Specific Certification Standards
Micropropagated Indexed Blackberry

I. Explanation of General Standards as Applied to Blackberry

A. The General Seed Certification Standards as adopted are basic and together with the following specific standards constitute the standards for certification of Indexed Blackberry.

B. Definitions

Cane cutting is a cane section of two or more nodes or buds (length of 4 – 6 inches) to be transplanted to produce a plant.

Crown is the persistent (perennial) base of the plant; the junction between canes and roots (some varieties have buds arise primarily on the crown).

Hardwood cutting is taken from a mature woody stem for the purpose of propagation.

Indexing is a procedure to determine virus or other pathogen infection by inoculation from the plant to be tested to an indicator plant (grafted onto plant to be tested) or by any other approved method.

Mericlones are plants clonally propagated from a single meristem tip.

Micropropagation is the art and science of plant multiplication in-vitro. Blackberry is micropropagated in tissue culture by aseptic transfer of meristem tip cultures to produce Nuclear stocks.

Nodal cutting is a cane cutting with a single node to produce a plant.

Primocane (succulent plants) is the current season's growth that develops from root or basal crown buds.

Root cutting is a root section with one or more buds.

Softwood cutting is taken from a green, immature, actively growing stem of a woody plant during spring or early summer for the purpose of propagation.

C. The General Seed Certification Standards are further defined as follows to apply specifically to Indexed Blackberry. Classes and sources of certified stock are defined as follows.

1. **Source stock** shall be material entering the Micropropagation Unit (MPU) at North Carolina State University (NCSU), obtained by methods acceptable to the North Carolina Crop Improvement Association (NCCIA).
2. **Nuclear stock** shall be plants produced from Source stock that has been micropropagated, indexed, apparently free of other pests, and evaluated in field test for trueness-to-variety. This material will be maintained under strict isolation by the MPU at NCSU. Nuclear stock may exist as *in-vitro* tissue culture plantlets or potted plants in a screened greenhouse. Nuclear stocks are made available to certified Blackberry plant producers after inspection by NCCIA.
3. **Foundation stock** is produced from Nuclear stock and grown in a greenhouse or screenhouse to exclude insects.
4. **Registered stock** is produced from Foundation stock in greenhouse, screenhouse, or field.
5. **Certified stock** is produced from Registered stock in greenhouse, screenhouse, or field.

II. Production Requirements

A. Facilities (greenhouse, screenhouse, water, equipment, etc) for plant production must be approved by NCCIA before Foundation stock is released to producer.

B. Foundation stock
   1. Foundation plants may be maintained indefinitely if grown in an insect-proof facility (greenhouse), in sanitized substrate, and indexed every three years.
   2. In greenhouse or screenhouse, Foundation plants shall be produced in separate sanitized containers with labeling of cultivar name and lot number (if applicable).
   3. Non-certified *Rubus* species must not exist within 152 meters (500 feet) of the perimeter of the greenhouse. Weeds that host diseases of major concern must be controlled within 152 meters (500 feet) of the perimeter of the greenhouse. Insects that vector diseases of major concern should be controlled in isolation area.
   4. Non-certified *Rubus* species must not exist within the greenhouse or screenhouse.
   5. Blossoms shall be removed before the blossoms open.

C. Registered stock
   1. Registered plants may be maintained indefinitely if grown in an insect-proof facility (greenhouse), in sanitized substrate, and indexed every three years.
   2. In greenhouse or screenhouse, Registered plants shall be produced in separate sanitized containers with labeling of cultivar name and lot number (if applicable).
   3. Non-certified *Rubus* species must not exist within 152 meters (500 feet) of the perimeter of the greenhouse. Weeds that host diseases of major concern must be controlled within 152 meters (500 feet) of the perimeter of the greenhouse. Insects that vector diseases of major concern should be controlled in isolation area.
   4. Non-certified *Rubus* species must not exist within the greenhouse or screenhouse.
   5. For field production, soil treatment is required with an approved method (ex. solid soil fumigation with methyl bromide + chloropicrin). Weeds that host diseases of major concern will be controlled. Insects that vector diseases of major concern should be controlled in isolation area.
   6. Non-certified *Rubus* species must not exist within 152 meters (500 feet) of the perimeter of the field used to produce certified Blackberry stock. Each lot and/or different cultivars are labeled and separated by a distance of 4.25 meters (14 feet) or a physical barrier that prevents intermingling of roots.
   7. Field produced Registered stock shall not be harvested beyond one year.
   8. Blossoms shall be removed before the blossoms open.

D. Certified stock
   1. Certified plants may be maintained indefinitely if grown in an insect-proof facility (greenhouse), in sanitized substrate, and indexed every three years.
   2. In greenhouse or screenhouse, Certified plants shall be produced in separate sanitized containers with labeling of cultivar name and lot number (if applicable).
   3. Non-certified *Rubus* species must not exist within 152 meters (500 feet) of the perimeter of the greenhouse. Weeds that host diseases of major concern

must be controlled within 152 meters (500 feet) of the perimeter of the greenhouse. Insects that vector diseases of major concern should be controlled in isolation area.

4. Non-certified *Rubus* species must not exist within the greenhouse or screenhouse.
5. For field production, soil treatment is required with an approved method (ex. solid soil fumigation with methyl bromide + chloropicrin). Weeds that host diseases of major concern will be controlled. Insects that vector diseases of major concern should be controlled in isolation area.
6. Non-certified *Rubus* species must not exist within 152 meters (500 feet) of the perimeter of the field used to produce certified Blackberry stock. Each lot and/or different cultivars are labeled and separated by a distance of 4.25 meters (14 feet) or a physical barrier that prevents intermingling of roots.
7. Field produced Certified stock shall not be harvested beyond one year.
8. Blossoms shall be removed before the blossoms open.

E. Documentation of soil treatments and use of plant protectants shall be made available to NCCIA.
F. A map identifying cultivars and lots must be provided to NCCIA.

III. Inspections

A. Greenhouse/Screenhouse
B. Grower will regularly inspect plants. All plants that are symptomatic of disease or etc. will be removed and destroyed. The grower will keep a log book recording cultivar and number of destroyed plants and make it available to NCCIA inspectors.
C. Grower will inspect in and around the greenhouse perimeters to ensure isolation standards are being met.
    1. NCCIA inspector must inspect and approve any greenhouse that has not been used for successful production of indexed blackberry plants.
    2. During the production of certified plants, NCCIA inspector will do at least one inspection during the growing period when plants are likely to express symptoms of virus infection, crown and cane gall infections and other disorders. NCCIA may conduct additional inspections if deemed necessary.
    3. All plants that are off-types, crown gall infected, virus infected, or exhibiting virus-like symptoms during inspections will be flagged by NCCIA inspector.
    4. Grower will remove all flagged plants immediately after inspection by NCCIA.
D. Field
    1. The grower should inspect fields regularly during the growing season and rogue all plants with symptoms of disease, etc. NCCIA should be informed if any problems are found.
    2. NCCIA inspector will perform three inspections of fields for certified plant production; 1) first inspection during April, 2) second inspection during July, 3) third inspection during October. Additional inspections may be performed if necessary.

IV. Inspection Standards

A. Greenhouse, General Requirements
   1. Unit of certification shall be the entire greenhouse.
   2. Isolation: Non-certified *Rubus* species must not exist within the greenhouse. Non-certified *Rubus* species must not exist within 152 meters (500 feet) of the perimeter of the greenhouse. Weeds that host diseases of major concern must be controlled within 152 meters (500 feet) of the perimeter of the greenhouse. Insects that vector diseases of major concern should be controlled in isolation area.

B. Field, General Requirements
   1. Unit of certification shall be the field or a portion of field. Any portion of the field that does not meet inspection standards may be delimited if it will not jeopardize the remainder of the field.
   2. Isolation: Non-certified *Rubus* species must not exist within 152 meters (500 feet) of the certified plants. Weeds that host diseases of major concern must be controlled within 152 meters (500 feet) of the certified plants. Insects that vector diseases of major concern should be controlled in isolation area.

C. Specific Greenhouse and Field Tolerances, maximum % of factor

Factor	Foundation Stock	Registered Stock	Certified Stock
Anthracnose	0	2.0	5.0
Crown and cane gall	0	0.1	1.0
Nematodes	0	0.05	0.1
Rust, systemic	0	0	0
Virus diseases	0	0.05	0.5
Other diseases	0	0.2	0.5
Varietal mixture	0	0	0
Root, cane, or crown inhabiting insects	0	0.05	0.1

V. General Requirements for Plants

A. Growers may sell Foundation, Registered, or Certified stock as certified plants.

B. An official certificate will accompany each sale of certified Blackberry plants or stock. This certificate will list the viruses indexed and other detail. Each container/plant will be labeled with variety and certification information.

C. A complete record of the number of certified Blackberry plant/stock sales will be maintained and made available to the official certifying agency. The record will include (a) class, (b) cultivar, (c) date of shipment, and (e) number of plants or stock shipped.

D. General Inspection Standards for Plants:
   1. Apparently free of biotic and abiotic diseases, insects, and other pests.
   2. True-to-variety characteristics.
   3. Good leaf color and plant size.
   4. Satisfactory plant size for to meet the expectations of the customer.
   5. Plants will not be shipped with non-certified plants.