



## Sensory characterization of rooibos tea and the development of a rooibos sensory wheel and lexicon

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### ARTICLE INFO

#### Article history:

Received 28 August 2011

Accepted 29 November 2011

#### Keywords:

*Aspalathus linearis*

Rooibos

Descriptive analysis

Sensory lexicon

Sensory wheel

### ABSTRACT

Rooibos samples were collected throughout the 2009 harvesting season from different geographic areas in the Western Cape, South Africa, and from different producers to capture as much potential variation in rooibos sensory characteristics as possible. The quality (i.e. the appearance of the leaves, and the color and flavor of the infusion) of 69 samples was evaluated by expert graders, and samples were grouped into four quality grades. Using descriptive analysis sensory profiles of the rooibos samples were developed and 121 aroma, flavor, taste, and mouthfeel descriptors were generated. A rooibos sensory wheel was created by selecting 27 flavor, taste and mouthfeel attributes and grouping these terms together to form a logical, convenient and user-friendly overview of the sensory descriptors associated with rooibos. The most frequently occurring descriptors were selected to compile a rooibos sensory lexicon of 14 flavor, taste and mouthfeel attributes along with a definition and reference standard for each term. It was found that the term “characteristic” rooibos flavor may be described as a combination of honey, woody and herbal-floral notes with a slightly sweet taste and subtle astringency. Also, differences in the sensory characteristics between and within different quality grades were established with low-quality tea often being associated with green, hay-like and musty flavors and a bitter or sour taste. High-quality tea was generally associated with pleasant rooibos attributes including honey, woody, floral and caramel notes and a sweet taste. This research is a first step towards the broader objective of standardizing the sensory terminology of rooibos tea.

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### 1. Introduction

Rooibos tea is an herbal tea product from the endemic South African fynbos plant, *Aspalathus linearis* and production is mainly concentrated in the Clanwilliam area, Western Cape, South Africa (Joubert & De Beer, 2011). In South Africa rooibos tea is well-established and enjoyed by approximately 10.9 million South African households (data supplied by South African Rooibos Council, SARC, Clanwilliam, South Africa). Internationally it is also well-known as a herbal tea, it is currently being sold in more than 37 countries, with the United States of America, United Kingdom, the Netherlands, Germany and Japan representing 86% of the export market in 2010 (Joubert & De Beer, 2011). The current international demand for rooibos is 5633 tons compared to only 750 tons in 1993. The domestic market for rooibos has also shown a steady increase over the years. It is estimated that rooibos captured ca. 23% of the domestic tea market with sales reaching more than 5000 tons (data supplied by SARC). In spite of the growing popularity of rooibos as a herbal tea, general tools to

ensure effective quality assessment and control of its sensory properties, such as a flavor wheel and lexicon, do not currently exist. Sensory lexicons or sensory wheels offer a collection of descriptive terms with which to describe the attributes of a certain product (Drake & Civile, 2002). Such tools can facilitate and improve communication between different role players in the industry by standardizing the terminology that is used when discussing certain product characteristics. This lack of a proper ‘communication’ tool is especially relevant with the introduction of rooibos to markets not familiar with its use. Furthermore, since the international tea market is becoming cluttered with numerous new herbal teas, fruit infusions and blends, effective product differentiation has become an increasingly important issue. It is crucial that the attributes of a product can be properly defined and described by means of a sensory wheel and lexicon.

The official South African regulation outlining the quality standards of rooibos is entirely inadequate in this regard as it is simply stated that “all rooibos shall have the clean, characteristic taste and aroma of rooibos” (Anonymous, 2002). In order for sensory attributes of rooibos to have any value, terms such as ‘characteristic’, ‘typical’ and ‘distinctive’ must have the same meaning for all role players in the rooibos industry, including the global industry. Although South African consumers that are familiar with the product might have an

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understanding of the concept of “characteristic” rooibos flavor, it would be difficult to communicate this to foreign markets. Furthermore, the variation in the sensory attributes of different batches of rooibos has not yet been established. A grading system is currently employed by the major rooibos marketing company to distinguish between high and low quality tea for commercial purposes. However, the final grade awarded to a batch of rooibos depends not only on the overall flavor of the tea infusions, but also on the appearance of the dry and wet leaves, as well as the appearance of the rooibos infusion (J. Basson, Rooibos Ltd., Clanwilliam, South Africa, 2009, personal communication). The specific sensory attributes of a batch of rooibos

may, therefore, not always be accurately predicted by the overall quality that is assigned to the batch by expert graders.

Furthermore, the development of a geographic indication (GI) for rooibos has been set in motion (Gerz & Bienabe, 2006). A GI is a label that is reserved for products which acquire their characteristic and defining qualities as a result of their geographical location, e.g. Champagne or Parma Ham (Grazioli, 2002). In this way producers can distinguish their product based on its specific origin-related characteristics. However, in order to establish a GI for rooibos a suitable, well-defined description of the “typical” sensory profile of South African rooibos is required. Again, the inadequacy of the term

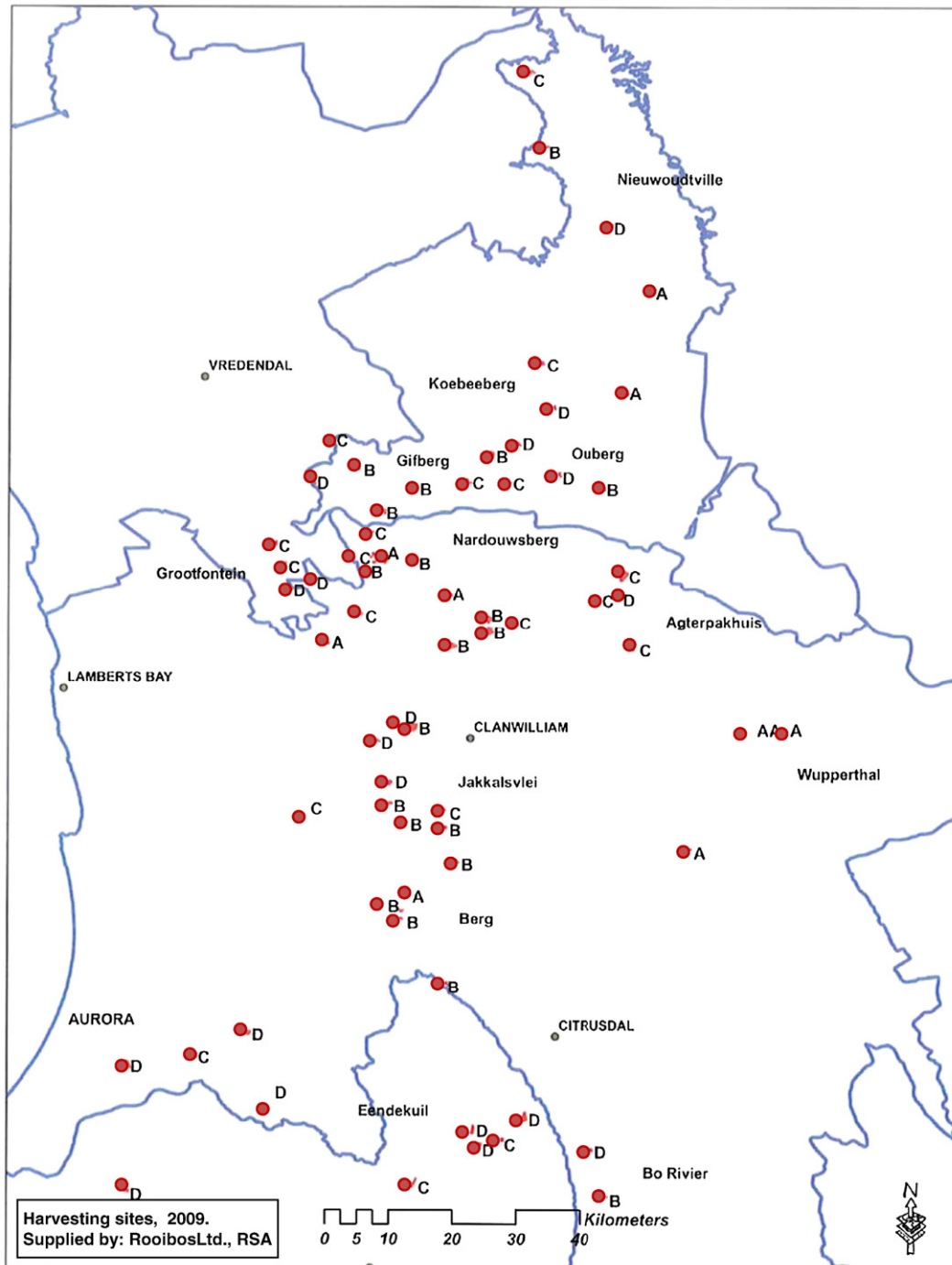


Fig. 1. Geographical locations of the plantations where rooibos samples were harvested in the Clanwilliam area, Western Cape region, South Africa (map supplied by Rooibos Ltd., Clanwilliam).

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