

A REPORT OF THE
HEMP VARIETY REVIEW BOARD



ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES

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May 2020

The Association of Official Seed Certifying Agencies (AOSCA), Hemp Variety Review Board (HPVRB), reviewed the following varieties on May 27, 2020. 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

2020 AOSCA HEMP VARIETY REVIEW BOARD

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Hemp

Auto Blues

1. A brief statement of the origin and breeding history, including selection criteria and the identity of the developer. State the variety's predominant usage type.

Auto Blues is an inbred day-neutral variety developed from the Blue Genius autoflower line from Eugenius LLC; the original Blue Genius line was most likely an F3 or F4 population; in this description we assume it was an F3. The original Eugenius line had a plethora of phenotypes with the only unilaterally retained characteristic being the autoflower trait and plant structure, plant size, flower color and aroma, and flower morphology being extremely variable. In June of 2019 in Santa Rosa, CA we germinated 1000 seedlings and selected 25 similar individuals were selected for self-pollination; 100 seeds from the 25 individuals were screened for uniformity. From the 25 F3-S1s, a the most uniform individual was selected and 200 seeds were germinated in November 2019 in Sandy, OR; from the 200 S1 seedlings, 50 were masculinized and 150 remained female and a selected open pollination of the 5 superior and uniform pollen donors and 10 superior and uniform pollen receivers was performed to generate breeder stock. The selections were made based on plant structure (upright plants reaching as tall as 3-3.5' in height), flower morphology (continuous spikelets of flowers of intermediate density), flower color (blue/silver to purple coloration), and flower aroma (citrus and pepper). In Beacon Hemp's parlance, the resulting F5 breeder stock is utilized for commercial production of inbreds and hybrids via open pollination; generation of additional breeder stock will occur via full-sib crosses of the F5 breeder stock. The predominant oil type is CBD/A dominant oil of varying concentration, viscosity, other chemical constituents, etc based on the solvent and methodology.

2. State the area of probable adaptation and primary purpose for which the variety will be used. Report states and areas within states where the variety has been tested and proposed areas of recommendation and merchandising.

Auto Blues was developed in Oregon; while much of the breeding and selection occurred in climate-controlled conditions, several screenings and selection events occurred in and around the Pacific Coast. Auto Blues has currently only been grown in California and Oregon. The primary uses are for CBD extraction, terpene extraction, and smokeable flower/pre-rolled hemp cigarettes.

3. Provide information and identifying characteristics to be used for field inspections of the variety.

While Auto Blues is a small plant by most hemp standards, it is one of the taller day neutral hemp varieties (reaching heights as tall as 3.5' and widths of 2.5'); some of its most distinctive traits are bright green and purple flowers with a blue or silver undertone; leaves that readily turn purple as harvest approaches, especially with cold nights. It has a sharp, acrid aroma that can be described as akin to citrus zest and freshy ground pepper.

4. If applicable, provide a statement relative to its disease, insect, and herbicide resistance or interaction.

There is currently no statistically significant data to provide regarding Auto Blues' resistance to disease, insects, or herbicides.

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Hemp

Auto Blues

5. Name the party responsible for maintaining subsequent generations of stock seed, procedures for producing seedstock, and other limitations that may be specified by the breeder. State any licensing agreements that are associated with this variety that would affect certifying agency activities.

Beacon Hemp maintains its own breeder stock for commercial production by itself in Sebastopol, CA. All genetic intellectual property rights are owned and maintained by Beacon Hemp.

6. State when certified seed will first be offered for sale if this variety is recommended for certification by official certifying agencies. State whether certified seed production acreage can be published by AOSCA and certifying agencies.

Certified seed will be offered for sale as soon as the variety has been approved by the AOSCA Variety Review Board; Beacon Hemp has already submitted an Industrial Hemp Experimental Line application to the Oregon Seed Certification Service. Beacon intends to initiate certified seed production immediately in Oregon and California. Beacon Hemp's certified seed production acreage can be published by AOSCA and certifying agencies.

7. State whether application will be submitted for protection under the U.S. Plant Variety Protection Act and whether such application would elect the option that seed sold by variety name must be certified (Title V Certification Option). State whether AOSCA may provide descriptive information to the PVP database.

Beacon Hemp intends to submit a PVP application for Auto Blues in 2021. When the PVP application is submitted, Beacon Hemp will elect to utilize the Title V certification option. AOSCA may provide the descriptive information to the PVP database.

Date this application was submitted: Apr 28, 2020

Date recommended by the VRB: May 27, 2021

Hemp

Auto Blunami

Origin & Breeding History

1. Auto Blunami is an F1 hybrid of Auto Tsunami pollinated by Auto Blues.

Auto Tsunami is an inbred, day-neutral variety derived from Grass-o-Matic's "Medigom" and Sohum Seed's "Harle Tsunami." Medigom is a feminized (only female plants), Type II (uniform heterozygous CBDA/THCA synthase genotypes that produce CBD-to-THC ratios of 2:1 to 1:1) day-neutral variety. Harle Tsunami is a photoperiodic, regular dioecious (male and female plants) variety with approximately 75% Type II and 25% Type III (homozygous only CBDA synthase genotype that produce CBD-to-THC ratios of >20:1). The goal of crossing these two lines was to create a uniformly type III, day-neutral seed line with improved agronomic traits and CBD productivity. From 100 Harle Tsunami plants, two Type III female plants were selected as pollen donors to outcross to a population of 100 Medigom pollen receivers; the resulting F1 seed lot was photoperiodic, feminized and 25% Type II and 75% Type III plants. From the 100 seeded Medigom plants, 5 were selected to screen; a total of 1000 seeds (200 seeds from 5 individual F1 crosses) were germinated. From the 1000 seedlings, 5 individual Type III plants were selected; the selected plants were clonally propagated for use as both pollen donors and receivers in a selective, reciprocal open pollination, resulting in an F2 population that was 100% Type III and 25% day-neutral. From the F2 population, 5000 seedlings were grown; 10 day-neutral pollen donors were selected and 50 day-neutral pollen receivers were selected for an open pollination to generate an F3 population that was 100% Type III and 100% day-neutral. Subsequent inbreeding of filial generations 4 and 5 occurred via small-scale (<100 plant screening) full-sib crosses of select individual pollen donors and receivers to fix traits for plant size, structure, and aroma profile. Production of the F6 generation occurred via selective open pollination of a 5000 seedling population, resulting in utilization of 75 pollen donors and 1000 pollen receivers and is the breeder stock for commercial seed production of inbreds and hybrids.

Auto Blues is an inbred day-neutral variety developed from the Blue Genius autoflower line from Eugenius LLC; the original Blue Genius line was most likely an F3 or F4 population; in this description we assume it was an F3. The original Eugenius line had a plethora of phenotypes with the only unilaterally retained characteristic being the autoflower trait and plant structure, plant size, flower color and aroma, and flower morphology being extremely variable. From a total of 1000 seedlings, 25 similar individuals were selected for self-pollination; 100 seeds from the 25 individuals were screened for uniformity. From the 25 F3-S1s, a the most uniform individual was selected and 200 seeds were germinated; from the 200 S1 seedlings, 50 were masculinized and 150 remained female and a selected open pollination of the 5 superior and uniform pollen donors and 10 superior and uniform pollen receivers was performed to generate breeder stock. The selections were made based on plant structure (upright plants reaching as tall as 3-3.5' in height), flower morphology (continuous spikelets of flowers of intermediate density), flower color (blue/silver to purple coloration), and flower aroma (citrus and pepper). In Beacon Hemp's parlance, the resulting F5 breeder stock is utilized for commercial production of inbreds and hybrids via open pollination; generation of additional breeder stock will occur via full-sib crosses of the F5 breeder stock.

Areas of Adaptation

2. Pacific Coast (Major farming regions of Oregon and Coastal California)

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Hemp

Auto Blunami

3. Identifying characteristics –

1. Taxonomic Classification: Cannabis sativa L. subsp. Sativa
2. THC Content: <0.3%
3. Sexual Type: Gynecious (feminized dioecious seed)
4. Flowering Type: Female
5. Time of Flowering: 75 – 90 days
6. Disparity of Female Flowering to Male Flowering: All genotypically female; 99.97% phenotypically female on most lots
7. Plant Height: 60 to 100 cm.
8. Plant Branching: Medium
9. Stem Internode Length: Medium
10. Stem Color: Green, red (more purple)
11. Leaf Color: Green, grey (more of silver undertone and purple coloration close to harvest)
12. Leaf Color Intensity: Medium
13. Leaf Size: Medium
14. Stem Grooves: Medium
15. Leaf Anthocyanin Coloration: Medium
16. Male Flower Anthocyanin Coloration: Medium (staminate flowers on genetically female plants)
17. Hairs on Calyx: _____
18. Seed Size & Shape: Large seeds, round and ovate in shape
19. Variants and Acceptable Levels: Small portion (<1%) of plants with elongated rachis/rachilla resulting in reduced flower density and mass.
20. Off-Types: _____

Disease, Insect, or Herbicide Resistance

4. There is currently no statistically significant data to substantiate claims regarding disease or insect resistance; early anecdotal results indicates that Auto Blunami demonstrates strong fungal disease resistance, similar to Auto Tsunami and its outcrosses. Auto Blunami demonstrates no herbicide resistance.

Seed Stock Maintenance

5. Current parental stock seed produced from a selective F5 and F6 open pollination for Auto Blues and Auto Tsunami respectively; future parental stock seed will be maintained via small scale full-sib and half-sib F6 and F7 crossings. Beacon Hemp maintains its own breeder stock for commercial production by itself in Half Moon Bay, California and its seed production partners, including Tap Reloop LLC in Sandy, Oregon and Ken Altman and Bruce Gibson in Bonsall, California. All genetic intellectual property rights are owned and maintained by Beacon Hemp.

Seed First Offered for Sale

6. 08/01/20

U.S. Plant Variety Protection Act

7. Beacon Hemp intends to submit a PVP application for Auto Blunami in 2020. When the PVP application is submitted, Beacon Hemp will elect to utilize the Title V certification option. AOSCA may provide the descriptive information to the PVP database.

Date this application was submitted: Apr 28, 2020

Date recommended by the VRB: May 27, 2021

Hemp

Auto Tsunami

Origin & Breeding History

1. Auto Tsunami is an inbred, day-neutral variety derived from Grass-o-Matic's "Medigom" and Sohum Seed's "Harle Tsunami." Medigom is a feminized (only female plants), Type II (uniform heterozygous CBDA/THCA synthase genotypes that produce CBD-to-THC ratios of 2:1 to 1:1) day-neutral variety. Harle Tsunami is a photoperiodic, regular dioecious (male and female plants) variety with approximately 75% Type II and 25% Type III (homozygous only CBDA synthase genotype that produce CBD-to-THC ratios of >20:1). The goal of crossing these two lines was to create a uniformly type III, day-neutral seed line with improved agronomic traits and CBD productivity. From 100 Harle Tsunami plants, two Type III female plants were selected as pollen donors to outcross to a population of 100 Medigom pollen receivers; the resulting F1 seed lot was photoperiodic, feminized and 25% Type II and 75% Type III plants. From the 100 seeded Medigom plants, 5 were selected to screen; a total of 1000 seeds (200 seeds from 5 individual F1 crosses) were germinated. From the 1000 seedlings, 5 individual Type III plants were selected; the selected plants were clonally propagated for use as both pollen donors and receivers in a selective, reciprocal open pollination, resulting in an F2 population that was 100% Type III and 25% day-neutral. From the F2 population, 5000 seedlings were grown; 10 day-neutral pollen donors were selected and 50 day-neutral pollen receivers were selected for an open pollination to generate an F3 population that was 100% Type III and 100% day-neutral. Subsequent inbreeding of filial generations 4 and 5 occurred via small-scale (<100 plant screening) full-sib crosses of select individual pollen donors and receivers to fix traits for plant size, structure, and aroma profile. Production of the F6 generation occurred via selective open pollination of a 5000 seedling population, resulting in utilization of 75 pollen donors and 1000 pollen receivers and is the breeder stock for commercial seed production of inbreds and hybrids.

Areas of Adaptation

2. Pacific Coast (Major farming regions of Oregon and California, including as far inland as the Willamette Valley and the San Joaquin Valley); has been farmed successfully in other states and climates (eg Wisconsin, Minnesota, Colorado, Vermont, Alabama).

3. Identifying characteristics –

1. Taxonomic Classification: Cannabis sativa L. subsp. Sativa
2. THC Content: <0.3%
3. Sexual Type: Gynecious (feminized dioecious seed)
4. Flowering Type: Female
5. Time of Flowering: 75-90 days
6. Disparity of Female Flowering to Male Flowering: All genotypically female seeds; 99.97% phenotypically female plants on most lots
7. Plant Height: 45 to 90 cm.
8. Plant Branching: Intermediate
9. Stem Internode Length: Short
10. Stem Color: Green
11. Leaf Color: Green
12. Leaf Color Intensity: Medium
13. Leaf Size: Medium
14. Stem Grooves: Medium
15. Leaf Anthocyanin Coloration: Weak
16. Male Flower Anthocyanin Coloration: Weak (staminate flowers on genetically female plants)
17. Hairs on Calyx: White
18. Seed Size & Shape: Large, round and ovate in shape
19. Variants and Acceptable Levels: Small portion (<1%) of plants with less dense spikelets of flowers
20. Off-Types: Small portion (<1%) iron deficient prone off-type

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Hemp

Auto Tsunami

Disease, Insect, or Herbicide Resistance

4. There are no official claims regarding disease or insect resistance that can be substantiated with statistically significant data; Auto Tsunami however has demonstrated improved tolerance of or resistance to several fungal diseases (botrytis, vascular wilts, root rot, powdery mildew). Auto Tsunami demonstrates no herbicide resistance.

Seed Stock Maintenance

5. Current stock seed produced from a selective F6 open pollination; stock seed will be maintained via small scale full-sib and half-sib F7 crossings. Beacon Hemp maintains its own breeder stock for commercial production by itself in Half Moon Bay, California and its seed production partners, including Tap Reloop LLC in Sandy, Oregon and Ken Altman and Bruce Gibson in Bonsall, California. All genetic intellectual property rights are owned and maintained by Beacon Hemp.

Seed First Offered for Sale

6. 04/01/19
Certified seed will be offered for sale as soon as the variety has been approved by the AOSCA Variety Review Board; Beacon Hemp has already submitted an Industrial Hemp Experimental Line application to the Oregon Seed Certification Service. Beacon intends to initiate certified seed production immediately in Oregon and California. Beacon Hemp's certified seed production acreage can be published by AOSCA and certifying agencies.

U.S. Plant Variety Protection Act

7. The current iteration of Auto Tsunami has already been sold commercially for over 1 year and thus is ineligible to plant variety protections (PVPs); Beacon Hemp intends to submit a PVP application for an improved version of Auto Tsunami in 2021. When the improved Auto Tsunami PVP application is submitted Beacon Hemp will not elect the Title V certification option. AOSCA may provide the descriptive information to the PVP database.

Date this application was submitted: Apr 28, 2020

Date recommended by the VRB: May 27, 2021

Hemp

Rincon

Origin & Breeding History

1. Rincon is a high CBD, high terpene, hemp variety grown for the CBD oil and smokable flower markets. Rincon is a hybrid variety resulting from the crossing of two parent lines. The parental lines of Rincon were bred using traditional plant breeding methods which may include self-pollination, backcrossing, and recurrent selection. Parent lines were selected for plant structure, flowering time, and cannabinoid content, amongst other desirable traits.

Areas of Adaptation

2. Based upon trials Rincon should be well adapted to areas of the eastern coast of the United States including, Florida, Georgia, North Carolina, South Carolina, and New York, amongst other locations. And on the western coast of the United States in areas such as California, Arizona, Nevada, Colorado, Oregon, and Washington, amongst other locations.

3. Identifying characteristics –

1. Taxonomic Classification: Cannabis sativa L. (hemp)
2. THC Content: Less than 0.3%
3. Sexual Type: Hybrid
4. Flowering Type: Female
5. Time of Flowering: 75 days
6. Disparity of Female Flowering to Male Flowering: 14 days
7. Plant Height: Medium 90 to 100 cm.
8. Plant Branching: Medium
9. Stem Internode Length: Medium
10. Stem Color: Green
11. Leaf Color: Green
12. Leaf Color Intensity: Medium
13. Leaf Size: Medium
14. Stem Grooves: Present
15. Leaf Anthocyanin Coloration: Weak
16. Male Flower Anthocyanin Coloration: Weak
17. Hairs on Calyx: Present
18. Seed Size & Shape: Small, Round
19. Variants and Acceptable Levels: Purple phenotypes
20. Off-Types: Short phenotypes

Disease, Insect, or Herbicide Resistance

4. Not known

Seed Stock Maintenance

5. Kayegene, LLC

Seed First Offered for Sale

6. 2021

U.S. Plant Variety Protection Act

7. Intending to submit an application

Date this application was submitted: May 14, 2020

Date recommended by the VRB: Feb 11, 2021

Hemp

NWG 2463 (Exp)

Origin & Breeding History

1. NWG 2463 is a dioecious hemp variety developed by New West Genetics, Inc. using recurrent selection and mass selection breeding methods. It is derived from a cross between NWG 988 and NWG 452 (US Patent Number: US 10,499,584 B2; PVP pending). NWG 988 is an F2 selected for high potential cannabinoid production. NWG 452 is a grain variety eligible for seed certification under the variety name NWG 452. The selection criteria for advancement of single plants and bulk selections were focused on early flowering, minimal branching, high yield *per se* of seed and female floral biomass, total CBD > 5.5% while maintaining total delta-9 tetrahydrocannabinol of < 0.30% when analyzed via HPLC using testing procedures set forth in the *Testing guidelines for Identifying Delta-9 Tetrahydrocannabinol (THC) Concentration in Hemp* for the USDA Hemp Program.

Areas of Adaptation

2. NWG 2463 was developed in Northern Colorado as a dual-purpose variety for production of cannabidiol (CBD) and hemp grain. It has been trialed in Colorado and is most adapted to Northern Colorado. However, it is expected to perform well in geographies located between latitudes of 37° and 43° and will be marketed in adjacent states and similar climates.

3. Identifying characteristics –

1. Taxonomic Classification: Cannabis sativa
2. THC Content: <0.30%
3. Sexual Type: Dioecious
4. Flowering Type: Male and Female
5. Time of Flowering: 54 days
6. Disparity of Female Flowering to Male Flowering: 3 days
7. Plant Height: 170 cm. (+/- 50 cm.) 120 to 220 cm.
8. Plant Branching: Few
9. Stem Internode Length: Short
10. Stem Color: Green
11. Leaf Color: Green
12. Leaf Color Intensity: Medium
13. Leaf Size: Medium
14. Stem Grooves: Shallow
15. Leaf Anthocyanin Coloration: Absent
16. Male Flower Anthocyanin Coloration: Absent
17. Hairs on Calyx: Present in medium density
18. Seed Size & Shape: TKW: 14 grams, ovate
19. Variants and Acceptable Levels: Plants with excessive branching on field edges, not to exceed 3% of population
20. Off-Types: None expected

Disease, Insect, or Herbicide Resistance

4. NWG 2463 has not been screened or selected for resistance to any known hemp pests or pathogens nor any herbicides.

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Hemp

NWG 2463 (Exp)

Seed Stock Maintenance

5. New West Genetics, Inc. is responsible for maintenance of Breeders seed by open pollination in small blocks in isolated fields. Single plants identified as being true to type will be tagged and selected by the breeder to maintain varietal purity. These plants will be recycled to produce the next Breeders seed stock. Breeders seed produced in this manner may be increased for up to two generations under the control of NWG and respecting AOSCA isolation distances for the production of certified Foundation seed. Second and third generation Breeders seed stock produced in this manner will then be used to produce Foundation seed stocks. Isolation and other requirements will be in accordance with the seed certification regulations of the state where it is produced. Foundation seed will be released to customers to produce certified seed Only one generation of certified seed is allowed. There will be no Registered class.

Seed First Offered for Sale

6. Certified seed of NWG 2463 will be offered for sale in 2021. New West Genetics prohibits publication of seed production acreage by AOSCA and seed certifying agencies.

U.S. Plant Variety Protection Act

7. An application for U.S. Plant Variety Protection will be filed in 2020, in which NWG will not elect that seed sold by variety name must be certified. AOSCA is permitted to provide descriptive information to the PVP database.

Date this application was submitted: Feb 27, 2020

Date recommended by the VRB: Jan 29, 2021

Hemp

NWG 2730 (Exp)

Origin & Breeding History

1. NWG 2730 is a dioecious hemp variety developed by New West Genetics, Inc using recurrent selection and mass selection breeding methods. It is derived from a cross between NWG988 and NWG452 (US Patent Number: US 10,499,584 B2; PVP pending). NWG988 is an F2 selected for high potential cannabinoid production. NWG452 is a grain variety that has been approved by AOSCA. The selection criteria for advancement of single plants and bulk selections were focused on early flowering, minimal branching, high yield *per se* of seed and female floral biomass, high levels of total CBD (> 5.2%) while maintaining total delta-9 tetrahydrocannabinol of < 0.30% when analyzed via HPLC using testing procedures set forth in the *Testing guidelines for Identifying Delta-9 Tetrahydrocannabinol (THC) Concentration in Hemp* for the USDA Hemp Program.

Areas of Adaptation

2. NWG 2730 was developed in Northern Colorado as a dual-purpose variety for production of cannabidiol (CBD) and hemp grain. It has been trialed in Colorado and is most adapted to Northern Colorado. However, it is expected to perform well in geographies located between latitudes of 37° and 43° and will be marketed in adjacent states and similar climates.

3. Identifying characteristics

1. Taxonomic Classification: Cannabis sativa
2. THC Content: <0.30%
3. Sexual Type: Dioecious
4. Flowering Type: Male and Female
5. Time of Flowering: 54 days
6. Disparity of Female Flowering to Male Flowering: 4 days
7. Plant Height: 190 cm. (+/- 50 cm.) 140 to 240 cm.
8. Plant Branching: Few
9. Stem Internode Length: Short
10. Stem Color: Green
11. Leaf Color: Green
12. Leaf Color Intensity: Medium
13. Leaf Size: Medium
14. Stem Grooves: Shallow
15. Leaf Anthocyanin Coloration: Absent
16. Male Flower Anthocyanin Coloration: Absent
17. Hairs on Calyx: Present in medium density
18. Seed Size & Shape: TKW: 12.98 grams; ovate
19. Variants and Acceptable Levels: Plants with excessive branching on field edges, not to exceed 3% of population
20. Off-Types: None expected

Disease, Insect, or Herbicide Resistance

4. NWG 2730 has not been screened or selected for resistance to any known hemp pests or pathogens nor any herbicides.

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Hemp

NWG 2730 (Exp)

Seed Stock Maintenance

5. New West Genetics, Inc. is responsible for maintenance of Breeders seed by open pollination in small blocks in isolated fields. Single plants identified as being true to type will be tagged and selected by the breeder to maintain varietal purity. These plants will be recycled to produce the next Breeders seed stock. Breeders seed produced in this manner may be increased for up to two generations under the control of NWG and respecting AOSCA isolation distances for the production of certified Foundation seed. Second and third generation Breeders seed stock produced in this manner will then be used to produce Foundation seed stocks. Isolation and other requirements will be in accordance with the seed certification regulations of the state where it is produced. Foundation seed will be released to customers to produce certified seed Only one generation of certified seed is allowed. There will be no Registered class.

Seed First Offered for Sale

6. Certified seed of NWG 2730 will be offered for sale in 2021. New West Genetics prohibits publication of seed production acreage by AOSCA and certifying agencies.

U.S. Plant Variety Protection Act

7. An application for U.S. Plant Variety Protection will be filed in 2020, in which NWG will not elect that seed sold by variety name must be certified. AOSCA is permitted to provide descriptive information to the PVP database

Date this application was submitted: Feb 27, 2020

Date recommended by the VRB: Jan 29, 2021

Hemp

NWG 4000 (Exp)

Origin & Breeding History

1. NWG 4000 is a dioecious hemp variety developed by New West Genetics, Inc. using recurrent selection and mass selection breeding methods. It is derived from a cross between NWG 988 and NWG 452 (US Patent Number: US 10,499,584 B2; PVP pending). NWG 988 is an F2 selected for high potential cannabinoid production. NWG 452 is a grain variety that has been approved by AOSCA. The selection criteria for advancement of single plants and bulk selections were focused on early flowering, minimal branching, high yield *per se* of seed and female floral biomass, elevated levels of total CBD (> 6.0%) while maintaining total delta-9 tetrahydrocannabinol of < 0.30% when analyzed via HPLC using testing procedures set forth in the *Testing guidelines for Identifying Delta-9 Tetrahydrocannabinol (THC) Concentration in Hemp* for the USDA Hemp Program.

Areas of Adaptation

2. NWG 4000 was developed in Northern Colorado as a dual-purpose variety for production of cannabidiol (CBD) and hemp grain. It has been trialed in Colorado and is most adapted to Northern Colorado. However, it is expected to perform well in geographies located between latitudes of 37° and 43° and will be marketed in adjacent states and similar climates.

3. Identifying characteristics

1. Taxonomic Classification: Cannabis sativa
2. THC Content: <0.30%
3. Sexual Type: Dioecious
4. Flowering Type: Male and Female
5. Time of Flowering: 54 days
6. Disparity of Female Flowering to Male Flowering: 4 days
7. Plant Height: 170 cm. (+/- 40 cm.) 130 to 210 cm.
8. Plant Branching: Few
9. Stem Internode Length: Short
10. Stem Color: Green
11. Leaf Color: Green
12. Leaf Color Intensity: Medium
13. Leaf Size: Medium
14. Stem Grooves: Shallow
15. Leaf Anthocyanin Coloration: Absent
16. Male Flower Anthocyanin Coloration: Absent
17. Hairs on Calyx: Present in high density
18. Seed Size & Shape: TKW: 13.2 grams, ovate
19. Variants and Acceptable Levels: Plants with excessive branching on field edges, not to exceed 3% of population
20. Off-Types: None expected

Continued on next page

Hemp

NWG 4000 (Exp)

Disease, Insect, or Herbicide Resistance

4. It has not been screened or selected for resistance to any known hemp pests or pathogens nor any herbicides.

Seed Stock Maintenance

5. New West Genetics, Inc. is responsible for maintenance of Breeders seed by open pollination in small blocks in isolated fields. Single plants identified as being true to type will be tagged and selected by the breeder to maintain varietal purity. These plants will be recycled to produce the next Breeders seed stock. Breeders seed produced in this manner may be increased for up to two generations under the control of NWG and respecting AOSCA isolation distances for the production of certified Foundation seed. Second and third generation Breeders seed stock produced in this manner will then be used to produce Foundation seed stocks. Isolation and other requirements will be in accordance with the seed certification regulations of the state where it is produced. Foundation seed will be released to customers to produce certified seed Only one generation of certified seed is allowed. There will be no Registered class.

Seed First Offered for Sale

6. Certified seed of NWG 4000 will be offered for sale in 2021. New West Genetics prohibits publication of seed production acreage by AOSCA and certifying agencies.

U.S. Plant Variety Protection Act

7. An application for U.S. Plant Variety Protection will be filed in 2020, in which NWG will not elect that seed sold by variety name must be certified. AOSCA has permission to provide descriptive information to the PVP database

Date this application was submitted: Feb 27, 2020

Date recommended by the VRB: Jan 29, 2021

Hemp

NWG 4113 (Exp)

Origin & Breeding History

1. NWG 4113 is a dioecious hemp variety developed by New West Genetics, Inc. using recurrent selection and mass selection breeding methods. It is derived from a cross between NWG988 and NWG452 (US Patent Number: US 10,499,584 B2; PVP pending). NWG988 is an F2 selected for high potential cannabinoid production. NWG452 is a grain variety that has been approved by AOSCA. The selection criteria for advancement of single plants and bulk selections were focused on early flowering, minimal branching, high yield *per se* of seed and female floral biomass, elevated levels of total CBD (> 6.5%) while maintaining total delta-9 tetrahydrocannabinol of < 0.30% when analyzed via HPLC using testing procedures set forth in the *Testing guidelines for Identifying Delta-9 Tetrahydrocannabinol (THC) Concentration in Hemp* for the USDA Hemp Program.

Areas of Adaptation

2. NWG 4113 was developed in Northern Colorado as a dual-purpose variety for production of cannabidiol (CBD) and hemp grain. It has been trialed in Colorado and is most adapted to Northern Colorado. However, it is expected to perform well in geographies located between latitudes of 37° and 43° and will be marketed in adjacent states and similar climates.

3. Identifying characteristics

1. Taxonomic Classification: Cannabis sativa
2. THC Content: <0.30%
3. Sexual Type: Dioecious
4. Flowering Type: Male and Female
5. Time of Flowering: 53 days
6. Disparity of Female Flowering to Male Flowering: 3 days
7. Plant Height: 170 cm. (+/- 50 cm.) 120 to 220 cm.
8. Plant Branching: Few
9. Stem Internode Length: Short
10. Stem Color: Green
11. Leaf Color: Green
12. Leaf Color Intensity: Medium
13. Leaf Size: Medium
14. Stem Grooves: Shallow
15. Leaf Anthocyanin Coloration: Absent
16. Male Flower Anthocyanin Coloration: Absent
17. Hairs on Calyx: Present in high density
18. Seed Size & Shape: TKW: 16 grams, ovate
19. Variants and Acceptable Levels: Plants with excessive branching on field edges, not to exceed 1% of population
20. Off-Types: None expected

Disease, Insect, or Herbicide Resistance

4. It has not been screened or selected for resistance to any known hemp pests or pathogens nor any herbicides.

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Continued from previous page

Hemp

NWG 4113 (Exp)

Seed Stock Maintenance

5. New West Genetics, Inc. is responsible for maintenance of Breeders seed by open pollination in small blocks in isolated fields. Single plants identified as being true to type will be tagged and selected by the breeder to maintain varietal purity. These plants will be recycled to produce the next Breeders seed stock. Breeders seed produced in this manner may be increased for up to two generations under the control of NWG and respecting AOSCA isolation distances for the production of certified Foundation seed. Second and third generation Breeders seed stock produced in this manner will then be used to produce Foundation seed stocks. Isolation and other requirements will be in accordance with the seed certification regulations of the state where it is produced. Foundation seed will be released to customers to produce certified seed Only one generation of certified seed is allowed. There will be no Registered class.

Seed First Offered for Sale

6. Certified seed of NWG 4113 will be offered for sale in 2021. New West Genetics prohibits publication of seed production acreage by AOSCA and certifying agencies.

U.S. Plant Variety Protection Act

7. An application for U.S. Plant Variety Protection will be filed in 2020, in which NWG will not elect that seed sold by variety name must be certified. AOSCA has permission to provide descriptive information to the PVP database

Date this application was submitted: Feb 27, 2020

Date recommended by the VRB: Jan 29, 2021

Hemp

Red Kross 02 **RK02BK (Exp)**

Starting in the harsh conditions of Alaska. Red Kross 02 variety was created by the method of hybridization of Baox and Finola (Red Kross) X Ringo's Gift hemp varieties with successive multiple family group selection in order to decrease harvest time to 80-100 days, increase stems productivity, fiber content and to decrease the content of THC compounds, including selection by anatomic structure of cross section of the stem in the flowering stage. We started the 1st F2 trial of Red Kross 02 in Merced County with 20 acres open pollination. We selected 100 of the best plants from that crop based on stem productivity and density of the flower mass. We then lab tested all 100 samples to ensure our cannabinoid profiles and THC content were stable at 37-1 ratio. We then selected the best seeds from that F2 selection and replanted a 1 acre F3 trial in Sutter County. In the Sutter county F3 trial we selected one plant based on the same criteria that we took into clone for future reproduction and represents the stabilized F4 Red Kross 02 variety. We then took the F4 clone into production in order to produce feminized seed to ensure we had a high percentage of females to represent a stabilized variety.

We started our trials in Oregon and California. We have adapted the variety to work for multiple micro-climates and other states we have held trials of the Variety include Alaska, Hawaii, New Mexico, North Carolina, New Mexico, Texas, Indiana, and Minnesota

While using the Red Kross 02 Variety for trials we have had no Disease, insect, or herbicide reactions.

Red Kross 02 was bred for Oil and Grain production

While breeding the variety the selection of elite plants for morphological, technological, and biological signs is carried out. In parallel, all breeding signs are monitored in the nursery of family test (a method of preliminary estimation of genotypes). Seeds of the best (typical) families are combined for the sowing of the super elite of the variety, with the subsequent receipt of the basic seed for the sowing of other reproductions.

The stability of variety is determined by 80-100 day harvest cycle, the absence or presence of the low THC content, high yield of stems, fiber and seed (not exceeding the standard in 10-15%), absence of male plants (99.0% in reproduction II). Proportion of Hermaphrodite Plants were well below 5% and height at beginning of flowering to be 122cm.

Pharmers Group LLC is the party responsible for maintaining seed stock. We have not entered into any licensing agreements that will affect the certification of the variety.

Once the variety is certified we will be offered for sale immediately. We would like AOSCA to publish seed production acreage.

Pharmers Group LLC does plan to apply for a PVP. Pharmers Group LLC will elect that seed sold by the variety name would be certified. AOSCA has permission to provide descriptive information to the PVP database.

Date this application was submitted: Mar 17, 2020

Date recommended by the VRB: Aug 31, 2021

Hemp

Sangria

Illinois (Exp)

I. PLANT

1. Sexual Type: Dioecious Monoecious Hybrid
2. Flowering Type: Male Female Male & Female

Proportion of Hermaphrodite (Bisexual) Plants:

- a. Low (<5%)
 b. Low-Medium (6%-35%)
 c. Medium (36%-65%)
 d. Medium-High (66%-94%)
 e. High (>95%)

Proportion of Female Plants:

- a. Low (<5%)
 b. Low-Medium (6%-35%)
 c. Medium (36%-65%)
 d. Medium-High (66%-94%)
 e. High (>95%)

Proportion of Male Plants:

- a. Low (<5%)
 b. Low-Medium (6%-35%)
 c. Medium (36%-65%)
 d. Medium-High (66%-94%)
 e. High (>95%)

3. Time of Flowering: 70 days after seeding
4. Disparity of Female Flowering to Male Flowering: 3 days
Additional descriptions about the flower induction: _____

5. Plant Height (At Flowering):

- a. Short
 b. Medium
 c. Tall
 d. Other (Specify) _____

Natural Plant Height (At Flowering) (cm) 183cm . 221cm (Mean of 20 Plants)

6. Plant Branching:

- a. Absent or Very Weak
 b. Weak
 c. Medium
 d. Strong

Hemp

Sangria Illinois (Exp)

II. STEM

(At Internode Below Last Opposite Leaves on Female of Monoecious Plants)

1. Main Stem Color:

- a. Yellow
 b. Medium Green
 c. Dark Green
 d. Purple
 e. Other (Specify) _____

2. Main Stem Length of Internode:

- a. Short
 b. Medium
 c. Long

Main Stem Length of Internode Mean of 20 (cm) _____ . _____

3. Main Stem Thickness

- a. Thin
 b. Medium
 c. Thick

4. Main Stem Groove Depth

- a. Shallow
 b. Medium
 c. Deep

5. Main Stem Pith in Cross Section

- a. Absent or Thin
 b. Medium
 c. Thick

6. Plant Anthocyanin Coloration of Crown

- a. Absent or Very Weak
 b. Weak
 c. Medium
 d. Strong

III. LEAVES

(Last-Formed Opposite and Fully Expanded Leaves, After Flowering)

1. Leaf Intensity of Green Color

- a. Light
 b. Medium
 c. Dark
 d. Other (Specify) _____

Hemp

Sangria Illinois (Exp)

2. Leaf Length of Petiole

- a. Short
 b. Medium
 c. Long

Leaf Length of Petiole Mean of 20 (cm) _____ . _____

3. Leaf Anthocyanin Color in Petiole

- a. Absent or Very Weak
 b. Weak
 c. Medium
 d. Strong

4. Leaf Number of Leaflets

- a. Few (<7)
 b. Medium (Majority =7)
 c. Many (>7)

5. Central Leaflet Length

- a. Short
 b. Medium
 c. Long

Central Leaflet Length Mean of 20 (cm) _____ . _____

6. Central Leaflet Width

- a. Narrow
 b. Medium
 c. Broad

Central Leaflet Width Mean of 20 (cm) _____ . _____

IV. INFLORESCENCE (FLOWERING)

1. Time of Male Flowering:

- a. Very Early
 b. Early
 c. Medium
 d. Late
 e. Very Late

Flowering Date (Male) Number of Days (Julian) _____

2. Male Flowers Anthocyanin Coloration

- a. Absent or Very Weak
 b. Weak
 c. Medium
 d. Strong

Hemp

Sangria
Illinois (Exp)

V. SEED

1. 1000 Seed Weight (g) _____
2. Seed Color of Testa
_____ a. Light Grey
 X b. Medium Grey
_____ c. Grey Brown
_____ d. Yellowish Brown
_____ e. Brown
3. Seed Color of Testa Color Code (RHS or Munsell) _____
4. Seed Marbling of Color
_____ a. Weak
 X b. Medium
_____ c. Strong
5. Seed Shape
 X a. Ovate
_____ b. Ovate/Oblong
_____ c. Oblong
_____ d. Other (Specify) _____

VI. Other

27. Describe variants* and their acceptable levels for this variety:

Date this application was submitted: May 15, 2020

Date recommended by the VRB: Mar 16, 2021

Hemp

Cherry Soda

Cherry Soda is a photo dependent cannabis sativa cultivar developed through pure line breeding, whose roots come from “Cherry Wine” lineage. “Cherry Wine” was chosen as a base cultivar gene pool due to its consistently low THC. In addition, gene segregation is approximately normal and gene transfer is generally easy. This cultivar was created to optimize mechanized CBD production, and originally adapted for the Northern hemisphere, and has been developed in Oregon. We recommend this plant for all CBD production applications.

The original seed stock was acquired in late 2016, and shelved to produce ample seed for 20 acres of selection stock. 40,000 seedlings were planted for the 2017 season and grown to fruition. Of those plants, 5 were chosen as idiotypes and cloned from the field for subsequent breeding.

The idiotype selections present as robust yielders with an ideal harvestability, >.3% THC, high CBD-a, and a preference for higher terpene levels and minor cannabinoids as it lends to better flower storability and oil content. Harvestability is determined by plant architecture. A medium number of lateral branching is preferred, with vertical lowers. Flower structure is also taken into account, with a preference for dense, heavy flowers that span the length of the lateral branches. Finally, selections must reach fruition within the month of September (northern hemisphere.)

The F2 seed stock was grown to fruition and the next round of clones was taken from idiotypical plants.

These were crossed together to create another round of seed, and then grown to fruition. From this came another round of clones for further breeding and were named “Cherry Soda” as the cultivar was no longer resembling the original cultivar.

Again, these clones were bred together, grown, and select plants were cloned for another breeding. At this time a male was introduced from the original seed stock and used to pollinate the clones. The male selection presented excellent architecture and early maturation. The resulting seed was grown and tested, resulting in the F4 generation.

The F4 generation was planted and produced another round of clones and crossed, to create an F5. This process continues today, with original seed stock males reintroduced every 3rd generation in order to inhibit any monoecious offspring.

Cherry Soda is a CBD rich cultivar developed by Ventura Seed Company, LLC. Ventura Seed Company, LLC, currently maintains Cherry Soda’s seed stock in a temperature-controlled environment. Seeds are labeled with cultivar name and date harvested and are stored in breathable seed bags in black plastic totes. Ventura Seed Company, LLC will maintain certified classes of Foundation, Registered, and Certified seed. Royalty fees and/or licensing agreements are anticipated. Commercial seed is ready for sale in fall of 2020.

Cherry Soda can be identified by look and smell. She maintains an average height for hemp plants and a 1 to 1 height/width ratio (when uninhibited.) She typically presents leaves and flowers with high Anthocyanin upon flowering, and delivers an above average trichrome count. The flowers finish densely with a low leaf/flower ratio and her smell is soft and sweet with notes of floral cherry and citrus.

This cultivar is intended for sale for the northern hemisphere in the spring of 2021. Seed production acres should not be disclosed at this time. An application will be submitted for protection under the U.S. Plant Variety Protection Act and the application would elect the option that seed sold by variety name must be certified (Title V Certification Option). AOSCA may provide descriptive information to the PVP database.

Date this application was submitted: Mar 20, 2020

Date recommended by the VRB: Mar 17, 2021