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Adams

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(54) **RASPBERRY PLANT NAMED ‘ENDURANCE’**

(50) Latin Name: *Rubus idaeus*
Varietal Denomination: **ENDURANCE**

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A01H 5/08 (2018.01)
A01H 6/74 (2018.01)

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USPC **Plt./204**

CPC *A01H 6/7499* (2018.05)
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USPC Plt./204
CPC ... *A01H 5/08; A01H 5/02; A01H 5/00; A01H 6/74; A01H 6/749; A01H 6/7499*
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

PP31,716 P3 * 5/2020 Adams *A01H 5/08*
Plt./204

* cited by examiner

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(57) **ABSTRACT**

This invention relates to a new and distinct everbearing variety of raspberry plant named ‘ENDURANCE’. The new variety is primarily adapted to the growing conditions of the central coast of California and is characterized by the following: late-season primocane production with medium to large sized fruit of medium-red coloration. Fruit is of consistent conic shape, releases easily from receptacle, possesses medium gloss and fair flavor. Foliage is flat to slightly convex, medium green; possessing weak rugosity, weak gloss and equal 3-5 foliates. Primocanes have an absent or very weak waxy coat, medium thorn density of small dark purple spines and have very weak anthocyanin coloration.

5 Drawing Sheets

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Latin name of the genus and species of the plant claimed:
Rubus idaeus.

Variety denomination: ‘ENDURANCE’.

BACKGROUND

The present invention relates to a new and distinct everbearing raspberry variety designated ‘ENDURANCE’. This new variety is a result of a controlled cross made in 2008 in Watsonville, Calif. between raspberry variety ‘GRANDEUR’ (patented, U.S. Plant Pat. No. 20,459) as the female parent and raspberry variety ‘04.3891’ (unpatented) as the male parent in an ongoing breeding program. The variety is botanically known as *Rubus idaeus* and was tested as ‘PS-08.056-18’ and ‘PS-5618’.

The seedling resulting from the aforementioned cross was asexually propagated by dormant canes in Santa Cruz County, Calif. and was subsequently selected by the inventor from a controlled breeding plot in Watsonville, Calif. in 2010. After its selection, the new variety was further asexually propagated by dormant canes, roots and non-dormant root shoot cuttings in Santa Cruz County, Calif., San Joaquin County, Calif. and Siskiyou County, Calif. The new variety was then extensively tested over the next several years in fruiting fields in Santa Cruz County, Calif. and has performed successfully in grower fields in USDA zones 9-10.

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This propagation has demonstrated that the combination of traits disclosed herein as characterizing the new variety are fixed and remain true to type through successive generations of asexual reproduction.

SUMMARY

‘ENDURANCE’ is primarily adapted to the climate and growing conditions of the central coast of California. This region provides the necessary year-round temperatures required for it to produce and maintain a strong vigorous plant and to remain in fruit production from July through December on primocanes and in the ensuing year from May through July on the floricanes. The following traits have been repeatedly observed and are determined to be unique characteristics of ‘ENDURANCE’, which in combination distinguish this raspberry plant as a new and distinct variety:

1. Dark purple spines
2. Late fruit yield
3. Medium red fruit color
4. Absent to very weak primocane glaucosity
5. Fair flavor

The raspberry variety that is believed to be most closely related to the new raspberry variety ‘ENDURANCE’ is the raspberry variety ‘GRANDEUR’ (patented, U.S. Plant Pat. No. 20,459). In comparison to the similar raspberry variety

‘GRANDEUR’, ‘ENDURANCE’ differs by the following combination of characteristics described in Table 1:

COMPARISON BETWEEN ENDURANCE AND
GRANDEUR

TABLE 1

Characteristic	‘ENDURANCE’	‘GRANDEUR’ (US PP20,459)
Primocane waxy coat (glaucosity)	Absent to very weak	Absent to very weak
Predominate number of leaflets	Equal 3-5	Always 3
Leaf shape (cross section)	Flat to slightly convex	Flat to slightly convex
Rugosity	Weak	Strong
Color mature fruit	RHS 43A Medium red	RHS 42A Medium red
Thorn Tip Coloration	N186B Greyed-purple	180C Greyed-red
Relative number of pedicel thorns	26.9 Many	16.2 Medium

‘ENDURANCE’ differs from its sibling raspberry variety ‘MAJESTIC’ (patented, U.S. Plant Pat. No. 31,716) by the following combination of characteristics described in Table 2:

COMPARISON BETWEEN ENDURANCE AND
MAJESTIC

TABLE 2

Characteristic	‘ENDURANCE’	‘MAJESTIC’ (U.S. Plant Pat. No. 31,716)
Time of fruiting (primocane)	Late	Medium
Terminal leaf shape	Lobed	Cordate
Leaf shape (cross section)	Flat to slightly convex	Slightly convex
Rugosity	Weak	Medium
Relative size of drupes	Large	Medium
Glossiness (fruit)	Medium	High
Adherence of receptacle	Very weak	Weak
Flavor	Fair	Very good

‘ENDURANCE’ differs from its parents, ‘GRANDEUR’ and ‘04.3891’, by the following combination of characteristics described in Table 3:

COMPARISON BETWEEN ENDURANCE,
GRANDEUR AND 04.3891

TABLE 3

Characteristic	‘ENDURANCE’	‘GRANDEUR’ (U.S. Plant Pat. No. 20,459)	‘04.3891’
Productivity	High	High	Medium
Glossiness (fruit)	Medium	Medium	High
Firmness (fruit)	Medium to high	Very high	Medium to low
Adherence of receptacle	Very weak	Very weak	Medium
Primocane time of fruiting	Late	Medium	Medium
Fruit size	Medium to large	Medium	Large
Flavor	Fair	Good	Good

For identification, a series of molecular markers have been determined for this new variety.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying color photographs illustrate the overall appearance of typical specimens of the new raspberry variety ‘ENDURANCE’ at various stages of development as true as reasonably possible with color reproductions of this type. Color in the photographs may differ slightly from the color value cited in the detailed botanical description which accurately describes the color of ‘ENDURANCE’. The depicted plant and plant parts of the new raspberry variety ‘ENDURANCE’ were taken in Watsonville, Calif. and are approximately 2 to 16 months old:

FIG. 1 shows typical leaf shape, foliate and rugosity characteristics of ‘ENDURANCE’ taken in the month of September 2020;

FIG. 2 shows bud, flower and fruit characteristics of ‘ENDURANCE’ taken in the month of September 2020;

FIG. 3 shows typical gloss, coloration, and drupelet formation of primocane fruit of ‘ENDURANCE’ taken in the month of September 2020;

FIG. 4 shows typical primocane and spine coloration of ‘ENDURANCE’ taken in the month of September 2020;

FIG. 5 shows typical dormant bud characteristics of ‘ENDURANCE’ taken in the month of January 2019.

DETAILED BOTANICAL DESCRIPTION

‘ENDURANCE’ has not been observed under all possible environmental conditions. The characteristics of the new variety may vary in detail, depending upon variations in environmental factors, including weather (temperature, humidity and light intensity), day length, soil type, and location.

The aforementioned photographs, together with the following description of the new raspberry variety ‘ENDURANCE’, unless otherwise noted, are based upon observations taken during the 2016-2017 growing season in Watsonville, Calif. Primocane measurements and ratings were taken from plants of ‘ENDURANCE’ dug from a nursery located in Siskiyou County, Calif. during the middle of October 2015 and planted approximately 3 to 4 weeks later in Watsonville, Calif. The approximate age of the observed primocane plants is 7 to 8 months. Floricane measurements and ratings were taken from the same planting of ‘ENDURANCE’ at an approximate age of 16 to 18 months. Yield observations and fruit quality characteristics are averaged from 3 years of data collected from the 2015 through 2018 production seasons. Flower measurements and characteristics are from secondary flowers unless otherwise noted. Fruit characteristics and measurements are from secondary fruit unless otherwise noted. Foliage characteristics and measurements are from 3-foliate foliage unless otherwise noted.

Color terminology where noted follows The R.H.S. Colour Chart Fifth Edition, Royal Horticultural Society, London, United Kingdom (2007).

The following tables 3-7 describe fruit, plant, foliage, flower and pest/disease characteristics of the new raspberry

‘ENDURANCE’ in comparison to the similar raspberry varieties ‘GRANDEUR’ (patented, U.S. Plant Pat. No. 20,459).

COMPARISON BETWEEN ENDURANCE AND GRANDEUR		
TABLE 3		
FRUIT CHARACTERISTICS		
Characteristic	‘ENDURANCE’	‘GRANDEUR’ (U.S. Plant Pat. No. 20,459)
Color mature fruit	RHS 42A Medium red	RHS 42A Medium red
Color achenes	RHS 159A Orange-white group	RHS 159A Orange-white group
Fruit length (mm)	27.71	22.91
Fruit width (mm)	23.20	20.12
Length/Width ratio	1.19 Longer than broad	1.14 Longer than broad
Seed weight (mg)	1.76	1.75
Drupelets per berry	95	93
Weight of single drupe (g/drupe)	0.071	0.043
Drupe length (mm)	7.45	5.25
Drupe diameter (mm)	4.53	3.86
Relative size of drupes	Large	Medium
Fruit size	Medium	Medium
Fruit per node	10	15
Predominant shape	Conical	Conical
Receptacle length (mm)	24.74	19.15
Receptacle diameter (mm)	12.02	10.32
Receptacle color	RHS 155B White group	RHS 155B White group
Evenness of color (fruit)	Even	Even
Glossiness	Medium	Medium
Adherence of receptacle	Very weak	Very weak
Firmness of flesh	Firm	Very firm
Firmness of skin	Firm	Very firm
Soluble Solids (% brix)	9.8	10.5
Flavor	Fair	Good
Shipping quality	Good	Good
Fruit storage life (avg)	9 days	12 days
Fruit market use	Fresh	Fresh

TABLE 4		
PLANT CHARACTERISTICS		
Characteristic	‘ENDURANCE’	‘GRANDEUR’ (U.S. Plant Pat. No. 20,459)
General:		
Habit	Semi-erect	Upright
Plant height (m)	1.5	1.4
Plant width (cm)	38	45
Time to initiate roots (days)	12-14	12-14
Canes per hill	7.5	6.9
Productivity	High	High
Self-fruitfulness	Yes	Yes
Type of bearing	Everbearing	Everbearing
Primocane:		
Color (true)	RHS 145A Yellow-green group	RHS 145B Yellow-green group
Length (cm)	153.5	143.6
Basal diameter (mm)	19.26	21.80

TABLE 4-continued		
PLANT CHARACTERISTICS		
Characteristic	‘ENDURANCE’	‘GRANDEUR’ (U.S. Plant Pat. No. 20,459)
Diameter central ⅓ (mm)	13.76	12.55
Lateral length at central ⅓ (cm)	27.7	43.6
No. fruiting laterals per cane	11.8	17.4
Total nodes per cane	39	31
Internode length at central ⅓ (mm)	38.93	48.84
Anthocyanin coloration	RHS 59B Red-purple group	RHS 59B Red-purple group
Anthocyanin intensity	Medium	Weak
Pubescence	Absent	Absent
Vegetative bud length (mm)	8.70	11.01
Vegetative bud diameter (mm)	5.15	6.11
Vegetative bud shape	Widely ovate	Widely ovate
Vegetative bud color	RHS 187A Greyed-red group	RHS 187A Greyed-red group
Strength of waxy coat (glaucosity)	Absent to very weak	Absent to very weak
Time of cane emergence	Medium to late	Medium
Time of flowering	Medium to late	Medium
Time of fruiting	Medium to late	Medium
Length of fruiting season	Long	Long
% of total yield	38%	50%
Flowering period	Late June to Late November	Late June to Late November
Harvest period	Late July to Late December	Late July to Late December
Primocane fruit weight (g)	4.7	3.8
Primocane yield (g/plant)	1,936	2,662
Young Shoots:		
Number (per meter)	15-20 Medium	15-20 Medium
Anthocyanin presence	Present	Present
Anthocyanin coloration	RHS 179A Red-purple group	RHS 179A Greyed-red group
Anthocyanin intensity	Weak	Medium
Thorns:		
Thorn presence	Present	Present
Thorn coloration (tip)	RHS 187A Greyed-purple group	RHS 180C Greyed-red group
Thorn coloration (base)	RHS N186C Greyed-purple group	RHS 145B Yellow-green group
Thorn length at central ⅓ (mm)	1.39	0.76
Thorn base at central ⅓ (mm)	1.32	1.53
Thorn density per cm at central ⅓	5.25 Medium	3.38 Medium
Thorn texture	Rigid	Rigid
Attitude of the tip	Horizontal	Horizontal
Floricanes:		
Color (true)	RHS 165B Greyed-orange group	RHS 164A Greyed-orange group
Length (cm)	123.4	119.8
Width at central ⅓ (mm)	12.58	12.04
Total nodes per cane	22	18
Internode length at central ⅓ (mm)	44.55	49.13
Fruiting lateral attitude	Erect	Erect
Time bud burst (vegetative)	Medium	Medium
Time of flowering	Medium	Medium
Time of fruiting	Medium	Medium
Length of fruiting season	Medium to long	Medium to long
% of total yield	62%	50%
Flowering period	Late April to Late June	Late April to Late June
Harvest period	Late May to Late July	Late May to Late July

TABLE 4-continued

PLANT CHARACTERISTICS		
Characteristic	‘ENDURANCE’	‘GRANDEUR’ (U.S. Plant Pat. No. 20,459)
Floricane fruit weight (g)	4.6	3.7
Floricane yield (g/plant)	3,161	2,680

TABLE 5

FOLIAGE CHARACTERISTICS		
Characteristic	‘ENDURANCE’ (3 Foliolate)	‘GRANDEUR’ (U.S. Plant Pat. No. 20,459) (3 Foliolate)
General:		
Color of upper surface	RHS N137A Green group	RHS N137A Green group
Color of lower surface	RHS 190B Greyed-green group	RHS 190B Greyed-green group
Venation	Pinnate	Pinnate
Shape in cross section	Flat to slightly convex	Flat to slightly convex
Arrangement	Compound	Compound
Relief between veins (rugosity)	Weak	Strong
Glossiness	Weak	Weak
Number of leaflets/leaf	Equal 3-5	Always 3
Total leaf length (cm)	26.1	22.5
Total leaf width (cm)	24.2	23.4
Terminal Leaflet:		
Length (mm)	165.1	127.5
Width (mm)	120.3	91.6
Length/width ratio	1.4	1.4
	Longer than broad	Longer than broad
Size	Large	Medium to large
Shape	Lobed	Cordate
Shape of base	Cordate	Cordate
Shape of tip	Acuminate	Acuminate
Margins	Biserrate	Biserrate
Lateral Leaflet:		
Length (mm)	128.3	105.5
Width (mm)	74.1	65.1
Length/width ratio	1.7	1.6
	Much longer than broad	Longer than broad
Rachis length (mm)	41.3	36.2
Rachis diameter (mm)	2.41	1.92
Rachis anthocyanin coloration of upper surface	RHS 184B	RHS 184A
Rachis anthocyanin intensity	Weak	Medium
Orientation	Opposite	Opposite
Arrangement	Compound	Compound
Relative position of lateral leaflets	Free	Touching
Shape	Ovate	Ovate
Shape of the base	Rounded	Oblique rounded
Shape of the tip	Acuminate	Acuminate
Margins	Biserrate	Biserrate
Petiole:		
Length (mm)	54.54	59.00
Width (mm)	3.50	3.99
Thorn presence	Yes	Yes
Thorn orientation	Erect	Erect
Anthocyanin coloration of upper surface	RHS 180B Greyed-purple group	RHS 184C Greyed-purple group

TABLE 5-continued

FOLIAGE CHARACTERISTICS		
Characteristic	‘ENDURANCE’ (3 Foliolate)	‘GRANDEUR’ (U.S. Plant Pat. No. 20,459) (3 Foliolate)
Anthocyanin intensity	Absent to very weak	Weak
of upper surface		
Stipule length (mm)	12.77	10.23
Stipule orientation	Erect	Erect to horizontal

TABLE 6

FLOWER CHARACTERISTICS		
Characteristic	‘ENDURANCE’	‘GRANDEUR’ (U.S. Plant Pat. No. 20,459)
Petal color (upper surface)	RHS 155C White group	RHS 155C White group
Petal color (lower surface)	RHS 155C White group	RHS 155C White group
Flower diameter (mm)	27.25	22.55
Petal length (mm)	8.25	6.42
Petal width (mm)	3.42	3.11
Petal length/width ratio	2.41	2.06
	Much longer than broad	Much longer than broad
Petal shape in cross section	Flat	Flat
Petal shape (overall)	Ovate	Ovate
Petal shape (apex)	Rounded	Rounded
Petal shape (base)	Attenuate	Attenuate
Petal margin	Entire	Entire
Petal texture	Glabrous	Glabrous
No. petals/flower	5.2	5.2
No. sepals/flower	5.2	5.2
Sepal length (mm)	10.80	11.20
Sepal width at base (mm)	4.41	6.49
Sepal shape	Deltate	Widely deltate
Sepal shape (apex)	Acuminate	Acuminate
Sepal coloration (upper surface)	RHS 144A	RHS 144B
Sepal coloration (lower surface)	RHS 144B	RHS 144C
Sepal margin	Entire	Entire
Sepal texture	Slightly pubescent	Slightly pubescent
	116	105
No. stamen/flower	116	105
Filament length (mm)	5.19	4.45
Filament color	RHS 155C White group	RHS 155C White group
	Medium	Medium
Pollen quantity	RHS 196D	RHS 196D
Pollen color	RHS 196D	RHS 196D
Anther length (mm)	1.16	0.79
Anther diameter (mm)	0.53	0.49
Anther coloration (pre-dehiscence)	RHS 155C	RHS 155C
Anther coloration (post-dehiscence)	RHS 165B	RHS 165B
Stigma shape	Lobed	Lobed
Stigma length (mm)	0.12	0.10
Stigma diameter (mm)	0.42	0.40
Stigma coloration	RHS 145D	RHS 145D
Style length (mm)	3.08	2.03
Style diameter (mm)	0.40	0.39
Style coloration	RHS 145D	RHS 145D
Ovule length (mm)	1.56	1.51
Ovule diameter (mm)	1.47	1.40
Ovule coloration	RHS 145B	RHS 145B
Pedicle length (mm)	21.55	23.86
Pedicle diameter (mm)	1.51	1.47
Pedicle anthocyanin coloration	RHS 181C	RHS 178A
Pedicle anthocyanin intensity	Absent to very weak	Medium

TABLE 6-continued

FLOWER CHARACTERISTICS		
Characteristic	'ENDURANCE'	'GRANDEUR' (U.S. Plant Pat. No. 20,459)
Relative number of pedicel thorns	26.9 Many	16.2 Medium
Peduncle anthocyanin presence	Present	Present
Peduncle anthocyanin coloration	RHS 184C Greyed-purple group	RHS 184A Greyed-purple group
Peduncle anthocyanin intensity	Weak	Medium

TABLE 7

PEST AND DISEASE REACTIONS		
Characteristic	'ENDURANCE'	'GRANDEUR' (U.S. Plant Pat. No. 20,459)
Spotted wing drosophila (Drosophila suzukii)	Susceptible	Susceptible
Two spotted spider mite (Tetranychus urticae)	Susceptible	Susceptible
Grey fruit mold (Botrytis cinerea)	Susceptible	Susceptible
Powdery mildew (Podosphaera aphanis var. aphanis)	Moderately resistant	Moderately susceptible
Yellow rust (Phragmidium rubi-idaei)	Moderately resistant	Moderately susceptible

I claim:
1. A new and distinct raspberry plant named 'ENDUR-
ANCE', as described and illustrated herein.

* * * * *

FIG. 1

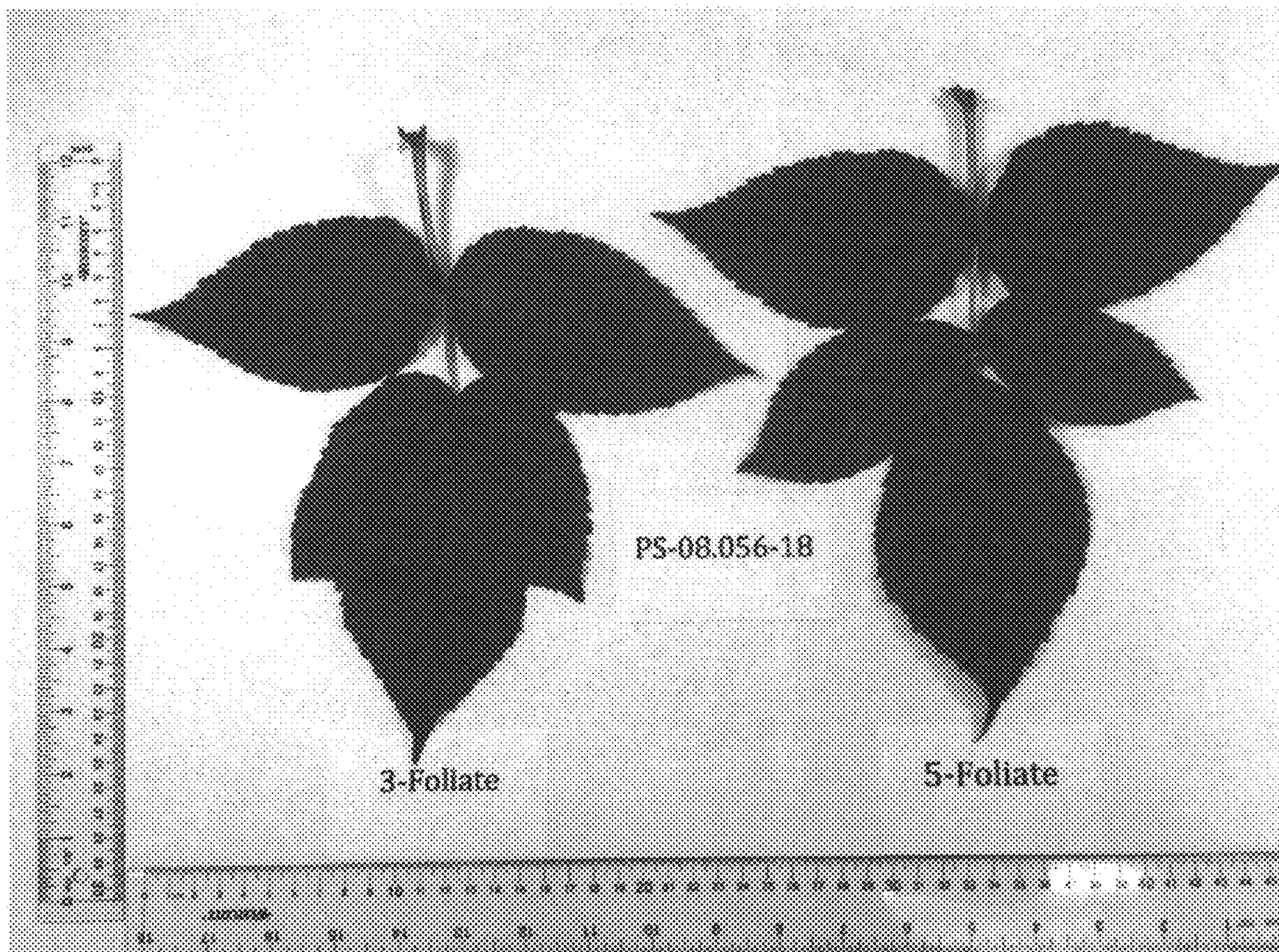


FIG. 2

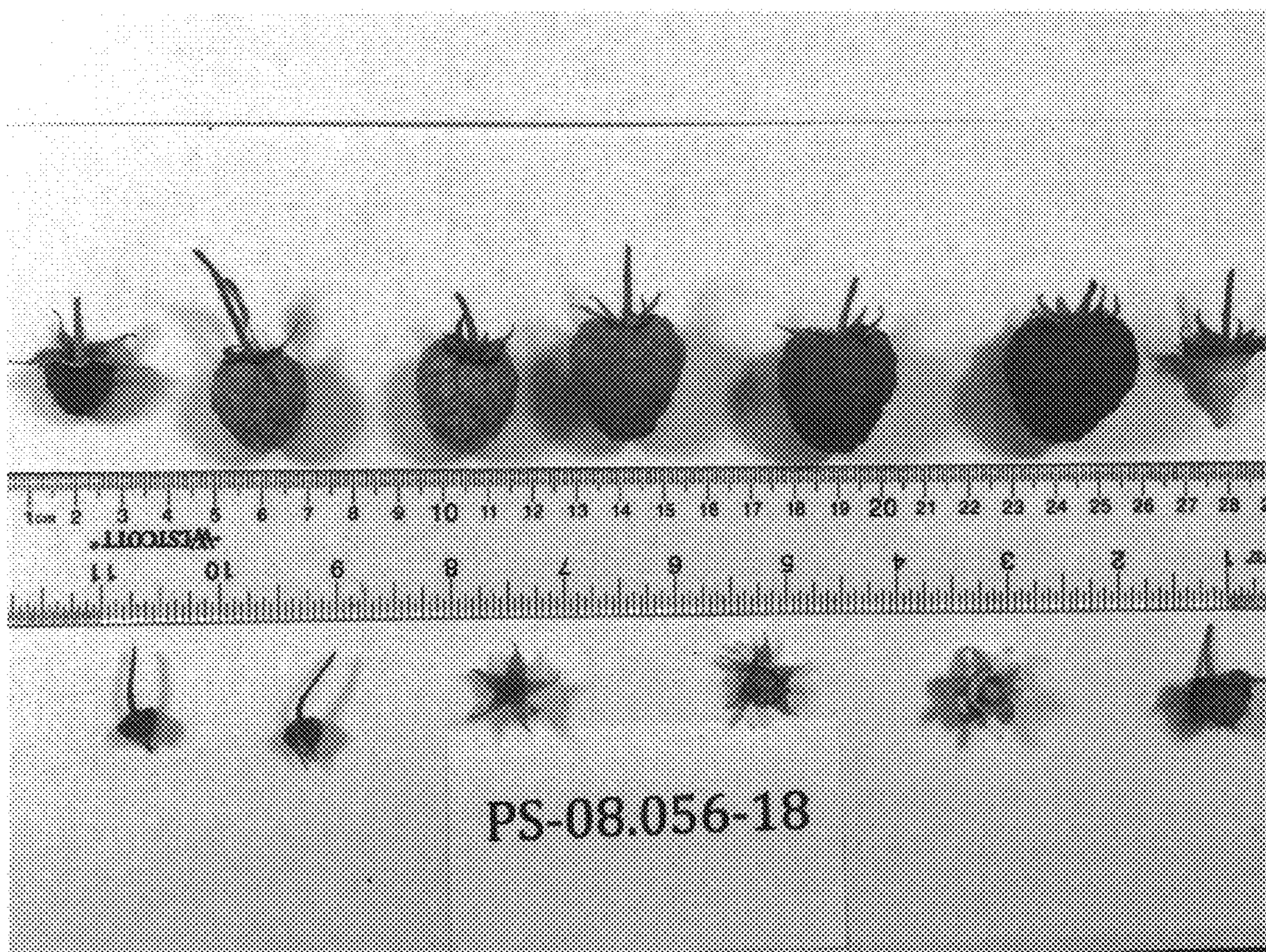


FIG. 3

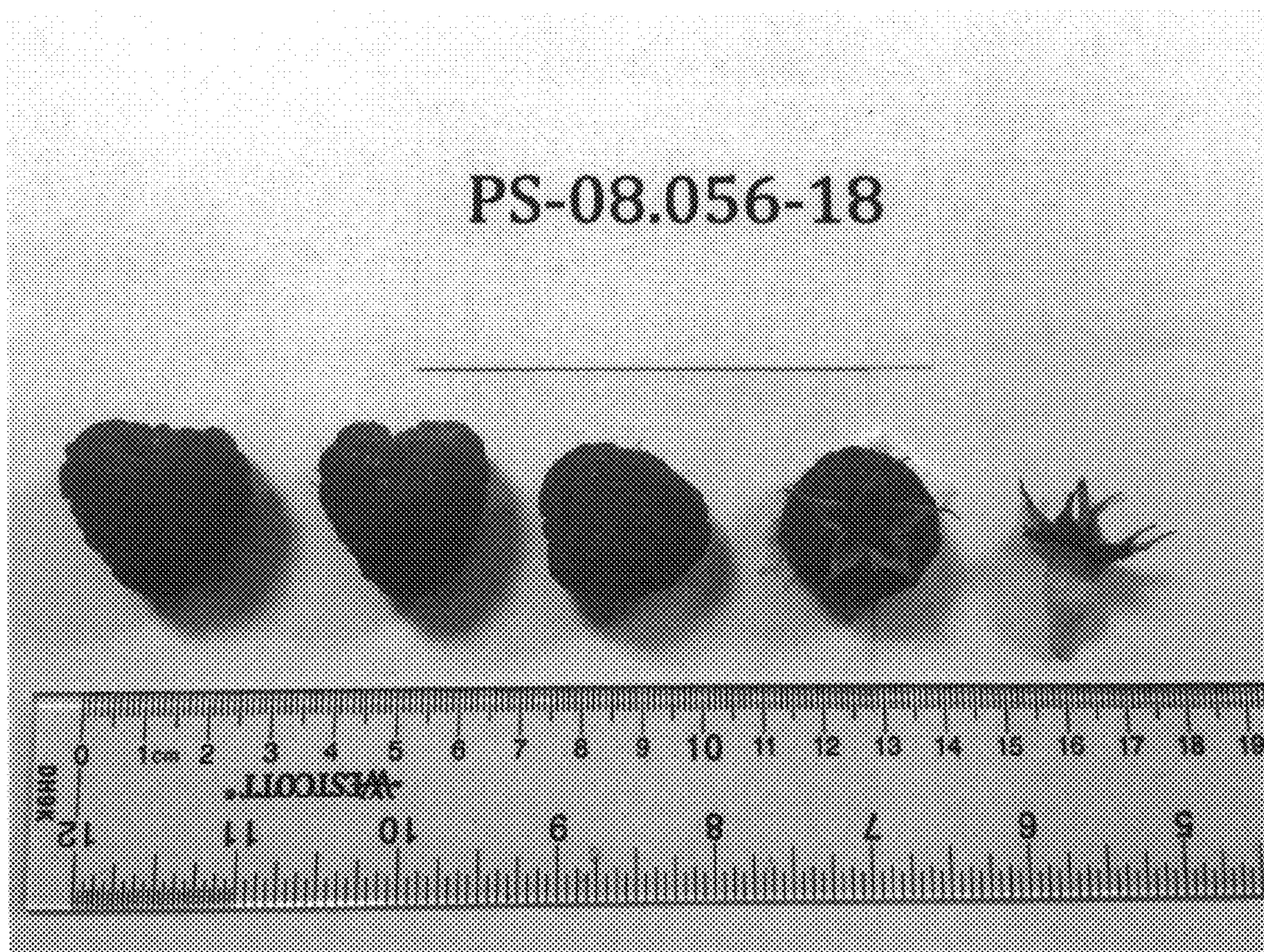


FIG. 4



FIG. 5

