



A survey of plants responsible for causing allergic contact dermatitis in the Amathole District, Eastern Cape, South Africa



Wilfred Mbeng Otang¹, Donald Scott Grierson², Anthony Jide Afolayan^{*}

MPED Research Centre, Department of Botany, University of Fort Hare, Private Bag X1314, Alice 5700, South Africa

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ABSTRACT

Background: An inventory of allergenic plants can enable vulnerable individuals to discover the source of their dermatitis and thus prevent re-exposure. However, because of the relatively little data available in the scientific literature with regard to the adverse effects of plant, the aim of this study was to document the plants responsible for allergic contact dermatitis (ACD) in the Eastern Cape. Interview questions targeted the local names of plants that cause allergies when in direct contact with the skin.

Results: Twenty four plant species in 11 families were reported as causative agents of ACD. The Asteraceae was probably the most important allergenic plant family, represented by commonly used medicinal plants such as *Artemisia afra*, vegetables such as *Lactuca sativa* and weeds such as *Coryza bonariensis*. Sub-acute eczematous lesions of the face and the exposed areas of the upper limbs were characteristic of Asteraceae allergies. Out of the 24 plants mentioned for causing ACD, 67% are principally used as food.

Conclusions: A high burden of occupational skin disease in the food industry will definitely translate into large costs in terms of days lost from work and adjustments necessary in the workplace. Therefore, health care practitioners need to be aware of possible occupational causes for all cases of ACD.

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1. Introduction

The skin is the largest organ of the human body. As the outermost barrier of the human body, it is the first to encounter chemical and physical factors from the environment and therefore prone to many health problems. Numerous occupations are associated with the risk of developing reactions to plants. These include food handlers, caterers, market gardeners, farmers, agricultural workers, florists, nursery workers, landscapers, forestry workers and loggers. It is estimated that 50% of agricultural occupational skin disease is due to plants, trees and natural vegetation (Modi et al., 2009). Plants can harm the skin in numerous ways: irritant contact dermatitis due to mechanical injury or by irritant chemicals in the plant sap, phytophotodermatitis resulting from skin contamination by plants containing furocoumarins following subsequent exposure to UV light and immediate (type I) or delayed hypersensitivity contact reactions mediated by the immune system in individuals sensitised to plants or plant products e.g. peanut allergy and poison ivy poisoning (van Ketel, 1975). Dermatitis and eczema are used synonymously to denote a polymorphous pattern of skin inflammation characterised at least in its acute phase by erythema,

vesiculation and pruritus (Saint-Mezard et al., 2004) while an allergy is an immune reaction causing local or systemic acute inflammation in susceptible individuals after repeated exposure to certain antigens. Approximately one third of people will suffer from an allergy at some time in their lives and 15–20% of children suffer from atopic eczema (Ben-Shoshan et al., 2012).

Allergic contact dermatitis (ACD) is a T-cell-mediated inflammatory reaction of the skin that occurs in sensitised individuals (Modi et al., 2009). ACD requires the activation of antigen-specific acquired immunity leading to the development of effector T cells which mediate the inflammation. It is characterised by redness, papules and vesicles, followed by scaling and dry skin. Unlike irritant dermatitis, allergic contact dermatitis requires previous sensitisation to the allergen and a sensitised immune system; hence, not everyone will develop an allergy to a culprit compound (Sasseville, 1999).

The Eastern Cape Province of South Africa is particularly known for its richness in plant species (Phillipson, 1987). The Xhosas, who are the major inhabitants of this province had no interaction with the Western world for many years, hence, they relied mainly on traditional knowledge of medicinal plants for the treatment of various diseases and ailments. The daily activities of the Xhosa people are centred mainly on agriculture: cattle rearing and the production of crops and vegetables in small fields along the rivers and in home gardens (Bhat and Jacobs, 1985). In addition to agriculture the gathering of wild fruits and other edible plant parts, the collection of honey and the hunting of wildlife also contribute to their livelihood. This high interaction with plants on

* Corresponding author. Tel.: +27 406022323; fax: +27 86 628 2295.

E-mail addresses: wotang-mbeng@ufh.ac.za (W.M. Otang), dgrierson@ufh.ac.za (D.S. Grierson), aafolayan@ufh.ac.za (A.J. Afolayan).

¹ Tel.: +27 33257274; fax: +27 866282409.

² Tel.: +27 406022321; fax: +27 866282409.

a daily basis may theoretically result in the possibility of mild to severe adverse plant sensitisations. Being one of the poorest provinces in South Africa, the majority of specialist care, including dermatology in the Eastern Cape is only available in the major hospitals. Many health care centres are run by clinical officers or nurses, rather than physicians, who act as the primary care workers but have very limited training in diagnosing dermatologic conditions (Hay and Marks, 2004). Recently, the number of allergic patients in the world is increasing (Ben-Shoshan et al., 2012).

However, because of the relatively little data available in the scientific literature with regard to the adverse effects of plants in the Eastern Cape, the aim of this study therefore, was to document the plants responsible for allergic contact dermatitis (ACD) in the Eastern Cape, along with their respective allergens and to describe the clinical presentations observed in plant-induced ACD. A comprehensive inventory of allergenic plants is important for risk avoidance and diagnosis of allergic symptoms. In addition, a basic understanding of plant-induced allergic contact dermatitis and the common plants that cause each type can enable vulnerable individuals to discover the source of their dermatitis and thus prevent re-exposure.

2. Materials and methods

2.1. Description of the study area

This study was carried out in the Amathole District (Fig. 1) of the Eastern Cape Province, South Africa. The Eastern Cape Province is one of the 9 provinces of South Africa and it falls within the latitudes

30°00' to 34°15'S and longitudes 22°45' to 30°15'E (Grierson and Afolayan, 1999). It is bounded by the sea in the East and the drier Karroo (semi-desert vegetation) in the west. The Amathole District Municipality is situated within the Eastern Cape Province, between Port Alfred and Port St John, and includes the city of East London. The climate is highly varied; the west is dry with sparse rain during winter or summer, with frosty winters and hot summers. Mean maximum temperature in January has been recorded as 26 °C and mean minimum as 10 °C in July. The main tribes of the area are Xhosa-speaking peoples who are divided into several tribes with related but distinct heritages.

2.2. Survey of plants that cause allergic contact dermatitis (ACD)

The study was carried out by interviewing 161 respondents in 12 locations (Tyahli, Ngwenya, Dyamala, Gxwedera, Roxeni, Mhehelo, Sheshegu, Alice, Mavuso, Chwaru, Gaga and Fort Cox) in the Amathole District of the Eastern Cape. High poverty levels, lack of modern health facilities and the extensive use of medicinal plants are characteristic of the selected locations. Study participants were selected by convenient sampling with particular focus on local people who regularly interact with plants or plant products such as food handlers, caterers, cooks, chefs, gardeners, farmers, agricultural workers, florists, herbalists and nursery workers. The survey was conducted from April to June 2014, through interviews and discussions which were conducted in Xhosa – the local language of the informants and were facilitated by a local field assistant who is fluent in both Xhosa and English. The interviews included questions that targeted the local names of plants that cause allergies when they come in direct contact with

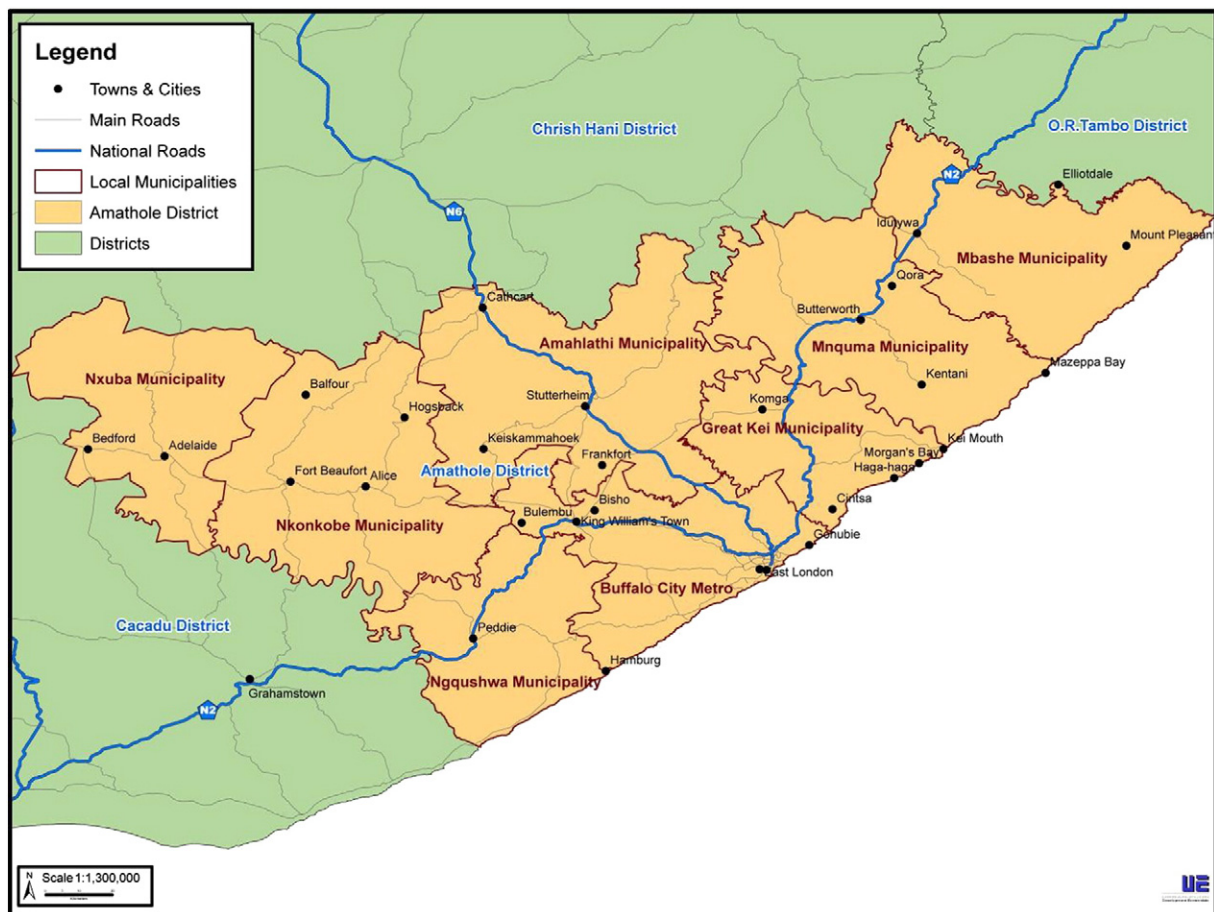


Fig. 1. Map of Amathole District Municipality. Source: Urban-Econ, Eastern Cape, 2011.

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