

A REPORT OF THE
HEMP VARIETY REVIEW BOARD



ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES

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September 2022

The Association of Official Seed Certifying Agencies (AOSCA), Hemp Variety Review Board (HPVRB), reviewed the following varieties on September 7, 2022. The Board recommended the inclusion of these varieties for certification. Seed of these varieties may be certified, providing production meets all standards of the Seed Certifying Agency of the jurisdiction in which the seed is grown.

All variety information, including descriptions, claims, and research data to support any claim, was supplied to the Hemp Variety Review Board by the applicants. The Hemp Variety Review Board makes judgments regarding recommendation of varieties for inclusion into certification based on the data supplied. Beyond that, the Hemp Variety Review Board takes no position on the accuracy or truthfulness of any description or claim made by the applicants.

Further information on current procedures, application forms, and detail regarding the Hemp Variety Review Board can be obtained from:

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Respectfully submitted,

Thomas Hardiman, Chairman
Hemp Variety Review Board

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Verda Bio, LLC **VB252S (Exp. Designation)**

VB252S is a high CBD-oil content feminized line developed by Verda Bio that is derived from a self-pollination of VB252. VB252 is a Verda Bio proprietary line. VB252 has advanced agronomical traits including late flowering and high flower yield.

Phenotypically the parental line, VB252, has physical characteristics of a cannabis hybrid, having characteristics of both cannabis sativa and cannabis indica. It is photoperiod sensitive variety with a later flowering time (harvest approximately 7 weeks after induction). VB252 leaves which are medium green phenotypically would be characterized as cannabis indica (broad large leaf structures). It has short internode spacing with full branching. Branches contain multiple nodes per branch. It is a larger than most cannabis sativa plants (favoring cannabis indica) having a propensity to grow over 6 feet tall within a standard 3–4-month outdoor grow season. VB252 is a robust growing plant. VB252 was selected due to its robust agronomical traits and general phenotypic appearance. VB252 was created from multiple generations of inbreeding.

The seeds variety, VB252S, was developed in WA state and is used for production of cannabinoids.

VB252S has been grown in greenhouse, outdoor and simulated growth pods (growth chamber that allow simulated grown conditions). This variety has been grown naturally in planting zones 6-8, but simulated growth in pods for planting zones 4 and 9. This variety is currently being recommended for planting zones 4-9. This variety can be used for flower or oil production. VB252S produces low levels of THC and high CBD levels.

The variety is a feminized seed with a low level of hermaphrodites (<5%). It is photoperiod sensitive variety with a later flowering time (harvest approximately 7 weeks after induction). The plant height is large and can vary depending on planting time, but averages 200 cm. The main stem color is green unless the plant undergoes a frost and then in may purple. Internode length, stem thickness and stem grove are average (medium). The leaves will be medium green with mean petiole of 4.5 cm, medium anthocyanin and central leaflet length of 7. Seeds are grey, brown with medium marbling and ovate shape. If provided optimal growing conditions, it will have a consistent appearance.

Verda Bio, LLC will be responsible for maintaining subsequent generations of seed stock. Standard procedures are in place for production and have been tested across multiple production runs. No licensing agreements exist that would impact certification.

Certified seed will be available if certified Spring of 2022. Acreage data can be published by AOSCA.

Protection will be filed is the USPTO. AOSCA may provide a descriptive information for the PVP database.

Verda Bio, LLC **VB4.21 (Exp. Designation)**

VB4.21 is a high CBD-oil content feminized hybrid line developed by Verda Bio that derives from a cross between VB252 and VB17X200D. VB252 and VB17X200D are Verda Bio proprietary lines. VB252 has donor line selected for advanced traits including late flowering and high flower yield (upon hermaphrodite induction). VB 17X200D was selected for oil content and specific cannabinoid yield and was used as the receiving line.

VB 17X200D is the receiver or female plant and has characteristics of cannabis sativa. It is photoperiod sensitive variety with a later flowering time (harvest approximately 7 weeks after induction). VB17X200D has characteristics of both cannabis sativa and cannabis indica. VB 17X200D leaf structure would be classified as cannabis sativa (narrow and long leaves). The leaves are medium green. It has a propensity to grow tall and narrow. It has large branch spacing and does not fill completely out. Its internode distance is long; with nodes that are distanced from one another. The plant branches and nodes do not completely fill out (meaning the plant has wide space between branches and nodes when fully mature). It was selected due to its unique oil profile.

Phenotypically VB252 is the pollen donor and has characteristics of hybrid; both cannabis sativa and cannabis indica. It is photoperiod sensitive variety with a later flowering time (harvest approximately 7 weeks after induction). VB252 leaves which are medium green phenotypically would be characterized as cannabis indica (broad large leaf structures). It has short internode spacing with full branching. Branches contain multiple nodes per branch. It is a larger than most cannabis sativa plants (favoring cannabis indica) having a propensity to grow over 6 feet tall within a standard 3–4-month outdoor grow season. VB252 is a robust growing plant. VB252 was selected due to its robust agronomical traits and general phenotypic appearance.

The variety was developed in WA state and is used for production of cannabinoids.

This variety has been grown in greenhouse, outdoor and simulated growth pods. This variety has been grown naturally in planting zones 6-8, but simulated growth in pods for planting zones 4 and 9. This variety is currently being recommended for planting zones 4-9. This variety can be used for flower or oil production. VB4.21 produces low levels of THC and high CBD levels.

The variety is a feminized seed with a low level of hermaphrodites. It is photoperiod sensitive variety with a later flowering time (harvest approximately 7 weeks after induction). The plant height is medium and can vary depending on planting time, but averages 182 cm. The main stem color is green unless the plant undergoes a frost and then in may purple. Internode length, stem thickness and stem grove are average (medium). The leaves will be medium green with mean petiole of 4.5 cm, medium anthocyanin, and central leaflet length of 7. Seeds are grey, brown with medium marbling and ovate shape. If provided optimal growing conditions, it will have a consistent appearance.

Verda Bio, LLC will be responsible for maintaining all seed stock in accordance with Verda Bio purity and stewardship standards. Standard procedures are in place for production and have been tested across multiple production runs. No licensing agreements exist that would impact certification.

Certified seed will be available if certified Spring of 2022. Acreage data can be published by AOSCA.

Protection will be filed is the USPTO. AOSCA may provide a descriptive information for the PVP database.

High Grade Hemp Seed Variety Name – Blue Arrow

Blue Arrow is an Inbred dioecious tri-crop hemp variety bred for grain, fiber and hurd production. It's breeding history began in 2019 with the crossing of a CBD-dominant Cherry Wine hemp plant (commercially available from High Grade Hemp Seed) with an unnamed East Asian hemp plant held in a private collection characterized with long internodal spacing and long flowering time. 100 seeds from this initial (F1) cross were planted (Indoors) and kept in vegetative state until cuttings/clones could be taken from the 10 most vigorous plants before flowering the selected "parent" plants for further assessment and selection. During the early stages of flower the (3) males & (7) females were identified. Notes were taken on all plants through the later stages of flower before terminating the plants prior to harvest. The male with highest volume and length of pollen shed was selected. Two of the females were selected based on size, height, and pith, as well as plant structure.

Next, clones of the selected male and female(s) siblings were grown-out in a controlled breeding room for pollination to avoid any contamination. Following harvest, drying, and conditioning 100 seeds from each sibling cross were planted (Indoors) side-by-side. After 4 weeks of vegetative growth the progeny of female (A) was more vigorous and uniform than the progeny of female (B). Those plants were advanced with any off-types being culled along with the female (B) population prior to pollination.

To assess the uniformity of the resulting progeny, 100 seeds from the sibling cross were planted (indoors) in the summer of 2019. Besides uniformity and vigor, selection for a single male and female plant(s) was based earlier pollination/flowering time. Observation notes were taken through post-harvest in order to confirm and set expected characteristics (phenos). This step was repeated another two times and by late spring of 2020 the resulting population had <5% outliers by size. This stabilized population was allowed to open-pollinate in a Colorado greenhouse to multiply the amount of seed and offspring were assayed for internodal length and chemotype. Because it is an inbred line, Blue Arrow is considered both the mother and the father. Seed stock of each generation is maintained in High Grade Hemp Seed's secure vault.

Blue Arrow is characterized by its increased internodal spacing and minimal branching nature.

High Grade Hemp Seed is the party responsible for maintaining subsequent generations of stock seed, procedures for producing seedstock. If recommended for certification, certified seed will be available for sale in 2024. The certified seed production acreage will be published by AOSCA and certifying agencies once that data is available.

High Grade Hemp Seed Variety Name – ArkRyder

ArkRyder is a feminized hybrid cross between Matterhorn (female) and Berry Blossom (female pollen donor); two commercially available oil hemp strains from HGH Seed Inc. To alter the production of secondary metabolites of Matterhorn CBG, we crossed it with an aromatic CBD variety called, Berry Blossom. The Matterhorn CBG father is an AOSCA registered seed variety and is feminized and CBG-dominant. A description of Matterhorn CBG may be found in its AOSCA registration. The Berry Blossom mother is our breeder selection clone-only plant that has been grown and maintained by High Grade Hemp Seed for over 5 years, also being submitted for AOSCA certification this year. Both parents are maintained indefinitely under 18 hours of light to prevent flowering and frequently cloned to preserve their genetics. Both parents are also preserved in seed form in our vault and may be planted as needed following certification. Following our breeding protocols, a cloned population of a Matterhorn CBG individual was masculinized to create feminized pollen which was subsequently applied to a cloned population of Berry Blossom. The resulting seed stock was grown outdoors in 2020, tested for compliance using our in-house laboratory. It can be described as fruity, with a slight rotten smell to it.

Due to the identical genetic code of the cloned parental lines, the seed stock represents a true hybrid, and the plants are more uniform than a seed lot created from multiple males and females. Both mother and father plants are maintained as vegetative stock, as well as in seed form in High Grade Hemp Seed's secure vault. During the 2020 and 2021 growing seasons, extensive phenotypic surveying was performed to assay the level of variance and it was found to be minimal. ArkRyder is identified by its thinner leaves, pyramidal shape and its shorter, stockier frame. Unlike its CBG-dominant father, ArkRyder is a CBD-dominant plant.

High Grade Hemp Seed is the party responsible for maintaining subsequent generations of stock seed, procedures for producing seedstock. If recommended for certification, certified seed will be available for sale in 2022. The certified seed production acreage will be published by AOSCA and certifying agencies once that data is available.

High Grade Hemp Seed Variety Name – Berry Blossom

Berry Blossom is an Inbred-line (feminized), oil variety that was created in 2016 by crossing an in-house selection of Cherry Kandahar S1 (privately held) with Chardonnay (commercially available). Cherry Kandahar was a mixed chemotype population of *Cannabis indica* that originated in Afghanistan. Surveying the population via chemical testing- a range of different cannabinoid ratios was observed. A selection was made of a single plant that had the highest CBD:THC ratio as determined by chemical testing using HPLC. This plant was subsequently cloned, reversed and then used to pollinate itself to generate a selfed S1 population. These seeds were grown out and another selection was made, choosing a short, squat framed plant with broad leaves that inherited the high CBD ratio chemotype of its parent. This plant was pollinated by a taller, more narrow-leafed Chardonnay selection to produce a vigorous hybrid with compliant cannabinoid production. Chardonnay is a low-variance F1 cross between a privately held inbred variety named Black Rose and our breeder selection of the commercially available Cherry Wine.

As a variety, Berry Blossom has exhibited a wide range of probable adaptation throughout the USDA zones as it has been grown with success in the Pacific NW (Oregon), Colorado, Texas, South & North Carolina, and New York. Berry Blossom is characterized by its short and woody main stem, allowing this plant to thrive in regions with high winds. It has a very fruity aroma, with a strong berry smell. Trimmed flowers may produce up to 1.9% total terpenes, with over half of that being myrcene. Berry Blossom has a CBD:THC ratio above 20:1 and yields large flowers. In some climates, leaves have been observed to change color as harvest time approaches, with strong shades of purple and red appearing in early October.

High Grade Hemp Seed is the party responsible for maintaining subsequent generations of stock seed, procedures for producing seedstock. If recommended for certification, certified seed will be available for sale in 2022. The certified seed production acreage will be published by AOSCA and certifying agencies once that data is available.

High Grade Hemp Seed Variety Name – Bueno

Bueno is an Inbred, feminized and resinous oil-producing hemp plant that produces large and fragrant inflorescences. It was created in 2017 by crossing Berry Blossom (commercially available from High Grade Hemp Seed) and a plant known as Cherry Uno. Cherry Uno was a breeder selection of the very first Cherry Wine seed release in 2011 and selected for its compliant cannabinoid production.

The parents of Bueno are hemp stalwarts and had been grown by High Grade Hemp Seed and our farm partners over many acres and seasons. Because of the great amount of hands-on experience with the parents, a selection was made of plants that exemplified the true nature of the variety. **The parent plants are maintained as seed and clone stock in High Grade's genetic collection and are used to create seed. A sufficient supply of parent seed is maintained in our secured vault for Bueno hybrid production and for inbreeding parent production via full-sibling crosses. To create feminized Bueno seed, a female population of Cherry Uno is masculinized to produce pollen which is then applied to female Berry Blossom plants.**

It shares many of the same characteristics of its parental lineage: large and resinous flowers, a squat and bushy growing pattern. Unlike varieties grown for fiber, **Bueno is a squat plant that is shorter and stouter than its parents.** It has short internodal spacing during flowering and multiple compounded racemes. **Its low stature means it is adapted to grow in high wind areas such as in Colorado.**

High Grade Hemp Seed is the party responsible for maintaining subsequent generations of stock seed, procedures for producing seedstock. If recommended for certification, certified seed will be available for sale in 2024. The certified seed production acreage will be published by AOSCA and certifying agencies once that data is available.

High Grade Hemp Seed Variety Name – EliRae

EliRae is a feminized hybrid cross between a Matterhorn CBG (female) and Bueno (female pollen donor); two commercially available oil hemp strains from HGH Seed Inc. In 2019, a field-planted Bueno plant was observed to have increased resin production compared to its siblings. Using our in-house analytical chemistry lab, we were able to determine that the ratio of CBD:THC (cannabinoids) was compliant and that this plant did have increased resin production. This plant was subsequently dug up, transplanted, and placed under 24-hours of light in order to change its growing pattern from flowering to producing vegetative growth. This new vegetative growth was subsequently cloned, allowed to grow into a large mother plant and cloned multiple times to create a genetically identical population. Concurrently, a population of CBG-dominant Matterhorn CBG (certified 2020) plants were surveyed in early 2020 and the fastest growing plant (tallest) was selected and allowed to grow into a mother plant. **Clones were subsequently taken from this mother plant, and then masculinized to create feminized pollen, which was then applied to the flowering Bueno population, resulting in the feminized EliRae seed stock. In this cross, Bueno is the mother and Matterhorn CBG is the father.** This variety was grown outdoors and in greenhouses in 2020, in an initial yield and data trial before being released for commercial production in 2021.

Due to the identical genetic code of the cloned parental lines, the seed stock represents a true hybrid, and the plants are more uniform than a seed lot created from multiple males and females. During the 2020 and 2021 growing seasons, extensive phenotypic surveying was performed to assay the level of variance and it was found to be acceptable. EliRae is identified by its fast-flowering (7-8 weeks) nature and wide flowers that grow in a multi-topped bush pattern. EliRae is currently being grown in multiple locations across the United States for oil production in the CBD industry.

High Grade Hemp Seed is the party responsible for maintaining subsequent generations of stock seed, procedures for producing seedstock. If recommended for certification, certified seed will be available for sale in 2024. The certified seed production acreage will be published by AOSCA and certifying agencies once that data is available.

High Grade Hemp Seed Variety Name – Napoleon

Napoleon is an **Inbred**, dioecious hemp variety that was bred to produce fiber, grain and hurd. It's breeding history began in 2019 with the crossing of a CBD-dominant Cherry Wine (commercially available from High Grade Hemp Seed) with an unnamed European hemp plant (held in a private collection) characterized with long internodal spacing and sturdy stalks. 100 seeds from this initial F1 cross were assayed, found to be a mixed population, and subsequently selected and inbred for three further generations indoors. **With each generation, 100 seeds were germinated and selection of the two tallest plants (one male and one female, determined genetically) occurred two months post-germination. After three full-sibling crosses, the population had <5% outliers by size.** This stabilized population was allowed to open-pollinate in a Colorado greenhouse to multiply the amount of seed and offspring were assayed for internodal length and chemotype.

It is a dioecious variety that grows tall and straight, with increased internodal spacing compared to common oil varieties. This variety was bred to be direct-seeded with a high planting density. When grown as intended, it exhibits minimal branching and is characterized by strong apical dominance. Stalks may be hollow early in life but become full and woody as the plant ages, starting from the base and moving upwards. High density planting will also lead to smaller, less-resinous flowers (below 5% total cannabinoids). Males flower faster than females. **Because it is an inbred line, Napoleon is considered both the mother and the father. Seed stock of each generation is maintained in High Grade Hemp Seed's secure vault and will be planted as needed.**

High Grade Hemp Seed is the party responsible for maintaining subsequent generations of stock seed, procedures for producing seedstock. If recommended for certification, certified seed will be available for sale in 2024. The certified seed production acreage will be published by AOSCA and certifying agencies once that data is available