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Psychoactive Plants: A Neglected Area of Ethnobotanical Research in Southern Africa (Review)

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ABSTRACT Psychoactive plant research has been actively pursued over the last century around the world, particularly in the Americas. Yet, southern Africa has often been regarded to have relatively few psychoactive plant species of cultural importance with little research conducted on the region's potential psychoactive flora. However, in the last decade, renewed interest has occurred in the study of psychoactive plants from southern Africa. Recent anthropological studies have demonstrated the significance of psychoactive plant medicines in the initiation process of southern African traditional healers and in treating mental illness, while numerous ethnopharmacological studies have screened southern African plants for psychotropic activity, with promising new findings and research directions resulting. Yet, despite this great progress, the indigenous cultural (ritual) uses of psychoactive plants by the indigenous people of southern Africa remains a neglected area of ethnobotanical research. Aspects identified as requiring further study include: the indigenous cultural understandings of mental illness and psychoactive plants, the role of psychoactive plants in the spiritual practices of southern African traditional healers, the influence of various psychoactive plant species used in traditional formulas and the folklore and mythology relating to indigenous psychoactive plants. Thus, much is still to be learnt and documented from the southern African traditional healers regarding their worldview and their botanical, diagnostic, methodological and healing knowledge that can provide insights into the treatment of mental illness and the actions of psychoactive plants.

INTRODUCTION

A Historical Perspective on Global and Southern African Psychoactive Plant Research

Psychoactive or psychotropic substances are substances that when ingested, affect the mind or mental processes. They can be defined as chemical substances that are used for the modification of the emotional, intellectual and behavioral function of humans and can be classified according to their action (for example, stimulants) or by their therapeutic use (for example, antipsychotics) (Werry and Aman 1993). Plants manufacture an array of psychoactive chemicals that exert a multitude of psychoactive effects ranging from those acting as sedatives, euphoriants, stimulants, sopoforics (inducing sleep), through to psychedelics, antidepressants and memory enhancers (Sobiecki 2002). Throughout history, humans have experimented with consuming plants and have come to recognize those with psychoactive properties, thereby incorporating them in medicine and spiritual healing practices (Schultes and Hofmann 1992). Thus, psychoactive plants have been important in sustaining the health and well-being of humankind.

Western academic research on psychoactive plants began as early as 1855 with Ernst Freiherr von Bibra's *Die Narkotischen Genussmittel und der Mensch* in which he considered seventeen plant narcotics and their potential psychoactive chemistries (von Bibra 1855). Half a century later, Carl Hartwich wrote another noteworthy book on thirty narcotic plants, *Die Menschlicen Genussmittel* (Hartwich 1911). These scholars were to catalyze the beginnings of psychopharmacological research on psychoactive plants. Soon after, in 1897, Arthur Heffter identified mescaline from the peyote cactus *Lophophora willimsii*, Lem. ex Salm-Dyck., the first such isolation of a naturally occurring psychedelic substance in pure form. Other scholars also continued the interdisciplinary research on psychoactive plants including Louis Lewin's seminal work, *Phantastica* (Lewin 1924) which was a breakthrough in the advancement of the pharmacological study of psychoactive plants. In 1924, Heinrich Kluver, who was born in 1897, the year Heffter isolated mescaline, began his work on understanding the mechanisms of mescaline in-

duced visions, which would be used as an explanatory model by the 21st century archaeologists in interpreting African San rock art and its visionary basis (Klüver 1928; Lewis-Williams 2002). In the period between Hartwich and Lewins' work, an American ethnobotanist, William E. Safford pioneered the study of the New World psychoactive plants. Later in 1936, a remarkable scholar, Richard Evan Schultes, began his studies on South American psychoactive plants. Over the next 49 years he would publish over 450 technical papers and nine books on ethnobotany, and is widely recognized as one of the most distinguished scientists in the field. Other notable researchers on the ethnobotany and chemistry of psychoactive plants included Robert Gordon Wasson, Roger Heim and Albert Hofmann. Thus, psychoactive plant use research has been actively pursued over the last century around the world, particularly in the Americas. 1

Yet, despite this, Africa and specifically southern Africa, has often been regarded to have relatively few psychoactive plants of cultural importance (Emboden 1980; Dobkin de Rios 1990; Schultes and Hofmann 1992). Anthropological and ethnobotanical studies focusing on psychoactive plant use from southern Africa are rare, and therefore, it can be said that psychoactive plant use appears to be a neglected field of ethnobotany in southern Africa. Possible reasons for this lack of attention include researcher bias concerning substance use (Winkelman and Dobkin de Rios 1989), lack of attention by researchers to the region's psychoactive flora (De Smet 1996), the overlooking of more subtle psychoactive effects of traditional plants medicines (Sobiecki 2008) and the loss of indigenous knowledge concerning psychoactive plant use due to acculturation. Other factors such as cultural prejudice and the failure to effectively interpret African traditional medicine concepts have been highlighted as influencing the study of traditional medicine in South Africa (Sobiecki 2014). For whichever single or combination of reasons, the majority of ethnobotanical studies from South Africa has historically focused on medicinal plants (16 %) and food plants (20 %), with only a few (7 %) relating to the category 'Magic, ritual and customs' (Liengme 1983). It is this last category that appears to be rich in plant species with reported psychoactive uses and effects (Sobiecki 2008, 2012), and which deserves more attention. 2

The aims of this paper are to show: the history of psychoactive plant research in southern Africa, the impetus and growth in the field of research, the intersection of the cultural and biological sciences studies of these poorly researched yet important medicinal plants in the southern African region, and future areas of potential research. 3

METHODOLOGY 4

A literature search was conducted in order to find recent anthropological and ethnopharmacological studies focusing on southern African psychoactive plants using Science Direct and Scopus databases. Key older anthropological studies were available from a 2002 preliminary inventory on plants used for psychoactive purposes from southern Africa (Sobiecki 2002). As useful as this preliminary inventory is, it however only contains previous literature accounts and lacks current fieldwork information on the cultural understandings on the role of psychoactive plants in southern African traditional healing practices, as well as critical ethnopharmacological data. Thus, this review paper provides a useful interdisciplinary analysis consolidating the diverse and current anthropological, ethnobotanical and phytochemical studies and perspectives on southern African psychoactive medicinal plants. 5

DISCUSSION 6

In the last century the few researchers who have undertaken previous, more focused studies on psychoactive plant use by the indigenous people of southern Africa, include: (Laidler 1928; Laydevant 1932, 1939; Watt 1967; Johnston 1972; Du Toit 1974, 1975; Broster 1981; Dobkin de Rios 1986; Emboden 1989; Winkelman and Dobkin de Rios 1989; Hutchings and Van Staden 1994; De Smet 1996; Smith et al. 1996; Neuwinger 1997; Dold et al. 1999; Hirst 1997, 2000). 7

During this time, comprehensive reviews on psychoactive plant used by the various ethnic groups from southern Africa were lacking with the exception of Watt (1967) who reviewed plants from Africa that are potentially useful for mental health. 8

However, in the last ten years there has been renewed anthropological and ethnobotanical 9

interest and research on psychoactive plant use in southern Africa (van Wyk and Gericke 2000; Mitchell and Hudson 2004; Hirst 2005; Sobiecki 2002, 2008, 2012). Sobiecki (2002) documented over 300 species of plants that are reported as having psychoactive uses in traditional southern African healing practices, for example, from treating conditions such as insomnia to convulsive conditions such as epilepsy. More recent mini-reviews have indicated the significant role that psychoactive plants have in the traditional spiritual practices of the indigenous people of southern Africa; namely in Southern Bantu traditional divination (Sobiecki 2008) the healing initiation process of Southern African traditional diviners (Sobiecki 2012) as well as the shamanic healing practices of the San Bushmen (Mitchell and Hudson 2004). Therefore, the notion that southern Africa is poor in plants with psychoactive uses and properties can no longer be held to be true. This may have implications for our understanding of the role of psychoactive plants in San rock art, and in the San and the Southern Bantu speakers' greater ethno-medicine and cultural practices.

At present, there is a global resurgence in the study of psychoactive/psychotropic substances including indigenous psychoactive plants for application in medicine (for example, The Multi-disciplinary Association for Psychedelic Research—MAPS). Some psychoactive plants from Central Africa and South America are being intensively investigated for their therapeutic potential as medical therapies to treat drug addiction and depression, examples being *Tabernanthe iboga* (Mash et al. 2000) and *Banisteriopsis caapi* (Palladino 2009; Thomas et al. 2013), and southern African psychoactive plants deserve the same attention.

Ethnopharmacological Studies on Southern African Psychoactive Plants

The monumental survey of medicinal and poisonous plants of southern Africa by Watt and Breyer-Brandwijk (1962), is undoubtedly the most significant ethnopharmacological based work of the regions flora and contains much valuable phytochemical and pharmacological lead information on southern African medicinal plants. However, some researchers have noted Watt and Breyer-Brandwijk's often classification of psychoactive plants as poisons as a being complicating factor (Mitchell and Hudson 2004:40), presumably making it difficult to distinguish between toxic and non-toxic psychoactive plants. Nevertheless, Watt (1967) took an interest in the psychoactive pharmacology of medicinal plants and appears to have produced the first review paper on African plants potentially useful for mental health. Despite these promising beginnings, the ethnopharmacological research on psychoactive plants from southern Africa by these scholars appears to have been short lived and did not receive a widespread and concerted research focus into the following decades in southern Africa. This trend continued into the 1990's as only three South African studies are reported as being published in the leading Journal of Ethnopharmacology between 1995 and 2004 (Light et al. 2005). Despite the scarcity of studies on southern African psychoactive plants in the latter half of the last century, some significant studies were conducted in the 1990's such as the comprehensive review on the historical use, traditional preparation and chemistry of a popular southern African psychoactive plant, *Sceletium tortuosum* (L.) N.E.Br., by Smith et al. (1996). This work primed much follow up research and important development work into this important Southern African psychoactive plant (Gericke and Viljoen 2008; Patnala and Kanfer 2009; Smith 2011; Harvey et al. 2011; Shikanga et al. 2011; Shikanga 2012a,b).

The last 10 years has seen a rapid expansion in the ethnopharmacological studies on potential South African psychoactive plants. To give an indication, 34 publications were found focusing on the screening of southern African plants for various neuro-receptor activities (Elgorashi et al. 2004; Nielsen et al. 2004; Risa et al. 2004a,b; Jäger et al. 2005; Sandager et al. 2005; Stafford et al. 2005, Elgorashi 2006a,b; Mahomed and Ojewole 2006; Stafford et al. 2006, Svenningsen et al. 2006; Jäger et al. 2007; Stafford et al. 2007; Ojewole 2008; Olsen et al. 2008; Pedersen et al. 2008a,b; Stafford et al. 2008, Neergaard et al. 2009; Pedersen et al. 2009; Stafford et al. 2009; Neergaard et al. 2010; Pedersen et al. 2010; Bay-Smidt et al. 2011, Marchetti et al. 2011; Nair et al. 2011; Eriksson et al. 2012; Jäger et al. 2012; Nair and van Staden 2012; Rønsted et al. 2012; Nair et al. 2013; Stafford et al. 2013; Nair and van Staden 2014), with new studies being continuously produced. A substantial number of these pharmacological studies were compiled into a

book chapter (Stafford and van Staden 2009). Such studies have demonstrated that various plants used in southern African traditional medicine for psychoactive purposes e.g., in treating epilepsy or mental health problems, have shown activity in bioassays for selected targets matching their traditional usage. Undoubtedly, new psychoactive compounds will result from continued investigations, which may have application in medicine for treating specific nervous system related disorders. A new and exciting research interest is whether phylogeny can predict chemical (for example, alkaloid) diversity and potential medicinal (psychoactive) activity of plants. Results showed alkaloid diversity and *in vitro* inhibition of acetylcholinesterase (AChE) and binding to the serotonin reuptake transporter (SERT) are significantly correlated with phylogeny (Rønsted et al. 2012).

Anthropological Studies on Psychoactive Plants Used in Southern African Traditional Medicine

Several authors have commented on the use of psychoactive plants by the indigenous healers from southern Africa, and the enhanced divining abilities that come from the use of these plant medicines (Laydevant 1932; Krige 1940; Kohler 1941; Boshier 1973; Katz 1976, 1982; Broster 1981, Hutchings 1989; van Wyk and Gericke 2000; Sobiecki 2008, 2012; Lambrecht 1998, 2014). In his classic paper the 'Religious or sacred plants of Basutoland', Laydevant (1932) explores the internal use of plants in the initiation of Sotho diviners and highlights the reported psychoactive effects of some of the plants and the need to investigate these plants for their potential psychoactive properties. Similarily, Broster (1981) provides a detailed account of the role of psychoactive plant preparations in the training and healing initiation process of a traditional Xhosa healer, and makes numerous mention of the need to conduct scientific studies in order to establish the plants potential psychoactive chemistries. A number of the plants mentioned by Broster (1981) are reported elsewhere as having psychoactive uses in the ethno-medicine practices of the Southern Bantu speaking people (Hirst 2000; Sobiecki 2008). These literature accounts have indicated the prevalence of psychoactive plants being used for divination by southern African traditional diviners. This led to the publication of a review of plants used in divination in southern Africa and their psychoactive effects (Sobiecki 2008). This paper reported on 85 species of plants that are used for divination by the Southern Bantu speaking people. Of these, 39 species (45 %) have other reported psychoactive uses, and a number have established hallucinogenic activity. These findings indicate that psychoactive plants have an important role in the spiritual healing and ritual customs of the Southern Bantu speaking people.

In a similar vein, the use of psychoactive plants by the Kalahari San Bushmen has seen new evidence that indicates that psychoactive plants were used on occasion in the past, and even at present, to facilitate the spiritual healing practices of these hunter gatherers, and that "much more systematic pharmacological assessment is needed of the plants used in trance-related and other ritual contexts by contemporary Bushman peoples" (Mitchell and Hudson 2004: 52).

The traditional use of psychoactive plants by the indigenous people of southern Africa in treating mental illness has been poorly studied in academia. Yet, anthropological studies reveal the popular use of a category of psychoactive plant medicines called *ubulawu* (Xhosa) by the indigenous people of southern Africa to clean the body and promote dreaming and healing (Hirst 1990, 2005). Specific mixtures of particular *ubulawu* species are used in the initiation process of southern African traditional healers to encourage their psycho-spiritual healing integration (Sobiecki 2012). Numerous interlinked factors are involved with using these plant medicines in the initiation process that include: the use of ritual, preparation and administration methods resulting in psychoactive effects, correct plant combinations and their psychoactive properties, and the psychological attitude of the initiate, all influencing the therapeutic outcomes (Sobiecki 2012).

Psychoactive plants are an important aid in the spiritual practices of Southern African traditional healers as they are used to access heightened states of awareness such as enhanced intuition and sensitivity, trance and lucid dreaming. These states are regarded as an effective means to connect with ones ancestral spirits and this ancestral connection together with the adjunct psychoactive effects of using the medi-

cines are both considered part of the healing process. From observing a number of southern African traditional healers, accessing these states and their content can serve as a means to learn, grow and become more skilled in using healing knowledge.

CONCLUSION

There is great progress being made in the ethnopharmacological studies on psychoactive plants from southern Africa, with the promise of developing new classes of psychoactive drugs from these plants. Evidence suggests that the healing dynamics occurring with the use of psychoactive plant medicines in southern Africa, and the traditional rituals associated with them, may offer contributions to contemporary treatment of mental illness. Therefore, there is a significant need for further anthropological and ethnobotanical research on the San Bushmen and the Southern Bantu speakers ritual uses of psychoactive traditional medicines. In particular, areas requiring fieldwork research and documentation include: the indigenous cultural understandings of mental illness and psychoactive medicines, the interactions between, and the effects of various psychoactive plant species used in traditional formulas, the role of psychoactive plants in facilitating trance states and divination, and the folklore and mythology surrounding southern African psychoactive plants.

In conclusion, psychoactive plant research has entered a period of rapid growth in southern Africa with much still to be learnt of the cultural, pharmacological and therapeutic aspects of psychoactive plant use from the region. In this way, a very promising future lies ahead for the study of southern African psychoactive plants that can further our appreciation of the region's indigenous knowledge heritage and can have application in the development of medicines, healing and societal wellness.

RECOMMENDATIONS

It has been noted by a number of researchers that one challenge when dealing with traditional medicines is that almost all of the literature available on African medicinal plants has been documented by people who do not belong to the cultural or even language group that they are reporting on. This can result in errors in translation and interpretation of the plant use and observer bias based on the outsiders' worldview. For these reasons, it is important to gain a more multidisciplinary and holistic understanding of the southern African traditional healers' worldview and their botanical, healing, diagnostic and methodological knowledge concerning psychoactive plant use that can provide insights into the process and treatment of mental disorder and the actions of psychoactive plants. This knowledge may also serve to prevent the likelihood of misguided and dangerous experimentation of African psychoactive plants newly discovered by westerners. Shamanic (or what can be also be described as indigenous psychoactive) plant tourism in Latin America has seen a rapid growth in recent years due to the increasing interest by westerners seeking spiritual healing alternatives and the same may occur in the African context with the revitalization of African psychoactive plant research. Inherent dangers in this possible trend include: at times, the naivety of the western tourist on the role and danger of sorcery in traditional medicine systems, untrained individuals holding psychedelic plant ceremonies, charlatan traditional healers and bogus internet ethnobotanical suppliers advertising and selling incorrect or wrongly identified plants or products with little knowledge on their effects or contra-indications. Thus, accurate information and education on the use of southern African psychoactive plants and their related ritual practices could mitigate such risks.

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