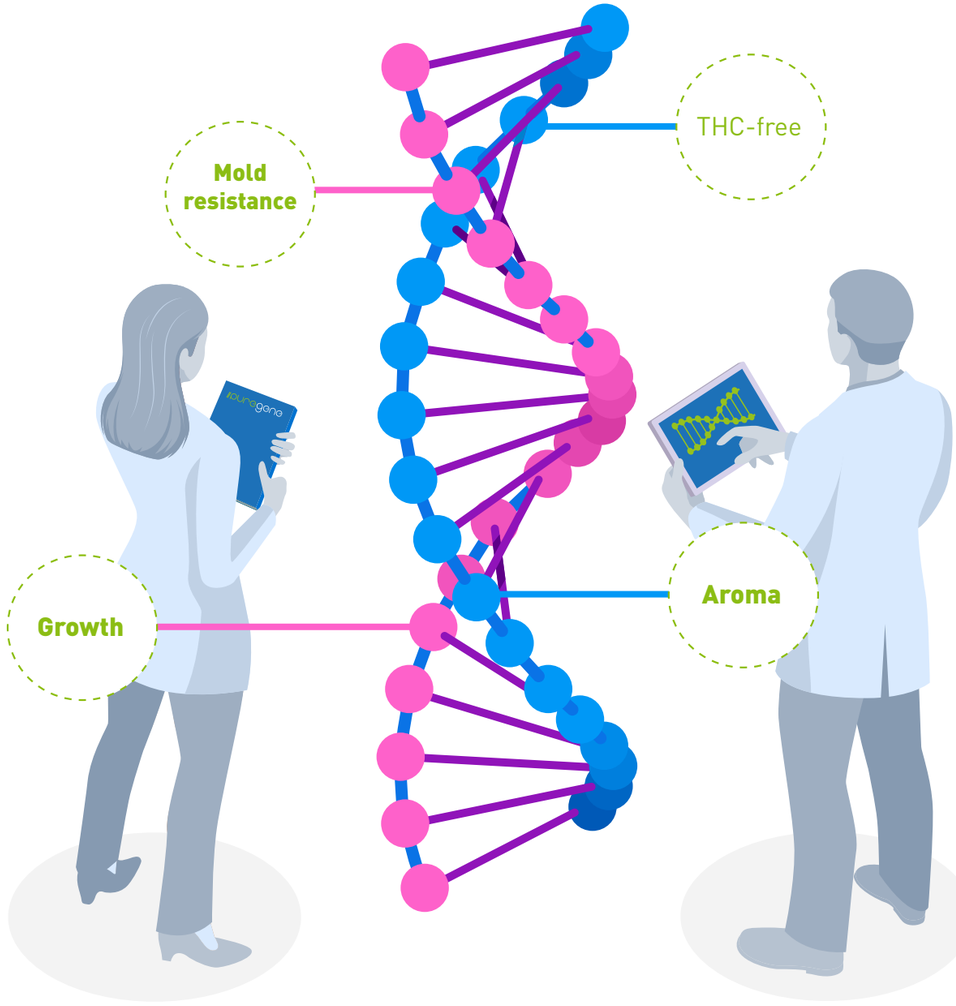
DNA is the blueprint of every living organism. With DNA, Puregene can decipher cannabis' unique natural chemistry and all its valuable traits.

Puregene's vision is that by taking a DNA-centric approach, we can create the most sophisticated breeding program. This breeding program will assemble the most desired chemistries and traits, resulting in our proprietary elite varieties.

Therefore, our customers can be assured that our varieties will give them the competitive edge needed in this ever-evolving cannabis market.

> *With DNA-centric, big-data based breeding, we are discovering and generating new valuable traits for substantial improvements in our varieties year in and year out.*
>
> Dr. Gavin George, Lead Technology Manager of Puregene AG

Clean propagation at Puregene



Deciphering the mystery behind cannabis

Puregene has sequenced the world's first cannabis super-Pangenome with its partners, NRGene and ETH-Zürich. The Pan-genome is the deciphered DNA of many plants. It is the world's largest endeavor in cannabis genomics. The DNA-blueprint of cannabis is not a mystery anymore.

Genetic knowledge is the key

All plant characteristics and traits, such as flavor, disease resistances, flower size, and yield, are controlled by its DNA. Puregene scientists are working tirelessly to discover where all these traits are located in the DNA of cannabis.

Pure Technology

The perfect combination

Our scientists' deep genetic knowledge of cannabis support-ed by big-data, allows for a precise prediction of the inherent potential every plant has, resulting in the best performing offspring for any cultivation method. Puregene's knowl-edge-based breeding ensures the optimal combination of parental quality traits and characteristics for every generation to come.

The Puregene technology advantage

With big-data and real-time field performances the tedious process of variety testing is substantially reduced, and elite varieties are the result; faster and more precise.

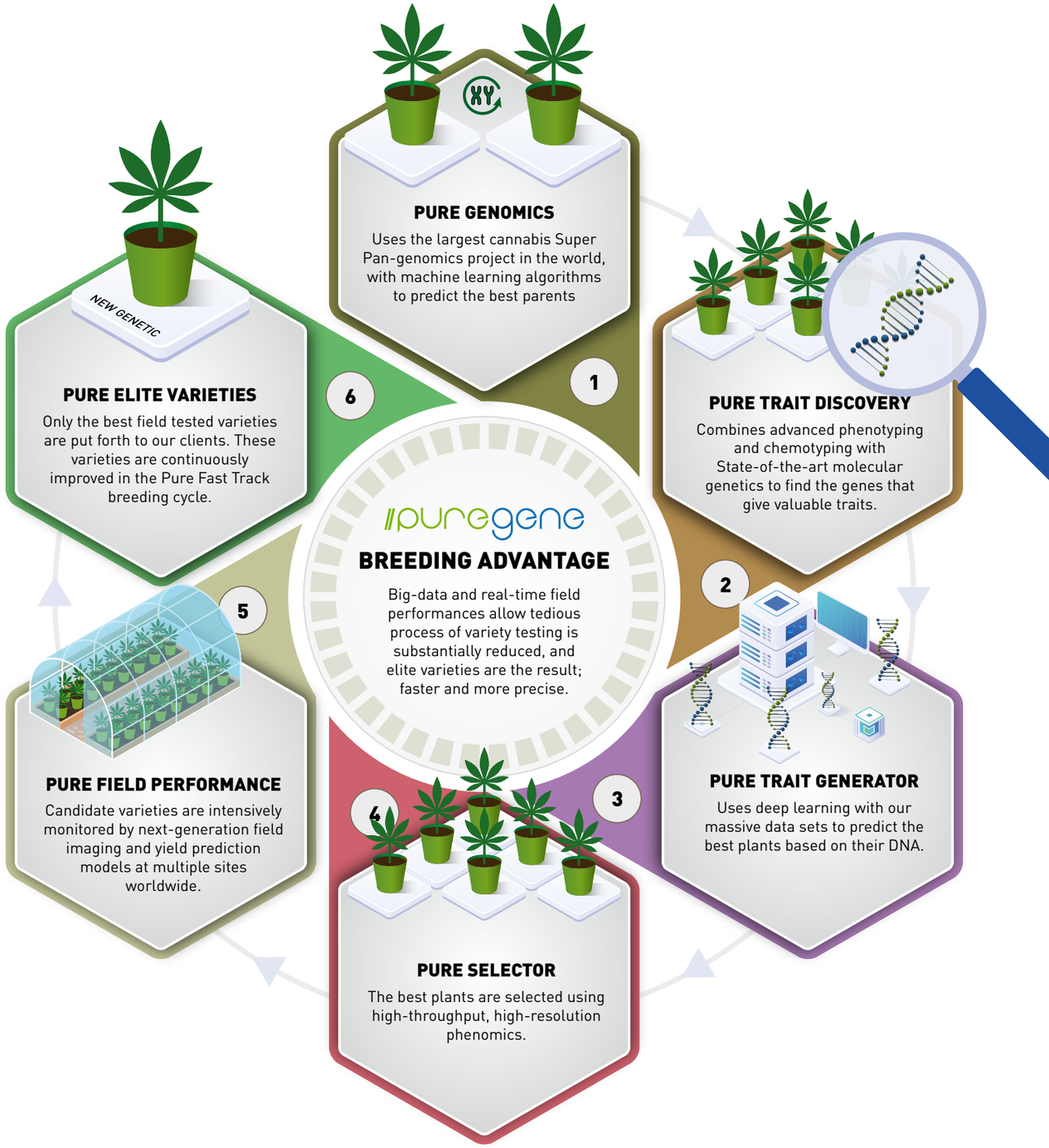
Genomic Innovation

The DNA controls all cannabis characteristics or traits, such as flavor, disease resistances, flower size, and yield. The genome is the entire DNA of a plant. Every plant variety has a unique genome. Puregene's goal is to remove the mystery and guesswork behind cannabis breeding. Our extensive knowledge of the cannabis DNA is the foundation of what we do.

In close collaboration with NRGene and the ETH Zurich, Puregene has sequenced the world's first cannabis Super Pan-genome. The Pan-genome is the deciphered DNA of many plants. It is the world's largest endeavor in cannabis genomics. Puregene has the DNA-blueprint of cannabis. We solved the mystery.

Knowledge is the key to progress. For this reason, Puregene has invested heavily to sequence the cannabis Super-Pan-Genome, gaining distinctive knowledge about cannabis and its DNA. This was one of the most ambitious genomic projects of any crop species. This advanced genomic knowledge guides our trait discovery and variety development pipelines. **Puregene breeds progress**.

The high demand for variety in cannabis products (e.g. flavors, cannabinoids) has led to cannabis being one of the most genetically diverse cultivated crop species.



Variety performance confirmation

The Puregene advantage

> *It`s key that our clients know exactly what to expect. For this reason we collect extensive field and indoor performance data at multiple sites. We provide this data directly to our clients with advice on when to plant, when to test, and when to harvest.*
>
> Dr. Michael Ruckle, Lead Science Manager of Puregene AG

Swiss Quality
The "Swiss Hemp Bill of 2011" was a visionary move that facilitated legal investments and innovation into the hemp industry before any other country in the world. That's why Switzerland's innovations, knowledge, genetics, and technologies in the cannabis field are years ahead of the rest of the world.

Experience
As a subsidiary of Europe's leading cannabis producer, we are constantly at the forefront of the industry. This unique collaboration allows us to create the genetics, forming the newest cannabis trends that will hit the market. It also means our varieties are market tested before global release, so we know exactly how they will perform.

World Class Innovation
All fields of agricultural technology are combined amongst our expert scientists. They are the foundation of our innovation pipeline. Partnering with the world's leading universities and private institutions enables us to combine time-tested practices with the most recent advances in agricultural innovation. And the results speak for themselves - The best genetics and cropping systems for cannabis.

Building on a Solid Foundation
We combine one of the largest non-psychoactive cannabis variety collections in the world with DNA-based breeding. Puregene selects and matches the best parental lines, and then breeds at unprecedented speeds.

Clean Stock
All our varieties are bred in controlled and clean environments, meticulously controlled by the Swiss Department of Agriculture. Our seeds and clones are disease free, fully feminized and held to the highest quality standards.

Compliance
Our dedication to quality has facilitated the first trans-Atlantic import of live cannabis plants into the US with the oversight from the USDA, DEA, and US customs. Our team works diligently with global authorities to ensure our products adhere to all local regulations.

Our Team

// Puregene
Under the visionary direction of Yannik Schlup, Puregene's research and development pipeline combines all state-of-the-art scientific advancements also used in major crops.

// Pure Variety Development
Lead by Dr Maximillian Vogt, PhD, Puregene's Variety Development program combines modern breeding schemes, molecular genetics, and high-thoughput phenotyping and chemotyping for the selection of the best new varieties.

// Pure Trait Discovery
Lead by Dr Gavin George, PhD, Puregene's Trait Discovery Pipeline utilizes our unique genomic and molecular toolset to generate the knowledge in cannabis that is required to control traits. These traits ensure variety performance is not left to chance.

// Pure Innovation Laboratories
Lead by Dr Michael Ruckle, PhD, Puregene's Innovation Laboratory develops the state of the art molecular genetic, and agronomic tools required to push the boundaries of future research at Puregene.

The Puregene family

> *Various industry leaders from the US have visited our fields in Switzerland and have simply been amazed at the health, consistency, yield and uniformity of our CBD and CBG crops.*
>
> Yannik Schlup, CBO of Puregene

Pure CBD

Available as clones // High CBD // mold and mildew resistant // fast growing // high yielding // low lodging // high quality flowers

Pure CBD outdoor production

Pure CBD

Outdoor cultivation at harvest

Indoor cultivation prior to harvest

Vegetative stage showing the typical, harvesting-optimized, branched structure

Trimmed indoor flower
about 2 inch wide

Pure CBD - Clonal line

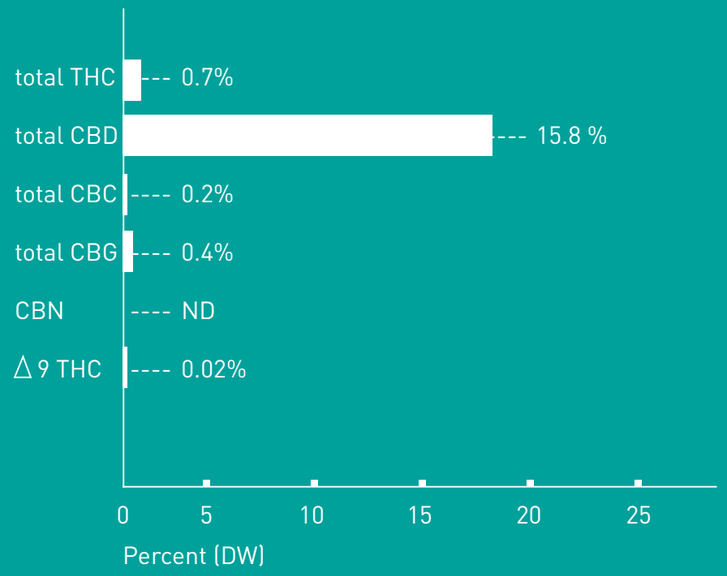
Flowers and extraction; indoor, glasshouse and outdoor production

Available as clones, this haze variety contains many great production traits. It was bred from the best market tested Swiss genetics. Its balance of production and quality traits make it one of the best varieties currently on the market for premium CBD cultivation. Incredibly resistant to molds and mildews and tolerates harsh growth conditions. Its highly branched profile ensures low lodging of mature flower and high yields. Pure CBD is suitable for most climates and compatible for indoor, glasshouse, and outdoor production. The terpene profile gives Pure CBD a nice mellow earthy flavor with a balance of fruit and spice. As with all current high CBD varieties on the market, Pure CBD has the potential to produce more than 0.3% total THC. Puregene will support cultivators to reduce THC risk and maximize CBD production.

Details:

- 900+ lbs/ acre of quality trimmed CBD flower (4000 plants per acre, 3.5 months on field)
- 3500+ lbs/ acre of CBD biomass (4000 plants per acre, 3.5 months on field)
- Up to 0.5% total THC (in late harvests)
- Around 15% CBD content
- 8.5 – 10 weeks indoor flower duration
- Harvest in October
- THC monitoring recommended

Cannabinoids (Cannabinoids in trimmed dried flower)



Clonal female Absolutely no males

15.8% CBD*

* trimmed flower at harvest (average values)
Fully documented: Puregene has conducted extensive analyses on the accumulation of total THC in Pure CBD during flower maturation to provide farmers with the optimal harvest time to maintain compliance with federal and local regulations.

Production metrics

	Low	Medium	High	Mean	+/-Range
Indoor flower yield (g/watt hps)				0.81	0.09
Oudoor biomass yield (lbs/acre)				3700	210
Outdoor dry flower yield (lbs/acre)				980	140
Max fertilizer input (A^2 s^3/m^3 kg)				2	0.1
Cannabinoid content at 8 weeks (%)				15.8	1.9
Stretch after 10 days (%)				180	12.9
Stretch after 20 days (%)				170	16.2

Production properties

Mildew resistance

Spider mite resistance

Ease of flower trimming

Botrytis resistance

MOLD AND MILDEW YIELD PROTECTION

Pure CBD - Field Yield Data 2020

	Spacing (inches)	Plants per acre	Flowering date	Target harvest date	Plant diameter at harvest (ft)	Plant height at harvest (ft)	High quality trimed flower (lbs per plant)	Dry high qualitytrimmed flower (lbs per acre)	Dry flower biomass/top third (lbs per plant)	Dry flower biomass/top third (lbs per acre)	Plant biomass/top two-thirds (lbs per plant)	Plant biomass/top two-thirds (lbs per acre)	Percent flower biomass
Apr 15th **	75	1000	Aug 15	Oct 5	6.5	8.0	1.6	1633	3.0	3000	10.4	10400	29
May 1st *	55	1800	Aug 15	Oct 5	4.6	6.4	0.67	1200	1.2	2200	3.6	6500	34
May 15th	50	2500	Aug 15	Oct 5	4.1	6.1	0.46	1150	0.84	2100	1.9	4800	44
Jun 1st	46	3000	Aug 15	Oct 5	3.8	5.6	0.37	1100	0.67	2000	1.5	4400	45
Jun 15th	42	3500	Aug 15	Oct 5	3.5	5.3	0.30	1034	0.54	1900	1.2	4100	46
Jul 1st	40	4000	Aug 15	Oct 5	3.2	4.5	0.23	980	0.45	1800	0.93	3700	49
Jul 15th	40	4000	Aug 15	Oct 5	2.8	3.2	0.21	820	0.38	1500	0.70	2800	54
Aug 1st	40	4000	Aug 15	Oct 5	2.5	1.9	0.12	490	0.23	900	0.38	1500	60

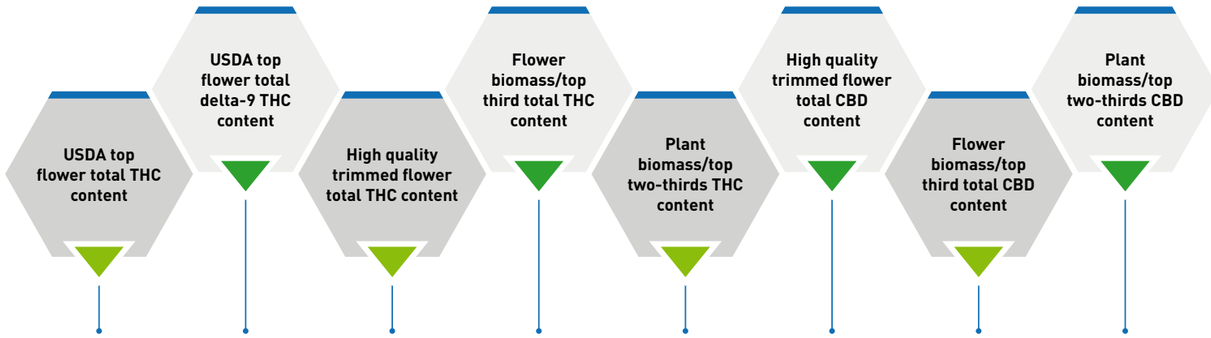
* Requires cages, netting, or stakes. Cannot be mechanically harvested.

** Requires 2-3 weeks growth in glasshouse prior to field planting and cages and netting for plant support.

Recommended planting window to maintain a high percentage of CBD-rich flower biomass in the harvested material.

As with any outdoor crop, inclimant weather, such as drought, or poor management can negitively impact yield.

Pure CBD - Field Yield Data 2020



1 week before target harvest date	0.27	ND	0.45	0.17	0.10	12.9	5.2	3.2
At target harvest date	0.30	0.02	0.59	0.27	0.19	16.4	6.9	5.2
1 week after target harvest date	0.38	0.02	0.57	0.29	0.21	16.3	8.2	6.1
2 weeks after target harvest date	0.45	0.02	0.58	0.29	0.22	16.5	8.0	6.2

Relavant COAs provided.
All values are provided as percent THC or CBD of a dry flower.
All values are best representative of the mean of the observed cannabinoid content.

The Pure CBD advantage

Feminized genetics means no males and no seeded flowers
Our proprietary seed feminization process ensures that over 99.9% of the seeds are feminized and essentially no males are present in the field. Therefore, the valuable CBD flower biomass will not be contaminated with seeds. All clones are female plants too.

High mildew and mold resistance
Mildew and mold are major enemies to any cannabis cultivation. By starting from the most resistant material available, we bred one of the strongest mold and mildew resistant CBD varieties available on the market.

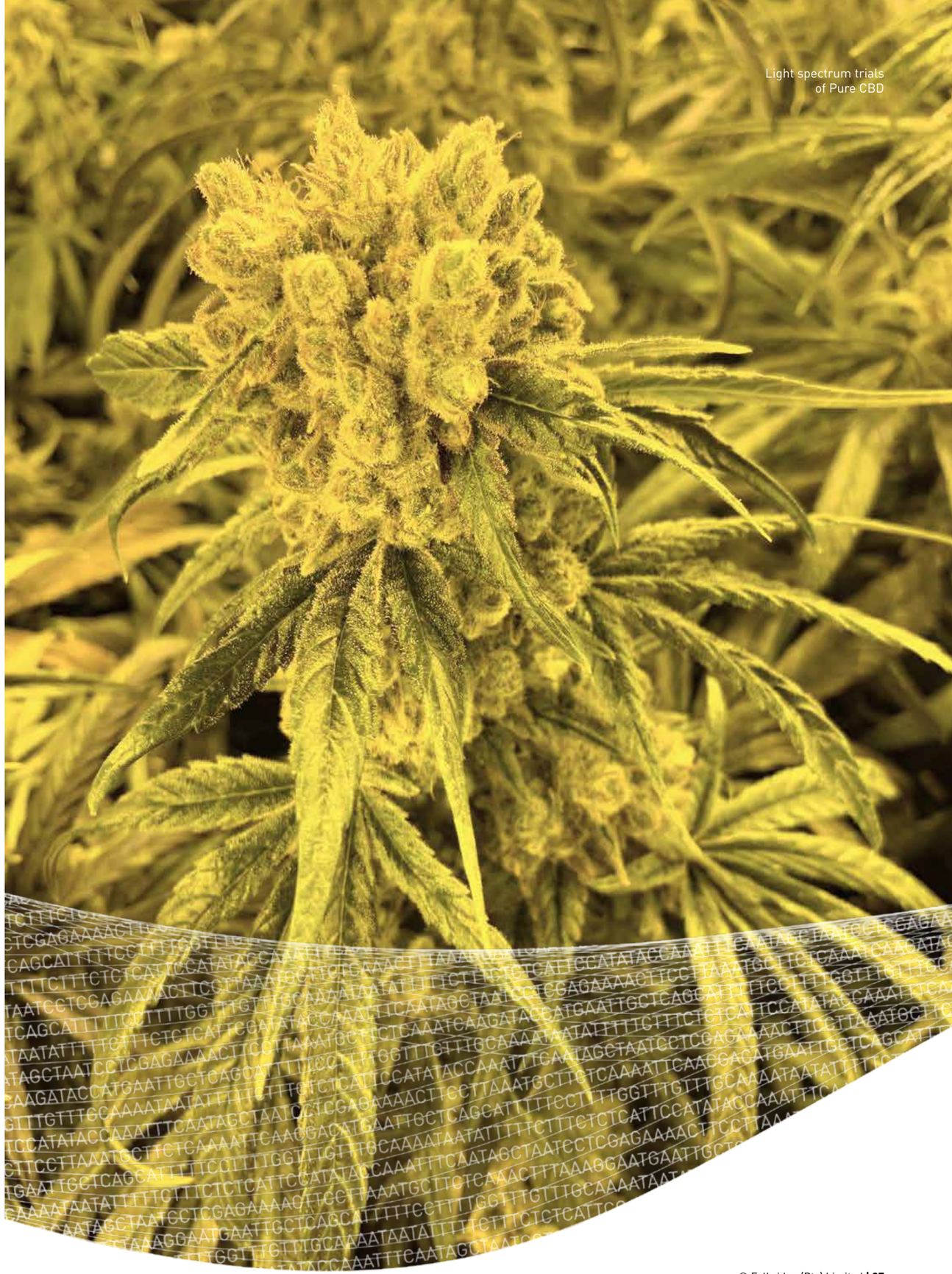
Extreme branching
Due to its high branching genetics, Pure CBD does not require the extra work of topping or pinching. The plants grow into a table-top structure, so flowers are exposed to the most direct sunlight, producing high CBD levels.

Mechanical harvest
Pure CBD clones were stabilized and re-selected over several growth cycles to remove all off-types. Plant growth is uniform across every planted field as with all major crops and is amenable to mechanical harvest of only the high value flower biomass.

High quality flowers give versatility at time of sale
Pure CBD produces superior quality flowers that are high in resin. The flavor and aroma profile are dominated by earthy myrcene with an appealing mix of nice spice notes.

Sturdy plants with high branching are optimal for outdoor production
The light and uniform branches are less prone to lodging and breaking in inclement weather than single large colas. This trait maximizes CBD flower biomass per acre, and facilitates an easy mechanized harvest.

Excellent rooting performance
The most important step in getting a high yielding cannabis crop is having strong roots early. Pure CBD has been bred to root fast and efficiently with low loss rates. Once in the field, Pure CBD establishes rapidly and guarantees a good harvest in the fall.



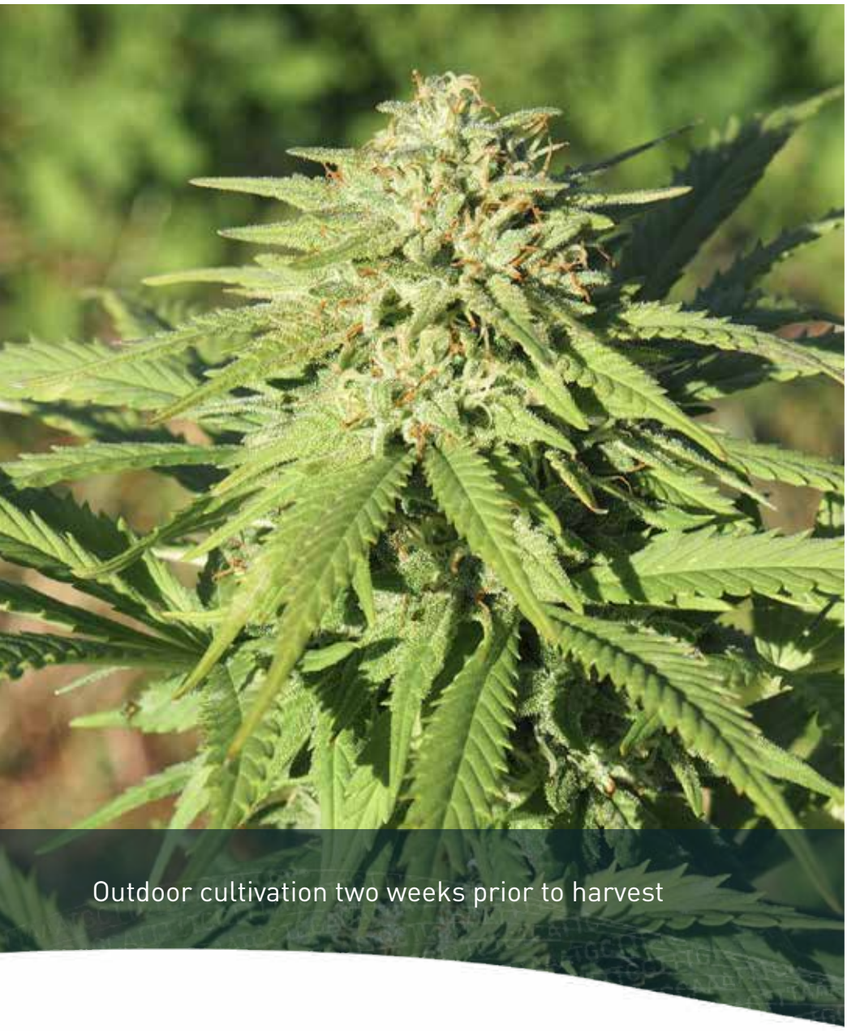
Light spectrum trials
of Pure CBD

Pure CBG clones
Pure CBG seeds

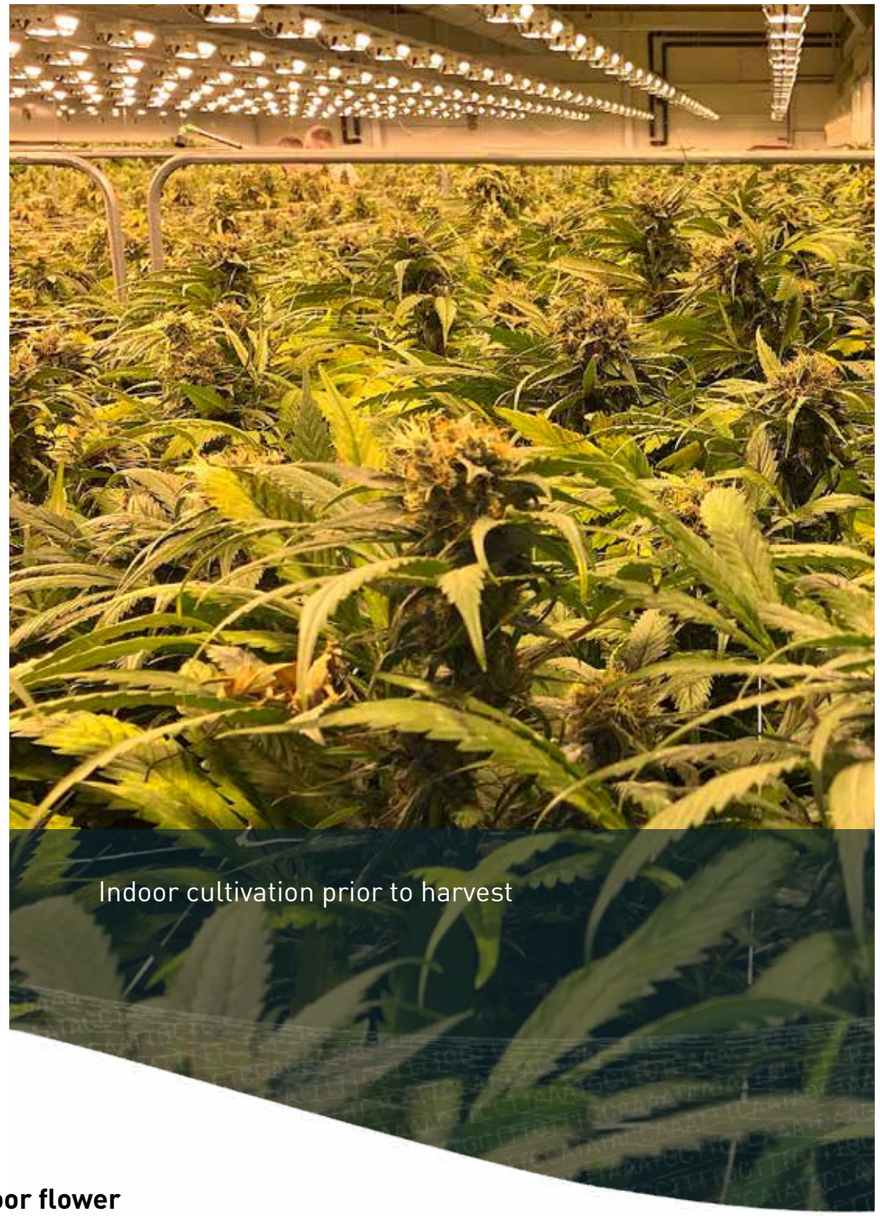
**Available as clones and seeds // High CBG //
Mono-chemotype // Extraction and flower production //
Essentially THC and CBD free**

Pure CBG two weeks
prior to harvest

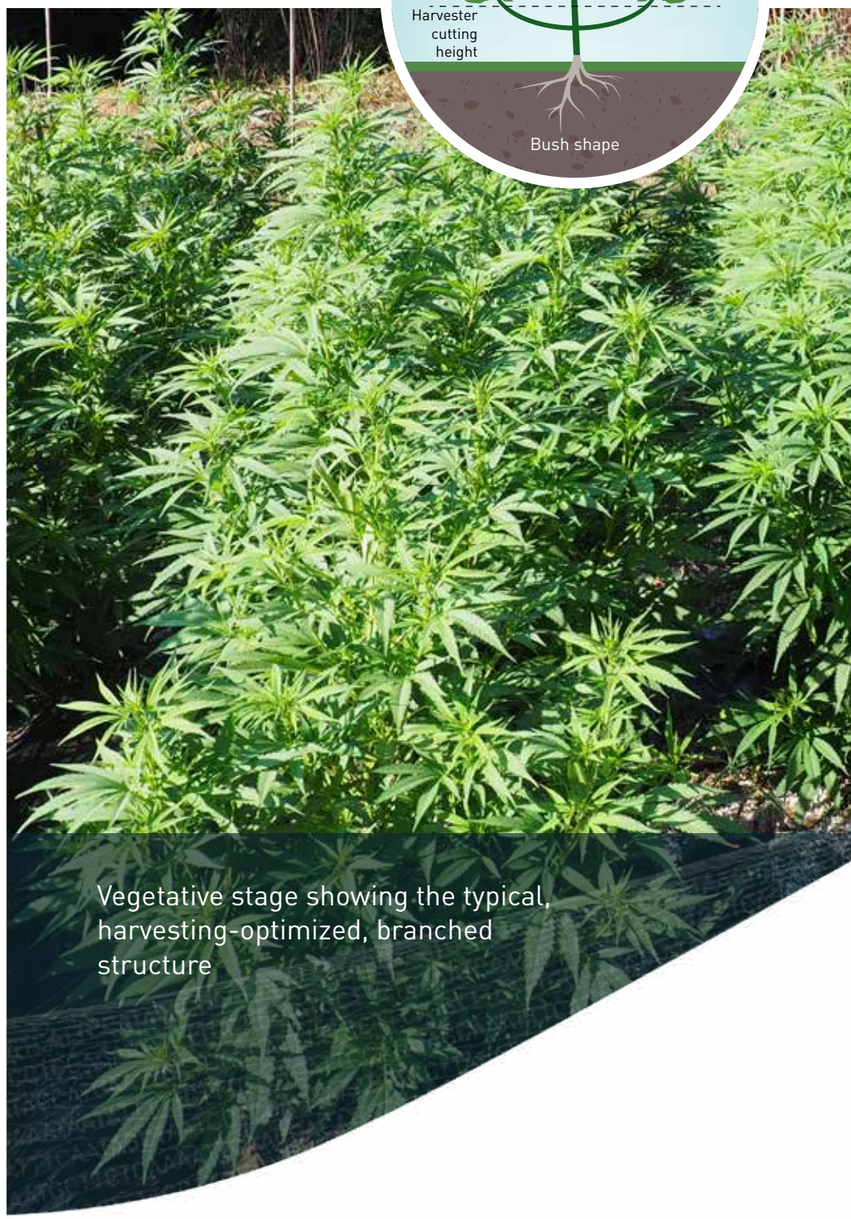
Pure CBG



Outdoor cultivation two weeks prior to harvest



Indoor cultivation prior to harvest



Vegetative stage showing the typical, harvesting-optimized, branched structure

Trimmed indoor flower
finished product

Pure CBG - Clonal line

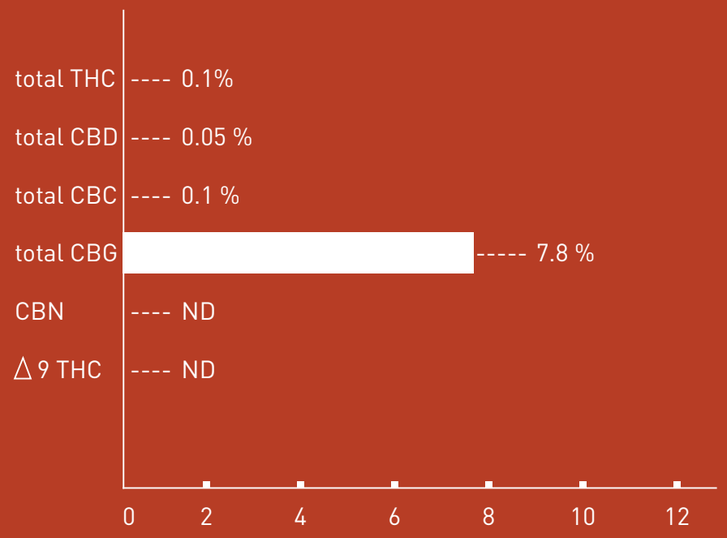
Flowers and extraction; indoor, glasshouse and outdoor production

Pure CBG is bred to be highly productive and solely produces the cannabinoid CBG. It grows fast, has a highly branched structure, as well as a dense, resinous flower. Its high CBG content makes flower production and extraction of this prized cannabinoid easily accessible. In all trials, this variety has never run hot with its ultra-low total THC content. Pure CBG is mid to late flowering and the target harvest is late September to early October in northern latitudes. The terpene profile gives Pure CBG a nice, mellow and earthy flavor.

Details:

- 700 – 900 lbs/ acre of quality trimmed CBG flower (4000 plants per acre, 3.5 months on field)
- 2600 – 3500 lbs/ acre of CBG biomass (4000 plants per acre, 3.5 months on field)
- Total THC content typically is between 0.05 and 0.08 %
- Never observed to exceed 0.1% total THC
- Around 8% CBG content
- 7.5 – 8.5 weeks indoor flower duration
- Harvest in September / October

Cannabinoids (Cannabinoids in trimmed dried flower)



Clonal female Absolutely no males

total THC compliant*

7.8% CBG*

* trimmed flower at harvest (average values)

Production metrics

	Low	Medium	High	Mean	+/-Range
Indoor flower yield (g/watt hps)				0.9	0.19
Oudoor biomass yield (lbs/acre)				3200	620
Outdoor dry flower yield (lbs/acre)				800	130
Max fertilizer input (A^2 s^3/m^3 kg)				1.9	0.1
Cannabinoid content at 8 weeks (%)				7.8	1.9
Stretch after 10 days (%)				170	30
Stretch after 20 days (%)				150	41

Production properties

Mildew resistance

Spider mite resistance

Ease of flower trimming

Botrytis resistance

Not recommended for high hummidity environments.

Pure CBG - Feminized seeds

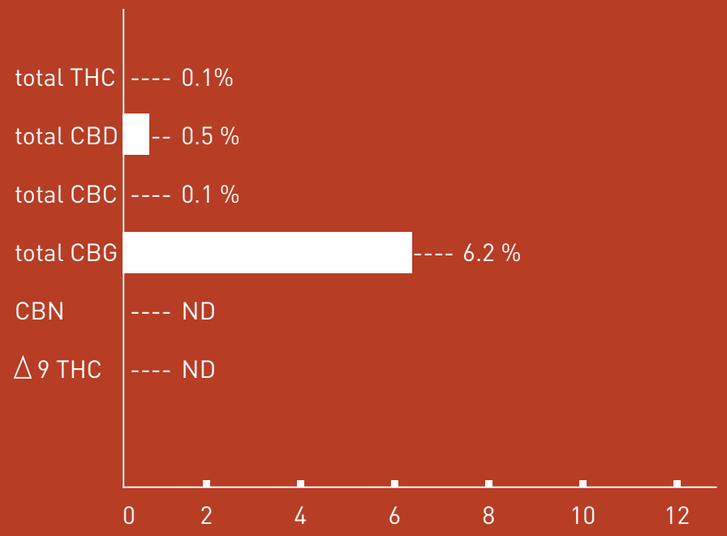
Extraction; glasshouse and outdoor production

Pure CBG is bred to be highly productive and solely produces the cannabinoid CBG. It grows fast, has a highly branched structure and a resinous flower. Its high CBG content makes flower production and extraction of this prized cannabinoid easily accessible. In all trials, this variety has never run hot with its ultra-low total THC content. Pure CBG is mid to late flowering and the target harvest is late September to early October in northern latitudes. Over 99.9% of the seeds are female.

Details:

- 700 – 900 lbs/ acre of quality trimmed CBG flower (4000 plants per acre, 3.5 months on field)
- 2600 – 3500 lbs/ acre of CBG biomass (4000 plants per acre, 3.5 months on field)
- Total THC content typically is between 0.05 and 0.08 %
- Never observed to exceed 0.1% total THC
- Around 6% CBG content
- Harvest in September / October

Cannabinoids (Cannabinoids in trimmed dried flower)



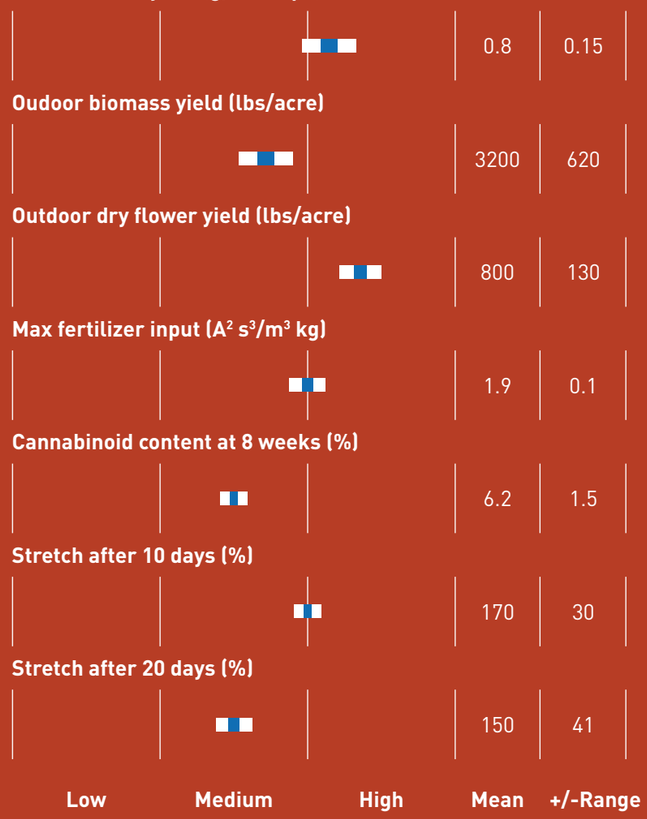
Clonal female Absolutely no males

total THC compliant*

6.2% CBG*

* trimmed flower at harvest (average values)

Production metrics



Production properties

Mildew resistance

Spider mite resistance

Ease of flower trimming

Botrytis resistance

Not recommended for high hummidity environments.

Pure CBG - Field Yield Data 2020

	Spacing (inches)	Plants per acre	Flowering date	Target harvest date	Plant diameter at harvest (ft)	Plant height at harvest (ft)	High quality trimed flower (lbs per plant)	Dry high quality trimmed flower (lbs per acre)	Dry flower biomass/top third (lbs per plant)	Dry flower biomass/top third (lbs per acre)	Plant biomass/top two-thirds (lbs per plant)	Plant biomass/top two-thirds (lbs per acre)	Percent flower biomass
Apr 15th **	75	1000	Aug 7	Oct 1	5.5	8.0	1.5	1500	2.7	2700	9.0	8950	30
May 1st *	55	1800	Aug 7	Oct 1	3.9	7.0	0.67	1200	1.1	2000	3.1	5600	36
May 15th	50	2500	Aug 7	Oct 1	3.5	6.7	0.46	1150	0.76	1900	1.6	4100	46
Jun 1st	46	3000	Aug 7	Oct 1	3.2	6.2	0.37	1100	0.60	1800	1.3	3800	47
Jun 15th	42	3500	Aug 7	Oct 1	3.0	5.8	0.26	900	0.49	1700	1.0	3500	49
Jul 1st	40	4000	Aug 7	Oct 1	2.7	5.4	0.22	870	0.40	1600	0.8	3200	50
Jul 15th	40	4000	Aug 7	Oct 1	2.4	3.8	0.18	730	0.34	1350	0.6	2400	56
Aug 1st	40	4000	Aug 7	Oct 1	2.1	2.3	0.11	430	0.20	800	0.3	1300	62

* Requires cages, netting, or stakes. Cannot be mechanically harvested.

** Requires 2-3 weeks growth in glasshouse prior to field planting and cages and netting for plant support.

Recommended planting window to maintain a high percentage of CBG-rich flower biomass in the harvested material.

As with any outdoor crop, inclimant weather, such as drought, or poor management can negitively impact yield.

Pure CBG - Field Yield Data 2020

	USDA top flower total THC content	USDA top flower total delta-9 THC content	High quality trimmed flower total THC content	Flower biomass/top third total THC content	Plant biomass/top two-thirds THC content	High quality trimmed flower total CBG content	Flower biomass/top third total CBG content	Plant biomass/top two-thirds CBG content
1 week before target harvest date	0.08	ND	0.05	0.01	ND	5.3	2.9	1.8
At target harvest date	0.13	0.01	0.08	0.08	0.05	7.5	4.8	2.9
1 week after target harvest date	0.08	ND	0.08	0.08	0.05	6.4	5.0	3.0

Relavant COAs provided.
All values are provided as percent THC or CBG of a dry flower.
All values are best representative of the mean of the observed cannabinoid content.

1 **Santhica 27**
Non-feminized (many males), low flower biomass, little branching, 1 % CBG in the flowers.

2 **Competitor's CBG**
Mostly feminized (few males), low flower biomass, little branching, 3-4 % CBG in the flowers.

3 **Pure CBG**
Completely feminized (no males), very high flower biomass, highly branched, over 8 % CBG in the flowers.

1

2

3

The Pure CBG advantage

Pure CBG - seeds & clones

Total THC compliant (US and EU)
Pure CBG has been tested for THC accumulation in all production environments and growth conditions. It has never been observed to exceed 0.1% THC in multiple field and indoor trials.

High CBG content means extraction is now financially viable
The only profitable source of CBG. Compared to current CBG varieties, such as Santhica 27, which only contains around 1% CBG in the flower, the high percentage of CBG in the Pure CBG varieties make extraction available at low cost.

Larger and dense flowers means more meaningful biomass per acre
Compared to current CBG varieties, which have small airy flowers with low biomass, our high resin type plant produces dense large flowers. Moreover, all Pure CBG varieties produce a higher number of flowers than existing CBG varieties.

Feminized genetics means no males and no seeded flowers
Our proprietary seed feminization process ensures that over 99.9% of the seeds are feminized and essentially no males are present in the field. Therefore, the valuable CBG flower biomass will not be contaminated with seeds. All clones are female plants too.

High quality flowers provide versatility at time of sale
Because Pure CBG produces high quality flowers it is versatile enough for value added products like smokable products even from outdoor cultivation.

Sturdy plants with high branching are optimal for outdoor production
The fully branched structure increases the number of flowers and supports the larger ones, even during rough weather. The plants do not lodge or break off easily. This trait maximizes CBG flower biomass per acre and facilitates harvest.

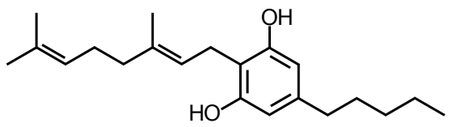
Excellent rooting performance
Pure CBG varieties have been bred to root fast and efficiently. Using Pure CBG guarantees varieties fast rooting and low loss rates during cloning.

What is CBG?

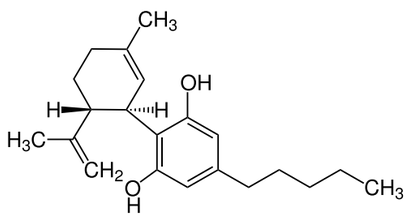
CBG is prized for its energizing effect and reported antimicrobial properties. Considered the mother of all cannabinoids, because all other cannabinoids stem from this one molecule. CBG provides a unique experience, which can be compared to the relaxing effect of CBD, without the sleepiness, and at the same time leaving an effect that is stimulating, uplifting and energetic. Until recently, no varieties offered enough CBG content to provide a mainstream experience, and only few people know of its benefits. Importantly, CBG is non-psychoactive.

CBG's unique interaction with the human cannabinoid receptors open a new frontier of both consumer enjoyment as well as pharmacological research, making it one of the most important cannabinoids on the market.

CBG - Cannabigerol



CBD - Cannabidiol



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