

2022 NC State Floral Hemp Variety Trial

David Suchoff¹, Margaret Bloomquist², Jeanine Davis²,
Shannon Henriquez Inoa¹, Katie Learn²

¹Department of Crop and Soil Sciences

²Department of Horticultural Science



The 2022 NC State floral hemp variety trials were conducted at three locations representing the three major geographic and agricultural production regions: Clinton (Sampson County; Coastal Plain), Salisbury (Rowan County; Piedmont), and Mills River (Henderson County; Mountains) (Figure 1).

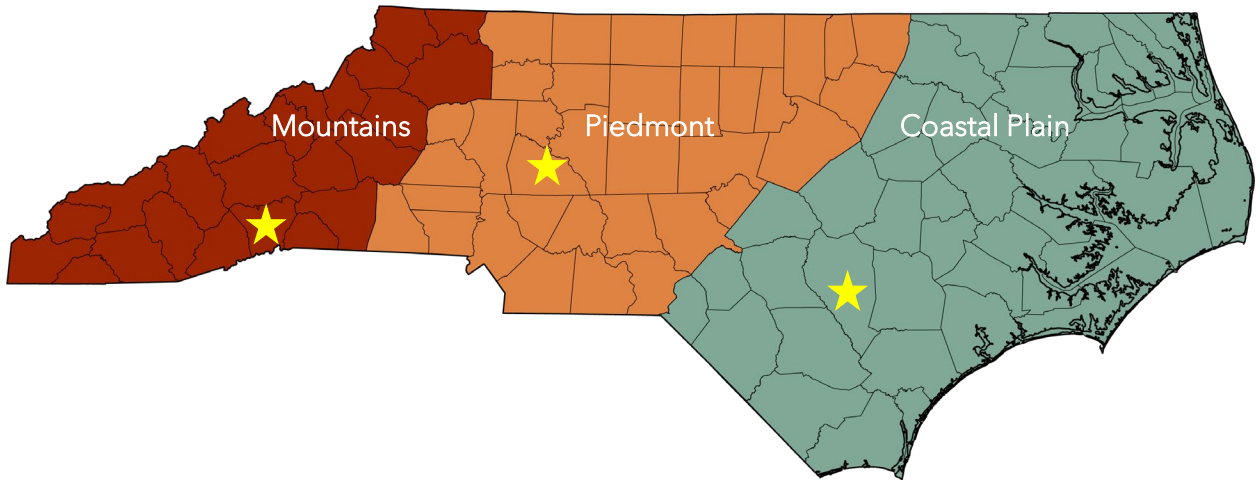


Figure 1. Locations of 2022 floral hemp variety trials.

Two varieties were investigated in the Piedmont, eight in the Coastal Plain, and ten in the Mountains from a total of three seed companies (Table 1). All varieties except 'Rania', 'Dazzling Duchess', and 'PDP', were started from seed on NC State campus. 'Rania', 'Dazzling Duchess', and 'PDP' cuttings were supplied by breeding company prior to transplant.

Table 1. Floral hemp variety name, source, and origin.

Variety	Source	Transplant origin	Locations*
Cakeberry Brulee	Oregon CBD	Seed	M,CS
Sour Brulee	Oregon CBD	Seed	M,CS
Sour Chem	Oregon CBD	Seed	M,CS
Sour Special Sauce	Oregon CBD	Seed	M,CS
Forbidden V	Oregon CBD	Seed	M,CS
Pine Walker	Oregon CBD	Seed	M,CS
Velox	P & R Seeds	Seed	M,P,CS
Rania	Quick Plug	Clone	M,P,CS
Dazzling Duchess	Quick Plug	Clone	M
PDP	Quick Plug	Clone	M

*M = Mountains; P = Piedmont; CS = Coastal Plain.

Production practices at each location mirrored those commonly used by North Carolina growers. Transplanting occurred during the first week of June. Experimental design was a randomized complete block with three blocks per location. Plots consisted of 10 plants spaced at 5' x 5' (1,742 plants/ac). Plasticulture (white polyethylene mulch + drip line) was employed at each location.

Total fertility inputs in Salisbury were 150 lbs N/ac (60 lbs N/ac applied pre-plant, the remainder applied via in-season fertigation), 60 lbs P/ac, and 120 lbs K/ac. Boron was applied at a rate of 1 lb/ac at the end of June. Field preparation also included a pre-plant burndown application of Gramoxone SL 3.0 and Devrinol 2xE. In-season weed management between rows included manual cultivation and hooded applications of Roundup PowerMax 3.

Total fertility inputs in Clinton were 150 lbs N/ac (75 lbs N/ac applied pre-plant, the remainder applied via in-season fertigation), 60 lbs P/ac, and 120 lbs K/ac. Boron was applied at a rate of 1 lb/ac. Field preparation also included a pre-bedding fumigation with Telone II, followed by an application of Dual Magnum after laying plastic. Weeds between rows were managed mechanically and with hooded applications of Dual Magnum.

Total fertility inputs in Mills River were 79 lbs N/ac (51 pounds pre plant and 28 pounds N/ac over 3 fertigations), 89 lbs P/ac, and 110 lbs K/ac. Boron was applied as foliar spray and in preplant with a total rate of of 1 lb B/ac. Fields also received 35 lbs Ca/ac, and micronutrient foliar spray. Pre-emergent herbicides TriCor (Trifloxysulfuron) and Paraquat, were applied prior to bedding. In-season weed management included minimal mechanical weeding.

Insect and disease pests were managed through a rotation of Manzate Pro-Stick, Coragen, Yellow Jacket Sulfur, Blackhawk, Quadris Opti, Asana XL, and Revus Top in Salisbury and Clinton; And with Serenade ASO, Xentari, and Serenade OPTI at the Mills River location. **These products are not currently labeled for use in hemp.**

Data collection

Date of floral initiation was collected for all varieties and trials. One floral sample per plot was collected for THC compliance, two weeks after floral initiation. Harvest occurred approximately 5 weeks after floral initiation at which point five plants were harvested. Height, width, stem base diameter, and fresh weight were collected. Plants were dried in tobacco curing barns at 105 °F until stems snapped. Floral and leaf material were bucked, weighed, and samples submitted for final cannabinoid analysis.

Data were analyzed in SAS v 9.4 (SAS, Cary, NC) using the GLIMMIX Procedure. Data were analyzed separately by location and block was treated as a random effect. When appropriate, the Tukey's HSD mean separation test was employed.

Table 1. Cannabinoid results - Mills River, NC.

Variety	Compliance Total THC ^a (%)	Harvest Total THC ^b (%)	Harvest Total CBD (%)	Harvest Total CBG (%)	Harvest Total CBDV (%)
Cakeberry Brulee	0.14 ab ^c	0.29 ab	7.90 ab	0.42 b	0.04 c
Dazzling Dutchess	0.07 b	0.30 a	8.87 a	0.19 cde	0.02 c
Forbidden V	0.04 b	0.13 b	3.64 c	0.18 cde	2.66 b
PDP	0.06 b	0.21 ab	3.62 c	0.35 bc	0.03 c
Pinewalker	0.04 b	0.13 ab	3.80 c	0.15 de	3.69 a
Rania	0.23 a	0.27 ab	7.66 ab	0.22 cde	0.00 c
Sour Brulee	0.11 b	0.19 ab	5.78 abc	0.65 a	0.04 c
Sour Chem	0.09 b	0.25 ab	4.94 bc	0.08 e	0.04 c
Sour Special Sauce	0.10 b	0.29 ab	6.13 abc	0.24 bcde	0.05 c
Velox	0.13 ab	0.17 ab	5.74 abc	0.29 bcde	0.07 c
p-value	0.0005	0.0083	0.0005	<0.0001	<0.0001

Significant p-values ($\alpha < 0.05$) in bold.

^aCompliance samples were collected ~30 days before harvest.

^bHarvest samples were collected following drying and bucking.

^cMeans within a cannabinoid followed the same letter are not significantly different ($\alpha > 0.05$).

Total THC calculated as % Δ^9 -THC + 0.877*%THCA.

Total CBD calculated as %CBD + 0.877*%CBDA.

Total CBG calculated as %CBG + 0.878*%CBGA.

Total CBDV calculated as %CBDV + 0.877*%CBDVA.

Table 2. Cannabinoid results - Clinton, NC.

Variety	Compliance Total THC ^a (%)	Harvest Total THC ^b (%)	Harvest Total CBD (%)	Harvest Total CBG (%)	Harvest Total CBDV (%)
Cakeberry Brulee	0.03 abc ^c	0.30 a	6.83 a	0.59 a	0.04 b
Forbidden V	0.02 c	0.05 c	1.20 b	0.05 c	1.33 a
Pinewalker	0.02 bc	0.03 c	0.83 b	0.03 c	1.33 a
Rania	0.06 ab	0.20 ab	5.02 a	0.12 c	0.01 b
Sour Brulee	0.04 abc	0.27 a	6.10 a	0.46 ab	0.04 b
Sour Chem	0.06 a	0.17 abc	4.80 a	0.07 c	0.03 b
Sour Special Sauce	0.06 ab	0.11 bc	3.70 ab	0.08 c	0.05 b
Velox	0.03 abc	0.30 a	6.88 a	0.28 bc	0.06 b
p-value	0.0049	<0.0001	0.0001	<0.0001	<0.0001

Significant p-values ($\alpha < 0.05$) in bold.

^aCompliance samples were collected ~30 days before harvest.

^bHarvest samples were collected following drying and bucking.

^cMeans within a cannabinoid followed the same letter are not significantly different ($\alpha > 0.05$).

Total THC calculated as % Δ^9 -THC + 0.877*%THCA.

Total CBD calculated as %CBD + 0.877*%CBDA.

Total CBG calculated as %CBG + 0.878*%CBGA.

Total CBDV calculated as %CBDV + 0.877*%CBDVA.

Table 3. Cannabinoid results - Salisbury, NC.

Variety	Compliance Total THC ^a (%)	Harvest Total THC ^b (%)	Harvest Total CBD (%)	Harvest Total CBG (%)	Harvest Total CBDV (%)
Rania	0.07 a ^c	0.30 a	7.78 a	0.18	0.02
Velox	0.03 b	0.10 b	2.96 b	0.08	0.03
p-value	0.0102	0.0138	0.0245	0.0804	0.7678

Significant p-values ($\alpha < 0.05$) in bold.

^aCompliance samples were collected ~30 days before harvest.

^bHarvest samples were collected following drying and bucking.

^cMeans within a cannabinoid followed the same letter are not significantly different ($\alpha > 0.05$).

Total THC calculated as % Δ^9 -THC + 0.877*%THCA.

Total CBD calculated as %CBD + 0.877*%CBDA.

Total CBG calculated as %CBG + 0.878*%CBGA.

Total CBDV calculated as %CBDV + 0.877*%CBDVA.

Table 5. Yield results- Mills River, NC.

Variety	Floral Initiation	Harvest Date	Height (ft)	Width (ft)	Stem Diameter (in)	Fresh Weight (lb/plant)	Dry Weight ^a (lb/plant)
Cakeberry Brulee	7/6	8/18	3.67 de ^b	2.93 d	1.42 bc	5.87 c	1.03 b
Dazzling Dutchess	7/25	9/19	2.81 ef	3.88 bc	1.10 cd	5.17 cd	0.91 b
Forbidden V	8/1	9/13	5.68 ab	5.51 a	1.82 ab	10.92 ab	1.43 ab
PDP	7/6-7/18 ^c	8/30	3.79 d	4.33 b	1.41 bc	8.37 abc	1.38 ab
Pinewalker	8/8	9/19	6.00 a	5.43 a	1.82 ab	11.83 a	1.23 ab
Rania	6/28	8/15	2.34 f	1.72 e	0.71 d	1.63 d	0.32 c
Sour Brulee	6/28-7/6	8/15	4.38 cd	3.78 bc	1.67 ab	7.13 bc	1.07 ab
Sour Chem	7/11	8/25	4.04 cd	3.51 cd	1.64 abc	12.37 a	1.38 ab
Sour Special Sauce	7/25	8/30	4.90 bc	5.10 a	2.02 a	11.49 a	1.58 a
Velox	7/6	8/18	4.40 cd	3.24 d	1.43 bc	7.033 bc	1.16 ab
p-value			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Significant p-values ($\alpha < 0.05$) in bold.

^aBucked floral and leaf material.

^bMeans within a response followed the same letter are not significantly different ($\alpha > 0.05$).

^cVarieties with a range of dates indicates non-uniform flower initiation.

Table 6. Yield results- Clinton, NC.

Variety	Floral Initiation	Harvest Date	Height (ft)	Width (ft)	Stem Diameter (in)	Fresh Weight (lb/plant)	Dry Weight ^a (lb/plant)
Cakeberry Brulee	6/29	8/3	3.39 ab ^b	3.47 a	1.22 a	4.28 bc	0.78 ab
Forbidden V	7/28	9/1	4.80 a	4.36 a	1.49 a	6.97 ab	0.95 ab
Pinewalker	7/22	8/26	4.16 ab	4.10 a	1.39 a	6.16 ab	0.73 ab
Rania	6/29	8/3	2.47 b	2.07 b	0.81 b	1.82 c	0.15 c
Sour Brulee	6/29	8/3	3.89 ab	3.48 a	1.25 a	4.17 bc	0.66 b
Sour Chem	7/7	8/11	3.72 ab	3.80 a	1.35 a	4.98 abc	0.74 ab
Sour Special Sauce	7/14	8/18	4.00 ab	4.07 a	1.44 a	7.67 a	1.00 a
Velox	6/29	8/3	4.14 ab	3.41 a	1.22 a	4.74 abc	0.75 ab
p-value			0.0149	0.0005	0.0004	0.0007	<0.0001

Significant p-values ($\alpha < 0.05$) in bold.

^aBucked floral and leaf material.

^bMeans within a response followed the same letter are not significantly different ($\alpha > 0.05$).

Table 7. Yield results- Salisbury, NC.

Variety	Floral Initiation	Harvest Date	Height (ft)	Width (ft)	Stem Diameter (in)	Fresh Weight (lb/plant)	Dry Weight ^a (lb/plant)
Rania	7/11	8/15	2.05 b ^b	1.42 b	0.78 b	1.35 b	0.24 b
Velox	6/28	8/2	4.10 a	4.48 a	1.42 a	7.13 a	1.15 a
p-value			0.0021	0.0195	0.0041	0.0139	0.0183

Significant p-values ($\alpha < 0.05$) in bold.

^aBucked floral and leaf material.

^bMeans within a response followed the same letter are not significantly different ($\alpha > 0.05$).