

Ischyrolepis subverticillata - New Crop Summary & Recommendations

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New Crop Report: *Ischyrolepis subverticillata* (Broom Restio)

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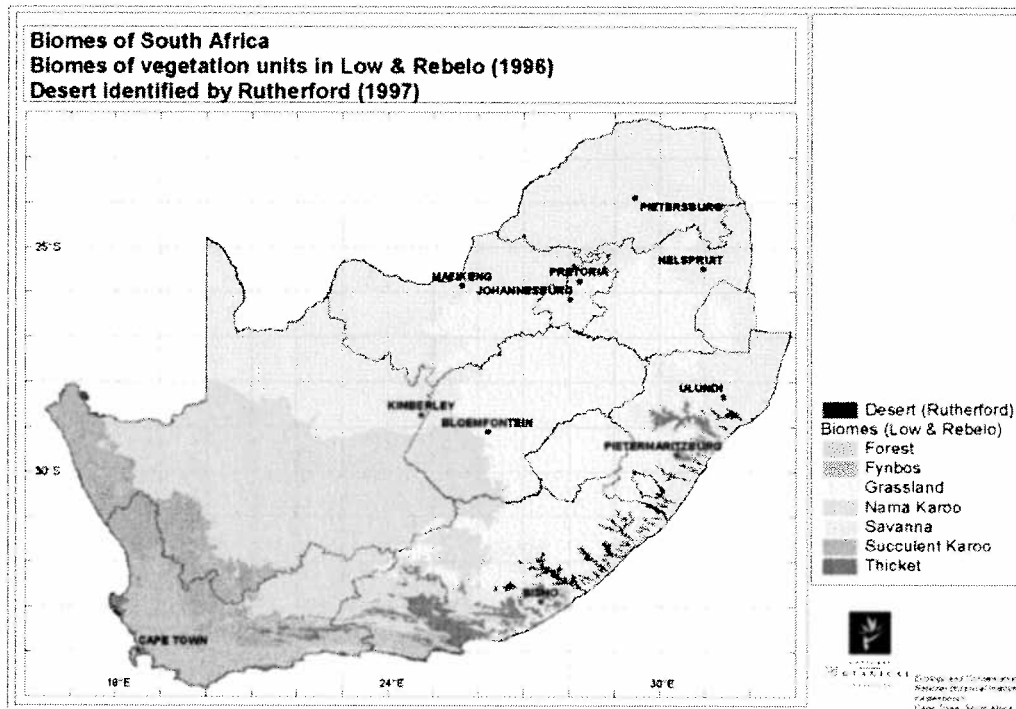
Taxonomy

- Scientific name: *Ischyrolepis subverticillata* Steud.
- Synonyms: None
- Common name: Broom restio, Besemriet, Dune Restio, Duineriet, Garden Restio, Tuinriet
- Family: Restionaceae (Restio / Cape Reed Family) (Jamieson, 2002)

Geographic Distribution

- Continent: Africa
- Countries: South Africa
- Region: South Western Cape, from Caledon to Paarl. The area where *Ischyrolepis subverticillata* is found constitutes the fynbos ecoregion at the south-western tip of the country (Jamieson, 2002). See Figure 1 below for the region's exact location.

Figure 1: Biomes of South Africa, including the fynbos ecoregion (South Africa National Biodiversity Institute, n.d.)



- Latitudinal range: Approximately 31° S to 35° S (see Figure 1 above)
- Altitude: Sea level to 2200 m (Robelo, 1998)
- General climate conditions: Mediterranean – “cool, moist winters and hot, dry summers” (Darke, 1999). “Rainfall varies from 200 to over 2000 mm per year, occurring mainly in the

winter months” (Robelo, 1998). Fire cycles occur every five to forty years (Brown, 1994). Broom restios are reliant upon the fires to stimulate seed germination and to reduce competition from other plants (Holmes, 2004).

- Tendency to naturalize or become invasive: Unknown

Native Habitat

- Habitat: Sandy, low-nutrient soils (Darke 1999), usually along streamlines or the margins of riverine scrub forest. Also found among sandstone bedrock in mountain valleys (Jamieson, 2002).
- Plant community: *Ischyrolepis subverticillata* occurs in the fynbos ecoregion of the Cape Floristic Region, which is “characterized by its high richness in plant species (8 700 species) and its high endemism (68% of plant species are confined to the Cape Floral Kingdom).” Aside from Restionaceae, prominent plant families include Asteraceae, Fabaceae, Rubiaceae, Sterculiaceae, Thymelaeaceae, Rhamnaceae, Ericaceae, and Brunaiaceae (South Africa National Biodiversity Institute, n.d.).

Taxonomic Description

- Overall Plant Habit/Description: Herbaceous perennial. Dioecious. 6’ tall by 4’ wide at maturity. (Over the course of one growing season, height will be 3’.) Densely clumping. Its growth form is very distinctive, with tall arching “cane-like stems, which have soft green whorls of modified branches at each node.” Silvery seed capsules form at the end of female inflorescences (Jamieson, 2002).
- Root System Type: Rhizomatous
- Presence/Type of Underground Storage Organs: Rhizomes
- Leaves: “Alternate, mostly scattered along stem, usually reduced to an open leaf sheath with a rudimentary blade” (BayScience Foundation, Inc., 2009)
- Flower: Dioecious. Female flowers are white, while male flowers are greenish-yellow and rather negligible. Flowers are wind-pollinated.
- Season of bloom: In its native habitat, the broom restio flowers in March or April. Seeds ripen by November (Jamieson, 2002).
- Use(s) by indigenous people: Historically, the stems of *Ischyrolepis subverticillata* have been used for brooms and roof thatching. More recently, “a renewed interest in traditional architecture has led to a flourishing thatching industry in the African Cape” (Darke, 1999).
- Other uses: Seed heads and stems are used in the international cut-flower industry.
- Additional Notes: Broom restios hold great potential for ornamental use in Mediterranean climates, especially as germination methods are continuously improved (Darke, 1999).

Name and Description of Varieties/Cultivars on the Market

- Not applicable

Propagation Method(s)

- Vegetative vs. Seed: *Ischyrolepis subverticillata* is almost always seed propagated. Restios do not respond well to root-disturbances, so root cuttings are not a successful means of

propagation (Darke 1999). However, little research has been done regarding vegetative propagation via cuttings, even though one group of researchers managed to root shoot cuttings at a rate of 75 percent after applying NAA and IBA (McCartan, 2004). Vegetative propagation should therefore be researched in greater depth.

- If veg., plant tissue source(s): Not applicable
- If veg., proposed propagation method(s) & temperatures: Not applicable
- If seed, no. of seeds/flower: Unknown
- If seed, seed dormancy: Seeds have a chemical dormancy that relates to smoke. Seeds need to be exposed to the chemicals in plant-derived smoke in order to overcome this dormancy (Brown, 1994). For commercial propagation, instant smoke papers can be used to imitate fynbos smoke. The seeds need to be soaked for 24 hours in a solution of instant smoke paper and water. One particular brand of instant smoke, Cape Super Smoke Plus, also contains “a range of natural germination stimulators... to overcome other forms of seed dormancy (Seedman.com, n.d.).
- If seed, germination temperatures/duration: 30° F difference between day and night temperature (after sowing, until germination occurs) (Seedhunt, 2009).

Product Specifications

- Crop Ideotype: It's difficult to have an ideotype because of the dioecious nature of *Ischyrolepis subverticillata*. The ornamental flowers and seed heads would be most desirable from an ornamental standpoint, so the ideal phenotype would be female (though, of course, it would need to be sold with a male counterpart). The ideotype would be compact and slow-spreading, and it would not be prone to lodging. The seed heads would mature prior to freezing (especially important in colder climates).

Market Niche—Identification & Justification

- Potential holiday(s) for this product: Foliage could be grown for autumn holidays, specifically Thanksgiving. The plants themselves could be produced for the usual Mother's Day sale date.
- Programmability, i.e. could this be forced year-round: Yes, with careful temperature and moisture regulation
- Crops with which this will compete in the market: Tall perennial and annual ornamental grasses, e.g. *Miscanthus sp.*, *Calamagrostis sp.*, *Schzacharium sp.*, etc.
- What kind of “story” can be told about this product: The marketing story of *Ischyrolepis subverticillata* would probably include information about the fires of the fynbos ecoregion. The crop could be portrayed as a majestic plant that emerges from the devastated rubble the fires have left behind. People would be very interested in the fact that broom restio seeds need smoke to germinate.
- Will this ever be a major crop? (why or why not): Maybe. Because of the difficulties of mass-producing broom restios, it will not become a major crop unless germination is improved. They could be quite popular as annuals in colder climates, especially due to their vast height. In climates where broom restios will be cold-hardy, they have great potential as ornamentals.
- Initial crop limitations/problems: Germination can take up to six weeks (or possibly longer). Even with instant smoke, germination rates are low. Seedlings need constant moisture, which

makes the crop high maintenance in its youth. The fact that broom restios are dioecious might also cause a problem, as female plants are more ornamentally desirable.

- Is this product already identifiable to the growers & consumers: No
- How soon this product could be available: Unknown

Anticipated Cultural Requirements

- Winter Hardiness (USDA Zones): Zone (7)8-9 – Marginally hardy to 20 degrees (Joy Creek, 2010).
- Heat/Drought Tolerance: Young seedlings need constant moisture for the first six weeks to two months, as they usually germinate during the rainy season in their native habitat; however, more mature broom restios will eventually tolerant heat and limited drought (Jamieson, 2002).
- Temperature (day/night): Unknown
- Light quantity, quality, duration; photoperiod response: Sun to partial shade (Joy Creek, 2010). No available information about photoperiod.
- Nutrition: Organic fertilizers (Seagro and Kelpak) and ammonium sulfate recommended for mature plants (Jamieson, 2002).
- Soil: Sandy/well-drained, acidic, low fertility, low phosphorus levels (Seedhunt, 2009)
- Plant growth regulators: Unknown
- Container size (through entire production cycle): Unknown
- Disease Resistance/Susceptibility: Unknown
- Fungicides, Insecticides: Unknown

Complete Production Schedule (from seed or cuttings)

- Estimated no. of weeks from planting to flower bud initiation, flower development, & shipping: Unknown
- Estimated time, type, and quantity of special treatment applications: Unknown
- Target sales date: Mother's Day sales (mid-May); autumn sales (stalks and seed-heads rather than plants)

Needs Assessment for Genetic Improvement

The need for crop improvement using standard breeding methodology or genetic transformation: *Ischyrolepis subverticillata* needs to be improved in terms of seed germination rates, as, even with instant smoke applications, only around 65 percent of seeds germinate (Brown, 1994). Further research is also needed in regards to vegetative propagation, especially cuttings. Aesthetically, broom restios could be improved into a more compact form. For varieties grown in northern climates, genetic improvement could be made on length of time to seed maturity, as the attractive seed heads would not mature before cold temperatures killed the plants.

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