

The use and potential commercial development of *Athrixia phyllicoides*

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Athrixia phyllicoides (Asteraceae) is a plant indigenous to the north-eastern mountain ranges of South Africa. It has been harvested for generations by rural communities for use as a tea and a medicine as well as to make brooms. Due to the popularity of these products, signs of over-exploitation of the plant have recently been noted. Commercial production of *A phyllicoides* may be considered as a means of alleviating this pressure on the plant's natural population and its habitat, provided that there is sufficient demand for the plant and its products. This article reports on two surveys conducted to determine the present use of the plant and to assess the demand for its products.

Die gebruik en kommersiële ontwikkelingspotensiaal van *Athrixia phyllicoides*

Athrixia phyllicoides (Asteraceae) is 'n inheemse plant wat in die noordoostelike bergreekse van Suid-Afrika aangetref word. Die plant word al geslagte lank deur landelike gemeenskappe geoes en vir die maak van tee, medisyne en besems gebruik. Hierdie plant-produkte is baie gewild en dit wil nou voorkom of die plant moontlik oorbenut word. Die kommersiële verbouing van *A phyllicoides* kan oorweeg word as 'n wyse waarop die druk op die natuurlike populasie van hierdie plant asook op sy habitat verlig sou kon word, mits die vraag na die plant en sy produkte groot genoeg is. In hierdie artikel word daar verslag gedoen oor twee opnames wat uitgevoer is om die huidige gebruik van die plant te bepaal en die moontlike vraag na *A phyllicoides*-produkte te beraam.

South Africa has a rich diversity of indigenous plants and animals.¹ According to the *South African Yearbook* (RSA 2000/2001: 148), it ranks third in the world for biological diversity, with approximately 24 500 known plant species (Horak 2003) many of which have ethno-botanical histories. Traditionally, plants are used for shelter, clothing, food and medicine. Although still used extensively in rural areas, indigenous plants, with the exception of those used for traditional medicine, are less widely used in urban areas. According to Edinburgh (1999: 28-9), there are between 200 000 and 300 000 traditional healers who supply health care to approximately 80% of the black population of South Africa. The traditional medicine trade, which is growing steadily, is estimated to be worth between R900 million and R2 billion per annum (Horak 2003; Williams 2002: 71). Virtually all the medicinal plant material is collected from the wild, coupled with the increasing demand for medicinal products, has led to a surfeit of opportunistic plant collectors who often practise unsustainable harvesting techniques. In some instances this has led to the local extinction of species (Minter 2000: 30-4).

One way of alleviating pressure on the natural environment is to grow indigenous plants commercially. This has been done to a limited extent in the case of medicinal plants and more extensively with indigenous flowering plants. One of the most successful commercial ventures involving indigenous plants is the Rooibos tea industry. South Africans have long been aware of the health properties and versatility of this beverage, which is made from the stems of *Aspalathus linearis* (*Fabaceae*). It is rich in anti-oxidants and has been used for the treatment of hypertension and insomnia, as well as various digestive and skin ailments. In addition, the deep red tea has a very pleasant taste and aroma. During the last few years its popularity has soared and it is currently being exported to most European countries, the USA, Japan and the Pacific Rim countries (*Phytomedicinal Informatics* 2003). Another indigenous tea, Honeybush, from the *Cyclopia intermedia* (*Fabaceae*) plant, which has recently been introduced into local and international markets, is slowly

1 Our sincere thanks to Mr Moses Mathebula and Mr Lucas Chaba for their assistance in conducting the surveys; Ms Laura Steyn for production of the figures; Mrs S Burger for the photographs, and Prof Frik de Beer for assistance with anthropological terminology and editorial advice. This material is based upon work supported by the National Research Foundation under grant number GUN: 2048685.

gaining in popularity. Both teas are indigenous to the South-western Cape and are produced only in this region.

The success of Rooibos and Honeybush tea can also be ascribed to the popularity of tea as a beverage. It is the most widely consumed beverage in the world, outdoing beer, wine, spirits and soft drinks, combined.² All teas derive from varieties of *Camellia sinensis* (*Theaceae*). It is generally assumed that tea originated in China, where it has been cultivated and consumed for more than 4000 years. Its medicinal and stimulant properties have been confirmed by a number of studies conducted over the past 15 years.³

A survey of indigenous plant use, conducted by the University of the North between 1996 and 2000, revealed that a number of plants are used as “teas” by local communities in the Limpopo province. One such “tea” plant is *Athrixia phyllicoides*.

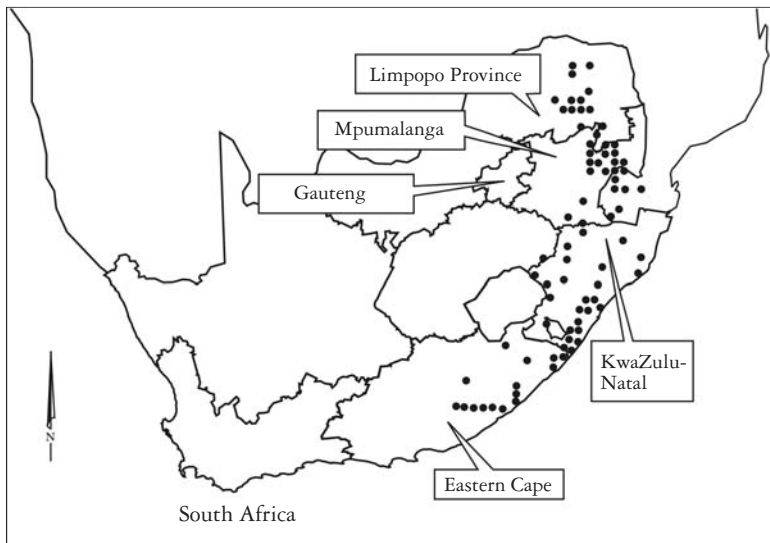
1. *Athrixia phyllicoides* (*Asteraceae*)

Athrixia phyllicoides DC (as identified at the herbarium, National Biodiversity Institute, Pretoria),⁴ of the family *Asteraceae*, is an attractive shrub with small silvery leaves and purple, daisy-like flowers. It grows in the mountainous parts of South Africa, from the Eastern Cape in the south to the Soutpansberg in the Limpopo province in the north (cf Figure 1). It is a multi-purpose plant which is used as a herbal tea, which may have medicinal and aphrodisiac properties, as well as for the making of brooms (Van Wyk & Gericke 2000: 102). In the past the plant was harvested and used exclusively by local communities. Recently, however, traders from Johannesburg and Pretoria who have realised the market potential of the brooms, have been hiring pickers to collect large quantities of the plant from the Wolkberg. Trucks, filled to overflowing with *A phyllicoides*, are a common sight on the highway leading to Gauteng during the autumn. Brooms made from this material are sold by hawkers on the city streets. This has led to over-exploitation of the plant in

- 2 Apostolides, Dept of Biochemistry, University of Pretoria. Personal communication, 1999. Lecture at the University of the North.
- 3 Cf Hara 1992; Wang *et al* 1992; Hertog *et al* 1993; Yang & Wang 1993; Vinson *et al* 1995; Yen & Chen 1995; Marks *et al* 1996; Nemezc 2000.
- 4 Specimen No OL01: PRE 592582.0; GENSPEC No 308615.

parts of the Wolkberg. The problem is compounded by the use of unsustainable harvesting techniques. Whereas the local people carefully pick only the branches, the “foreign” pickers uproot the entire plant. Moreover, the increased harvesting frequency does not allow the plants sufficient time to recover. This clearly unsustainable practice has led to increasing scarcity of the species along the lower parts of the Wolkberg (Chaba 2000). As a result, local villagers now have to travel much higher up the mountain in order to harvest *A phylicoides*. A similar situation is developing on the Drakensberg escarpment of the Eastern Cape.⁵

Figure 1: Occurrence region of *A phylicoides*



Source: South African National Biodiversity Institute 2003

The rate at which the plant is being collected from the wild indicates that there is considerable demand for *A phylicoides* brooms in both urban and rural areas. According to literature, *A phylicoides* is also widely

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used as a medicine and is very popular as a tea (Van Wyk & Gericke 2000: 102). If this is indeed the case, there could be sufficient market demand for the plant to be considered for commercial production. This would not only provide sufficient material for the market, but would also decrease the environmental pressure presently being exerted on the species. However, before commercialisation can be considered, information is required on, among other things, the traditional use of the plant, its use in urban areas, its market potential, viable propagation techniques and its chemical and pharmacological properties. Since agronomic research and biochemical analyses are time-consuming and costly, it would be prudent to determine first whether there is a real market for the tea and the other *A phylloides* products. The purpose of this study was two-fold; to gain a better understanding of how the plant is used traditionally and to determine whether there is a demand for *A phylloides* tea and related products in urban areas.

2. Methodology

Two surveys were conducted. The aim of the first was to find out how the plant is used traditionally. The second was conducted in urban areas in order to assess how much indigenous knowledge has been retained by blacks living there and to gauge the market potential for the tea.

2.1 The rural survey

The first survey was conducted by Mr M L Chaba, a postgraduate student at the University of the North. For the sake of convenience and accessibility, an area in the western part of the Wolkberg was selected as the study area. The Mopani and Capricorn districts, which form the western-most boundary of the plant's natural habitat, are relatively close to the University of the North. The area is inhabited by Northern Sotho-speaking people.

Of the twenty villages located within this area, six were randomly selected for the survey. They were Makgeng, Thabakgone, Boyne, Mankgaile, Monywaneng and Segwashe. The location of these villages is indicated in Figure 2.

2.2 The urban survey

Gauteng is South Africa's most densely populated province and has a population of over seven million people (RSA 2000/01: 148). It also contains the largest urban black population in the country. Since the objective of this survey was to obtain information which could be used to generalise the findings to the total black population, a multi-stage sampling technique was used. The first step involved the identification of all the black residential areas in Gauteng. Thereafter, three areas were randomly selected in which to conduct the questionnaire survey: Marabastad and Mamelodi, near Pretoria, and Soweto, near Johannesburg. Since these places are inhabited by many people who have migrated from rural areas to Gauteng in search of employment, they contain a rich blend of various ethnic groups.

Before the actual survey was begun, one area (Marabastad) was randomly selected for a pilot study. Twenty respondents were interviewed. The information obtained and the respondents' comments were used to adjust and refine the questionnaire.

Data-collection was by means of structured interviews in the three urban study areas (cf Figure 2). The surveys were conducted on the main streets of the respective areas at various times of the day and different days of the week during April and May 2002. A convenient random sampling technique was used to select fifty respondents in each of the study areas. The sampling elements comprised black pedestrians and hawkers. No selection criteria such as age, ethnic group or gender were taken into account since the aim was to sample a wide cross-section of the inhabitants of the study areas. The prospective respondent were greeted, either in English or in one of the indigenous languages, and once their attention had been drawn, the purpose of the survey was briefly explained and permission requested to continue with the interview. Since *A phylloides* has different local names, dry samples of the plant were shown to respondents in order to ensure that they knew which plant was being researched. If the respondent did not know the plant, only personal information was noted, the interview terminated, and the next person approached. For those respondents who were familiar with the plant, the interviews focused on its uses (what it was used for, how it was used and prepared, why was it used and by whom), where and how it was obtained and how it compared to other commercial products.

The biographical and socio-economic attributes of the respondents were noted because, according to the literature, plant use varies among different ethnic groups (Harris & Mohammed 2003).

3. Results and discussion

3.1 The rural survey

The *A phylloides* plant is known locally as bush tea, mountain tea or Bushman's tea (Fox & Norwood Young 1982; Van Wyk & Gericke 2000). Northern Sotho-speakers call it *teyê thaba*, *teyê naga* or *motlhatlbaisha*.⁶

68 of the 92 respondents (73%) reportedly used the plant to prepare a herbal tea. In eleven of their households it is drunk every day. The popularity of the tea was ascribed to its pleasant taste and to its purported health benefits. It is most frequently consumed by older women. 37% of the respondents did not use it as a tea, either because it was too difficult to collect or because they preferred the taste of commercially produced teas. The easy accessibility of commercially produced tea as well as the "snob" value of using "European" tea may be partly responsible for this. This group consisted mainly of younger people. A number of them had, however, drunk the tea when they were children.

During autumn and early winter, the people collect the leaves and twigs of the plant from the mountain areas. Large bundles of these are tied together and taken home, where the material is placed in a dry place or hung from the roof-beams (cf Figure 3). The tea is prepared by adding a handful of broken twigs and leaves to about 1.5 litres of boiling water. This is boiled for five minutes, after which the decoction is strained and served. The beverage is usually served without milk. Sugar is added to taste but less is necessary than for other teas, since bush tea is naturally quite sweet.

6 Alternative spellings are *moblablaila* (Ziervogel & Mokgokong 1975: 396) and *moblablaisa* (Kriel 1965: 410).

Figure 3: Women in the Wolkberg district carrying bundles of *A phylicoides*



The use of the plant for making brooms is more common since all 92 respondents used *A phylicoides* brooms. Long branches are harvested, are stripped of their leaves, and the ends are bound together to make a comfortable handle. The brooms are preferred to commercially produced ones, since they are believed to be stronger and to sweep more effectively.

Although the villagers take care not to damage the plant during harvesting, this is not the case with the hired pickers from the cities, who often uproot the entire plant. According to the villagers, the plant is becoming ever less obtainable and they now have to walk up to 12 km to reach *A phylicoides* populations.

Relatively few respondents (8%) use the plant as a medicine. Those who do, use it for hypertension, heart disease and diabetes, as a “blood purifier”, for diarrhoea and vomiting, as an anthelmintic and for skin problems.

3.2 The urban survey

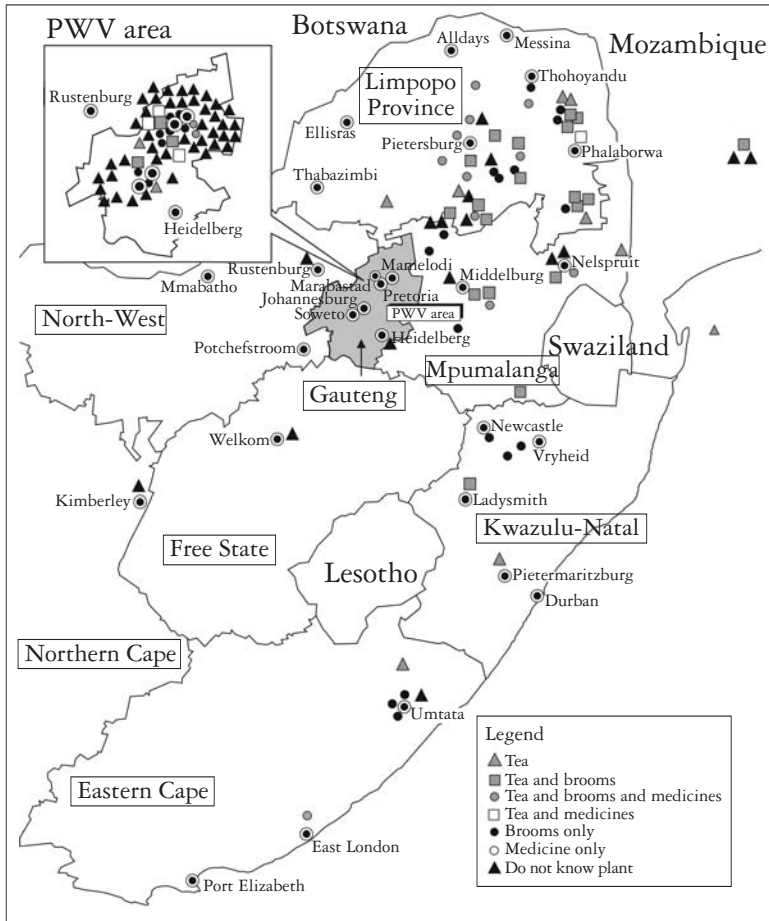
Of the 150 respondents who were interviewed in all three study areas, 82 (55%) indicated that they knew the bush tea plant and used it in different ways. These respondents originated from seven of the nine provinces of South Africa, namely, Limpopo, Mpumalanga, Gauteng, the North-West, the Free State, the Northern Cape and the Eastern Cape. They included a variety of ethnic groups including Northern Sotho, Southern Sotho, Tswana, Zulu, Ndebele, Swazi, Xhosa, Tsonga and Venda.

It was surmised that age, gender or ethnicity (in the sense of place of origin) might explain their knowledge or lack of knowledge of the plant.

Analysis of the respondents' characteristics indicated that roughly equal proportions of men and women knew and used the plant. This implied that knowledge of the plant was not influenced by gender. Age did not appear to play a role either, since 50% of respondents who knew the plant for all three uses were younger than 35, whereas respondents who knew the plant for use only as tea and brooms fell into the 30-to-41 year age group.

In an attempt to determine the role of ethnicity in indigenous knowledge, the origins of the respondents were mapped (Figure 4). The majority (63%) of respondents who did not know the plant came from the Gauteng province while 33% came from the Free State, the Northern Cape and the North-West province. This pattern is not surprising since *A phyllicoides* does not occur naturally in these areas. Only three of the 68 respondents who originated in areas where *A phyllicoides* occurs were acquainted with the plant. It is possible that these respondents might have left the rural areas so long ago that their indigenous knowledge of the plant had been lost.

Figure 4: Region of origin of respondents



By contrast, 60% of respondents familiar with the plant were not born in the study areas, but had relocated or migrated there, mostly from the Limpopo province although in a few cases from Mpumalanga, KwaZulu-Natal and the Eastern Cape. All these areas coincide with the region of natural occurrence of the plant. Those respondents who came from other areas probably obtained their knowledge of the plant from rela-

tives or friends who hailed from *A phylicoides*-growing areas or had become acquainted with it during personal visits to such areas.

As indicated earlier, *A phylicoides* is known under different names to the various ethnic groups represented in the sample. These are listed in Table 1.

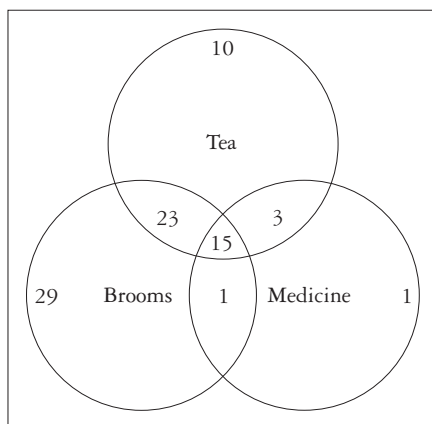
Table 1: Local names for *Athrixia phylicoides* (from survey)

Ethnic group	Name
Northern Sotho	<i>teyê thaba</i>
	<i>teyê naga</i>
	<i>molhatlbaisba</i>
Tswana	<i>teyê naga</i>
Tsonga	<i>tee ya ntaba</i>
	<i>ringana</i>
Zulu	<i>tee ya ntaba</i>
Xhosa	<i>mblongana</i>

The survey indicated that people living in urban areas also used the plant for broom, as tea and medicine. Figure 5 indicates that *A phylicoides* is most commonly used as a broom (68 of the 82 respondents). The urban respondents maintained that *A phylicoides* brooms were cheaper, lasted longer and “swept cleaner” than commercially produced ones. Brooms were usually purchased from hawkers at around R10 each.

A large proportion (56/82) of the respondents used *A phylicoides* tea, mainly because of its pleasant taste. The preparation method was the same as that used in rural areas, with a decoction rather than an infusion being brewed.

Figure 5: Number of respondents who were familiar with various plant uses



Although fewer urban black people used the plant for its medicinal properties (19/82), they claimed that a number of ailments could be treated by ingestion or application of the tea or leaves, including diabetes and stomach ailments, as well as circulation and heart problems. “Cleansing” and revitalising properties were also ascribed to the plant. External application was said to cure skin conditions such as abscesses, boils and sores.

The respondents also indicated the sources of plant material and products. About 57% of the respondents picked it themselves when visiting rural areas. At times, the entire plant is uprooted because this process is less time-consuming while the lower leafless parts of the branches and the roots make ideal handles for the broom. Figure 6 clearly shows the underground parts of the plant attached to the brooms. Obtaining plant material in this manner may have negative consequences for the continued availability and survival of the plant.

Figure 6: Brooms sold at markets⁷



Around one third of the respondents bought plant material from herbal shops and hawkers in Gauteng. Owners of herbal shops and hawkers of traditional medicines indicated that they have been selling the plant for many years. The price for 100g of plant material was around R8.

7 Note that parts of the rhizome are still attached to the brooms, indicating that the plant was uprooted when harvested.

4. Commercial potential

The discussion above clearly indicates that *A phylloides* is well known and widely used for a variety of purposes. The fact that plant material is still collected from the wild by people living in cities indicates that it is sought after and that the supply of the tea and the medicine is limited in urban areas, where it is available from herbal shops. One of the most important indications of the market potential of the tea is the fact that all 82 of the urban respondents who knew the plant indicated that they would purchase it if it were commercially available.

4.1 Potential market for *A phylloides* tea in Gauteng

The size of the potential market for *A phylloides* tea was obtained by determining the proportion of the respondents who used it relative to the size of the total sample for each ethnic group. For example, 18 of the 28 Northern Sotho-speaking people interviewed used it, and this represented 64% of Northern Sotho respondents interviewed. Since the survey was conducted in a random manner, the results could be extrapolated to the entire population of the Gauteng province. According to the census figures (*Statistics South Africa* 2001b) there were 945 657 Northern Sotho-speaking people in Gauteng in 2001. This implies that a maximum of 605 220 (64% of 945657) Northern Sotho-speakers in Gauteng may drink *A phylloides* tea if it is commercially available. Table 2 gives the proportions of *A phylloides* tea-drinkers in each of the ethnic groups surveyed and the estimated number for Gauteng.

Although it is extremely unlikely that over two million people living in Gauteng would purchase *A phylloides* tea, it can be assumed that a considerable proportion of the market would actually do so if the tea were available in supermarkets.

Table 2: Estimated size of the *A phylicoides* tea market in Gauteng

Ethnic group	% <i>A phylicoides</i> tea drinkers (per ethnic group)	Population in Gauteng (2001)*	Estimated market for <i>A phylicoides</i> tea in Gauteng
Northern Sotho	64	945 657	605 220
Tsonga	39	505 379	197 097
Swazi	50	122 560	61 280
Zulu	50	1 902 026	951 013
Tswana	4	741 218	29 648
Southern Sotho	9	1 159 587	104 362
Ndebele	12.5	171 019	21 377
Xhosa	28.5	671 046	191 248
	Total	6 218 492	2 161 245

* *Statistics South Africa* 2001b

4.2 Potential market for *A phylicoides* brooms in Gauteng

The estimated size of the *A phylicoides* broom market is given in Table 3. These values were obtained by the same calculations used in section 4.1.

Table 3: Estimated size of the *A phylicoides* broom market in Gauteng

Ethnic group	% <i>A phylicoides</i> broom users (per ethnic group)	Population in Gauteng (2001)*	Estimated market for <i>A phylicoides</i> brooms in Gauteng
Northern Sotho	61	945 657	576 850
Tsonga	42	505 379	212 259
Swati	43	122 560	52 700
Zulu	43	1 902 026	817 871
Southern Sotho	22	1 159 587	255 109
Ndebele	62.5	171 019	106 886
Xhosa	43	671 046	288 549
Tswana	48	741 218	355 784
	Total	6 218 492	2 666 008

* *Statistics South Africa* 2001b

The popularity of this type of plant use is reflected in the size of the potential market in Gauteng as shown in Table 3.

5. Summary and conclusion

This paper represents a report on the utilisation of *A phylicoides* in selected rural and urban areas. Surveys were conducted in three black residential areas in Gauteng and at six villages in the Wolkberg region of the Limpopo province. In both rural and urban areas, the plant is most often used as a broom. A relatively large proportion of respondents used it as a tea, while its use as a medicine is limited. The urban survey revealed that knowledge of the plant is confined to people originating from areas where *A phylicoides* grows naturally. A number of them still travel to the rural areas to obtain plant material, or they obtain it as a gift from friends or family living there. The Wolkberg respondents indicated that the plant is coming under increasing human pressure from unsustainable harvesting practices.

The multiplicity of uses of *A phylicoides*, the popularity of, and demand for the plant and its products in both urban and rural areas, and the respondents' willingness to purchase "bush" tea, all suggest that *A phylicoides* does have commercial development potential. Projections of the size of the potential market for *A phylicoides* tea (and *A phylicoides* brooms) among blacks in Gauteng indicate that such a project could be viable, and it would obviously be enhanced by the development of additional products or markets, including, *inter alia*, the local and international health tea markets. Additional benefits of such commercial production would include the alleviation of pressure on the plant in the wild and the creation of employment in both urban and rural areas.

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