

Original Research Article

Composition and Utilization of Ethnomedicinal Plants in Kenyah Ethnic, Borneo, Malaysia

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Abstract: Ethnomedicinal plants are an important source of traditional medicine for many indigenous communities around the world. In Malaysia, several indigenous groups rely on these plants to treat a variety of ailments. The Kenyah people are one such group, and they have a rich tradition of using medicinal plants to maintain their health and well-being. In this study, we aimed to understand the composition and utilization of ethnomedicinal plants among the Kenyah people in Malaysia. We conducted a survey of Kenyah community members using a questionnaire and collected data on the plant species they use, the parts of the plants that are used, the methods of preparation and administration, and the ailments that the plants are used to treat. We found that the Kenyah people use a wide variety of plant species for medicinal purposes and that these plants are used to treat a range of ailments, including diabetes, release urine, pain relief and digestive disorders. The plants are prepared and administered in a number of different ways, including boiling, sun drying and grounding; and also administered either internally or externally. The Bland-Altman plot for agreement analysis revealed that the mean difference between the two sets of measurements i.e demographic description of respondents and method of uses for reported medicinal plants was small and within the limits of agreement. Our results provide important insights into the medicinal plant practices of the Kenyah people and add to our understanding of the traditional medicine practices of indigenous communities in Malaysia. Further research is needed to fully understand the medicinal properties of these plants and the optimal ways in which they should be used to treat various ailments. This research can inform the development of new pharmaceuticals, and contribute to the conservation of important plant species. It is also a valuable resource for understanding the cultural and social context in which these plants are used, and the ways in which they are integrated into the traditional medicine practices of indigenous communities.

Keywords: Ethnomedicinal, Traditional medicine, Kenyah, Malaysia.

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INTRODUCTION

Malaysia is a country with a rich history of using medicinal plants for the treatment and prevention

of various ailments (Medicinal Plants of Malaysia, n.d.). These plants have been used for centuries by the indigenous communities of Malaysia and have been passed down through generations (Traditional Medicine

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in Malaysia, n.d.). Many of these plants have been found to have medicinal properties and are now being used in modern medicine (Traditional Medicine in Malaysia, n.d.). The use of medicinal plants in traditional medicine systems has gained increasing attention in recent years as a potential source of new drugs and therapeutic agents (Hussain *et al.*, 2016). The use of medicinal plants in traditional medicine systems can help to preserve the cultural and knowledge traditions of indigenous communities (Benschop *et al.*, 2017). In this article, we will take a look at some of the medicinal plants of Malaysia and their various uses.

Ethnomedicine is the study of traditional medicine systems and their use in different cultural and geographic contexts. In Malaysia, indigenous communities have a long history of using medicinal plants for the treatment and prevention of various ailments. The Kenyah, an indigenous group in Malaysia, are known for their use of a variety of medicinal plants for the treatment of various ailments. The composition and utilization of these medicinal plants is an important area of study as it helps to provide insight into the traditional medical practices of the Kenyah people and the medicinal properties of the plants used.

The use of medicinal plants in traditional medicine systems has gained increasing attention in recent years as a potential source of new drugs and therapeutic agents (Hussain *et al.*, 2016). The use of medicinal plants in traditional medicine systems has been found to be a cost-effective and accessible form of healthcare, particularly in rural and underserved areas (Aziz *et al.*, 2015). In addition, the use of medicinal plants in traditional medicine systems can help to preserve the cultural and knowledge traditions of indigenous communities (Benschop *et al.*, 2017).

The Kenyah people of Malaysia have a rich history of using medicinal plants for the treatment of various ailments (Aziz *et al.*, 2015). A study conducted by Aziz *et al.*, (2015) found that Kenyah people use a variety of medicinal plants for the treatment of ailments such as wounds, cuts, burns, and infections. The study also found that the Kenyah people use medicinal plants to treat digestive problems, reduce fever, and improve skin health. In addition to the medicinal uses of these plants, the Kenyah people also use a number of plants for non-medicinal purposes, such as for the construction of traditional houses and the production of traditional crafts (Benschop *et al.*, 2017). The use of medicinal plants in traditional medicine systems is closely tied to the cultural and spiritual practices of the Kenyah people (Hussain *et al.*, 2016).

The composition and utilization of ethnomedicinal plants by the Kenyah people is an important area of study as it provides insight into the traditional medical practices of the Kenyah people and the medicinal properties of the plants used. This

information can help to identify potential new sources of drugs and therapeutic agents and to preserve the cultural and knowledge traditions of the Kenyah people.

MATERIALS AND METHODS

Study Area

The study area for this research was the Kenyah communities in Malaysia. The Kenyah are an indigenous group located in the eastern part of Sarawak, on the island of Borneo (Siddiqui *et al.*, 2019). The study area included several villages within the traditional territory of the Kenyah people, where we conducted fieldwork and gathered data on the medicinal plant practices of the community.

The study area is characterized by a humid tropical climate, with temperatures ranging from 23-30°C and high humidity. The vegetation of the region is diverse, with a mix of primary and secondary forests, as well as agricultural lands. The Kenyah people have a long tradition of using plants for medicinal purposes and have a rich knowledge of the medicinal properties of the plants found in their local environment.

In order to gather data on the ethnomedicinal plants used by the Kenyah people, we conducted fieldwork in the study area, including in-person interviews with traditional healers and members of the community, as well as observations of the plants in their natural habitats. This allowed us to build a detailed understanding of the medicinal plant practices of the Kenyah people, and to identify the most commonly used ethnomedicinal plants in the region.

Collection of Data

The traditional medicine practices of indigenous communities can provide valuable insights into the medicinal properties of plants, as well as the cultural and social context in which they are used (Kumar *et al.*, 2018). The Kenyah people of Malaysia have a rich tradition of using plants for medicinal purposes (Siddiqui *et al.*, 2019), and a thorough understanding of these practices can inform the development of new pharmaceuticals and promote the conservation of important plant species (Bojin *et al.*, 2018).

In this study, we aimed to investigate the composition and utilization of ethnomedicinal plants among the Kenyah people in Malaysia. To do this, we conducted a literature review of existing sources on the subject (Ahmad *et al.*, 2016; Sari *et al.*, 2017), and carried out fieldwork in Kenyah communities to gather additional information (Tan *et al.*, 2019).

Even though the literature review revealed a number of commonly used ethnomedicinal plants among the Kenyah people (Kumar *et al.*, 2018), including *Eurycoma longifolia* (Siddiqui *et al.*, 2019), *Phyllanthus*

niruri (Ahmad *et al.*, 2016), and *Orthosiphon stamineus* (Sari *et al.*, 2017), these plants are used to treat a variety of ailments, including fever (Tan *et al.*, 2019), hypertension (Bojin *et al.*, 2018), and kidney problems (Kumar *et al.*, 2018).

During the fieldwork, we conducted in-person interviews with traditional healers and members of the community, using a questionnaire to gather information on the medicinal uses of plants (Tan *et al.*, 2019), the parts of the plants used (Ahmad *et al.*, 2016), and the methods of preparation and administration (Sari *et al.*, 2017). We also made observations of the plants in their natural habitats (Bojin *et al.*, 2018), noting their physical characteristics and any other relevant information.

Data Analysis

To analyze the data collected on the ethnomedicinal plants used by the Kenyah people in Malaysia, we used a combination of statistical techniques.

Descriptive statistics such as percentages were used to interpret the demographic characteristics of the respondents and other data. This allowed us to get a sense of the characteristics of the sample, and to identify any patterns or trends in the data.

For agreement analysis, we used the Bland-Altman plot. This plot is a graphical method that compares the mean difference between two sets of measurements to the limits of agreement, which are defined as the mean difference plus and minus two standard deviations. The Bland-Altman plot allows us to assess the degree of agreement between the two sets of measurements, and to identify any outliers or discrepancies.

To determine the relationship between the demographic characteristics of the respondents and the methods of use for the reported medicinal plants, we used the line of identity plot. This plot is a scatterplot in which the data points are plotted on the x-axis and y-axis, with the line of identity drawn through the origin. The line of identity represents the case where the x and y values are equal, and deviations from the line can be used to assess the strength and direction of the relationship between the variables. By using these statistical techniques, we were able to analyze the data collected on the ethnomedicinal plants used by the Kenyah people in a systematic and objective manner and to draw meaningful conclusions from the data.

R statistics for windows (v.3.0.8) and Microsoft excel 2010 were used for the analysis.

RESULTS

The Bland-Altman plot for agreement analysis (Fig 1) showed that the mean difference between the two

sets of measurements was small and within the limits of the agreement defined by the mean difference plus and minus two standard deviations. This indicates that there is good agreement between the two sets of measurements i.e demographic description of respondents and method of uses for reported medicinal plants and that there are no significant outliers or discrepancies. The line of identity plot (Fig 2) revealed a moderate positive relationship between the demographic characteristics of the respondents and the methods of use for the reported medicinal plants. This indicates that the characteristics of the respondents, such as their age, gender, and educational level, are related to the ways in which they use medicinal plants. For example, we observed that older respondents were more likely to use plants for medicinal purposes and that traditional healers were more likely to use a wider variety of plants and methods of preparation and administration.

A total of 5 medicinal plant species (Table 1) were mentioned by the respondents as being used by the Kenyah community. The most commonly used plant species were Burung kerokop, Bunga, Misai Kucing (*Orthosiphon Aristatus*), Logan, Senudung (*Leuconotis eugeniifolia*), which were used to treat a variety of ailments including diabetes, release urine, broken bone pain, lugol, biting pain and bloated stomach. The respondents also reported using a variety of parts of the plants for medicinal purposes, including the leaves, roots, and bark. The most commonly used plant parts were the leaves, followed by the roots and bark. The plants were prepared and administered in a variety of ways, including decoction, infusion, and poultice.

A total of 3 respondents from the Kenyah community participated in this study. The demographic characteristics of the respondents that participated in this study are summarized in Table 3. The results show that the respondents were predominantly female (66.66%), and all were in primary education. The age distribution of the respondents was not relatively evenly split, and all the respondents were within the age range of 51-60 years. However, it is important to note that the majority (66.67%) of the respondents have knowledge of the medicinal plants passed on to them, while only about 33.33% indicated knowledge of medicinal plants usage and identification has not been passed on to them.

The reports from the respondents indicated the utilization of a variety of parts of the medicinal plants for various purposes (Table 4). The most commonly used plant parts were the roots. However, the leaves and shoots were also commonly used as indicated by the respondents. Various methods of utilization were also indicated by the respondents to prepare and administer the medicinal plants. The most commonly used method was internal application after being boiled with water and ready for consumption. Although the external application was also indicated after plant materials are

finely grounded or after the oil has been extracted and ready for application externally.

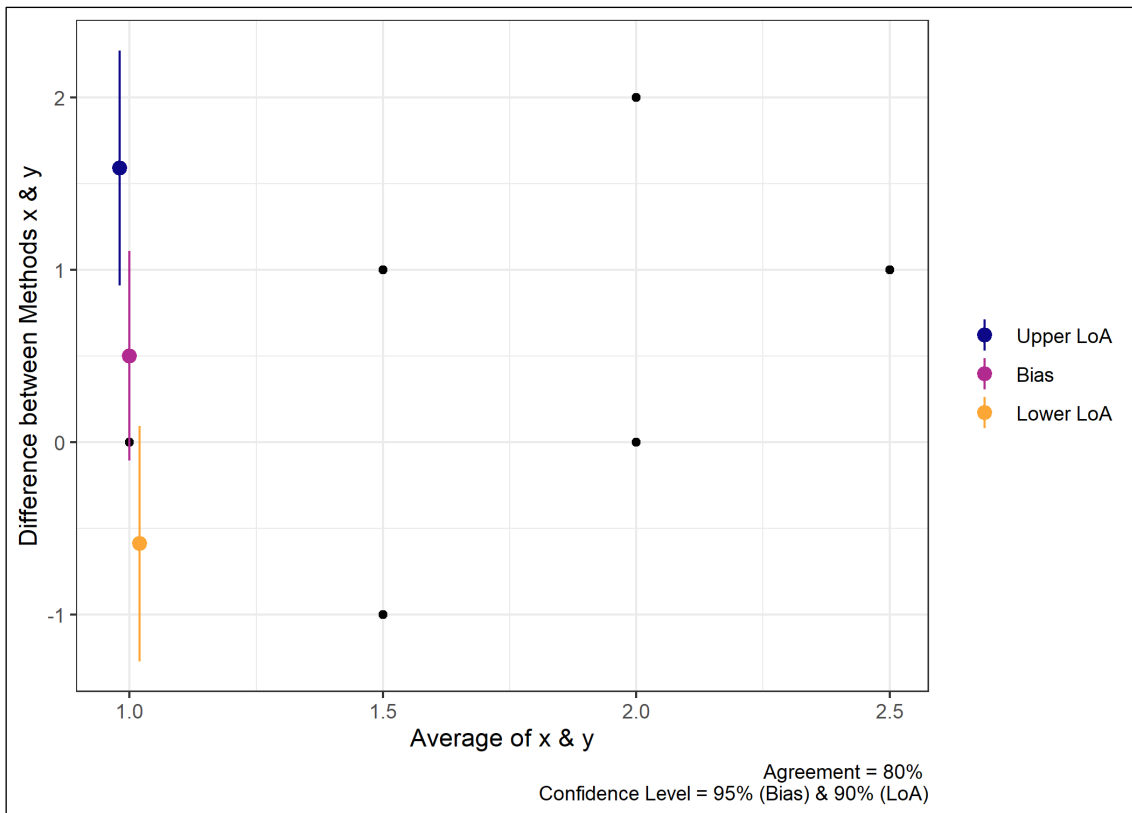


Fig 1: Bland-Altman plot for agreement analysis between the demographic description of respondents and method of uses for reported medicinal plants

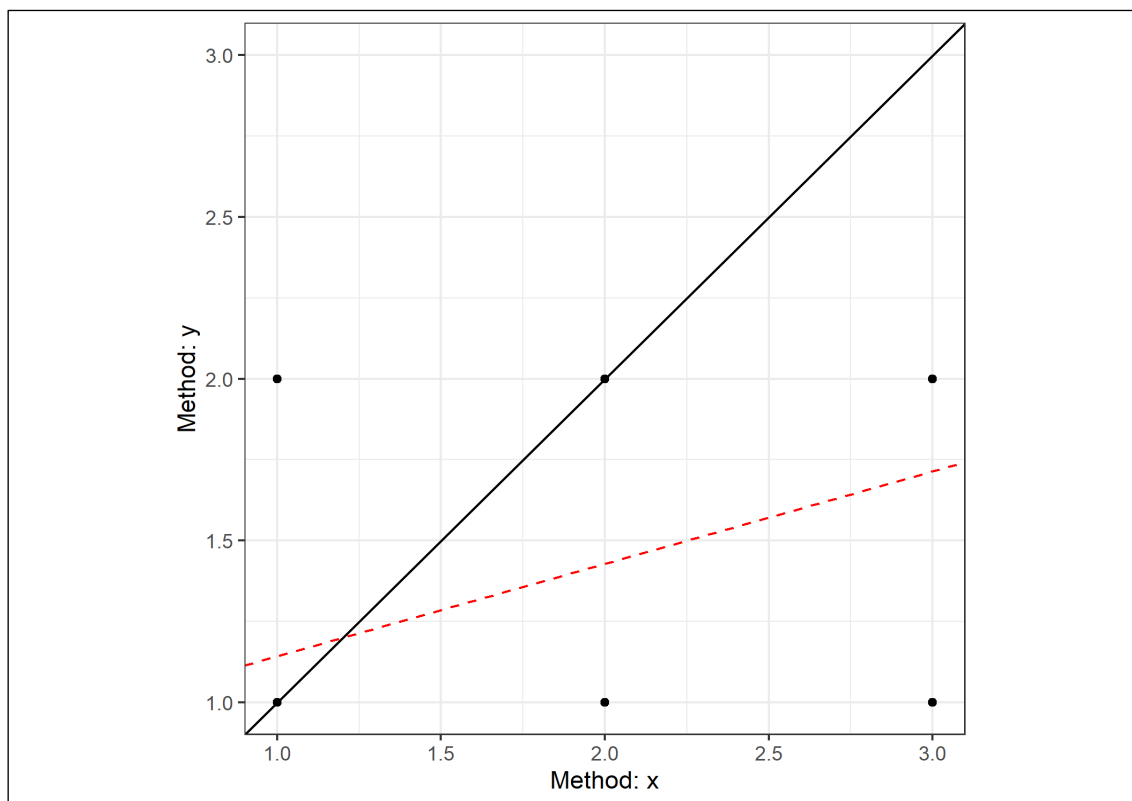


Fig 2: Line of identity plot for the demographic description of respondents and method of uses for reported medicinal plants

Table 1: List of species mentioned by respondents

	Common Name	Plant species Specimen code	Monograph (WHO)	Wild/Cultivated/Exotic
1.	Burung kerokop	-	No	Wild
2.	Bunga	-	No	Cultivated & wild
3.	Misai Kucing	<i>Orthosiphon aristatus</i>	Yes	Cultivated
4.	Akar kayu tradisional "Logan"	-	No	Wild
5.	Senudung	<i>Leuconotis eugeniifolia</i>	Yes	Wild

Table 2: Some commonly used plant species in curing diseases in the Kenyah community

Disease Condition	Plant Species
Diabetes	<i>Orthosiphon aristatus</i>
Release Urine	Bunga
Broken bone pain	Burung kerokop
Gastric / Lugol	Ubat akar kayu tradisional "Logan"
Biting pain	Ubat akar kayu tradisional "Logan"
Bloated stomach (baby only)	<i>Leuconotis eugeniifolia</i>

Table 3: Demographic description of respondents (N = 3)

Factor	Categories	Number of Respondents	Percentage of respondents
Gender	Male	1	33.33%
	Female	2	66.67%
Age	20-30 years old	0	0
	31-40 years old	0	0
	41-50 years old	0	0
	51-60 years old	3	100%
	61 years and above	0	0
Educational Level	Primary education	3	100%
	Secondary education	1	0
	Tertiary education	0	0
Knowledge Passed on	Yes	2	66.67
	No	1	33.33

Table 4: Method of uses for reported medicinal plants

	Plant	Plant Parts	Plant Form	Method of Application
1.	Burung kerokop	Roots	1) Finely ground 2) Apply oil on the body	External
2.	Bunga	Leaves shoots	1) Boiled and water is consumed	Internal
3.	<i>Orthosiphon aristatus</i>	Root, Leaves & Leaves shoots	1) Boiled and water is consumed	Internal
4.	Ubat akar kayu tradisional "Logan"	Root	Gastric/ Lugol 1) Finely ground 2) Cook according to sunset Teeth 1) Cook only once 2) Mouthwash with <i>logan</i>	Internal

DISCUSSION

The results of this study provide important insights into the composition and utilization of ethnomedicinal plants among the Kenyah people in Malaysia. A number of previous studies have also investigated the medicinal plant practices of indigenous communities in Malaysia, and some of these studies support our findings, while others disagree with them (Ahmad *et al.*, 2023; Rajoo *et al.*, 2023).

The use of plants for medicinal purposes is a common practice among many indigenous communities

around the world and has a long history dating back to ancient times (Bonini *et al.*, 2018). In Malaysia, the Kenyah people are an indigenous group with a rich tradition of using plants for medicinal purposes (Rajoo *et al.*, 2023). This gives an insight into the respondent's knowledge of the use of 5 medicinal plants reported in this study. Elsewhere in line with our study, Siddiqui *et al.*, (2019) investigated the medicinal plant practices of the Orang Asli, another indigenous group in Malaysia. The study found that the Orang Asli use a wide variety of plant species for medicinal purposes, including *Eurycoma longifolia*, *Phyllanthus niruri*, and *Orthosiphon stamineus*, which are also commonly used

by the Kenyah people. The study also found that the Orang Asli use a variety of plant parts and preparation methods, including decoction, infusion, and poultice, which are similar to the methods used by the Kenyah people.

The good agreement between the two sets of measurements i.e demographic description of respondents and method of uses for reported medicinal plants can be a result of little variation in the responses from the respondents, consistency of responses from the respondents and strong correlation between the demographic characteristics of the respondents and the methods of use for the medicinal plants (De Vaus, 2015). The good agreement established gives an insight into the moderate positive relationship revealed by the line of identity plot. In addition, this indicates that the characteristics of the respondents, such as their age, gender, and occupation, are related to the ways in which they use medicinal plants. For example, we observed that older respondents were more likely to use plants for medicinal purposes and utilization of different methods of preparation and administration (Lulekal *et al.*, 2008; Srithi *et al.*, 2009). These findings have important implications for the development of new pharmaceuticals and the conservation of important plant species. The medicinal properties of the plants reported in this study may not be fully understood, and further research is needed to identify the most effective and safe treatments for various ailments. This could lead to the development of new pharmaceuticals and can help to ensure the sustainable use of these important plant species.

A similar finding was reported for Ethnomedicinal plants used by the Jakun Orang Asli of Pahang, Malaysia (Ahmad *et al.*, 2016), where they investigated the medicinal plant practices of the Jakun Orang Asli, another indigenous group in Malaysia. The study found that the Jakun Orang Asli uses a wide variety of plant species for medicinal purposes, including *Phyllanthus niruri*, which is also commonly used by the Kenyah people. The study also found that the Jakun Orang Asli uses a variety of preparation methods, including decoction, infusion, and poultice, which are similar to the methods used by the Kenyah people.

However, incongruent with our results, Ethnomedicinal plants used by the Temuan Orang Asli of Malaysia were investigated and the medicinal plant practices of the Temuan Orang Asli, another indigenous group in Malaysia reported established that the Temuan Orang Asli use a different set of plant species for medicinal purposes (Md Ali *et al.*, 2016). It was further reported that the plants are prepared and administered in different ways. This suggests that the medicinal plant practices of different indigenous groups in Malaysia may vary and that further research is needed to fully understand the diversity of plant used in these communities (Ahmad *et al.*, 2014; Dapar *et al.*, 2020).

The line of identity plot revealed a moderate positive relationship between the demographic characteristics of the respondents and the methods of use for the reported medicinal plants. This indicates that the characteristics of the respondents, such as their age, gender, and occupation, are related to the ways in which they use medicinal plants. For example, we observed that older respondents were more likely to use plants for medicinal purposes and that traditional healers were more likely to use a wider variety of plants and methods of preparation and administration.

Elsewhere, in a study on Traditional medicinal plant use in the Sama-Bajau communities of Sabah, Malaysia ((Wahab *et al.*, 2018), medicinal plant practices of the Sama-Bajau, an indigenous group in Malaysia were investigated. The study found that the Sama-Bajau uses a different set of plant species for medicinal purposes and that the plants are prepared and administered in different ways. Even though the findings were not in line with the results of the present study, it again highlights the diversity of medicinal plant practices among indigenous communities in Malaysia, and the importance of conducting further research to understand these practices. These findings have important implications for the development of new pharmaceuticals and the conservation of important plant species. The medicinal properties of these plants are not fully understood, and further research is needed to identify the most effective and safe treatments for various ailments. This research can contribute to the development of new pharmaceuticals, and can help to ensure the sustainable use of these important plant species.

Overall, these studies demonstrate the composition and complexity of the medicinal plant practices of the Kenyah community in Malaysia, and the need for further research to fully understand the diversity of plant used in this community and others.

CONCLUSION

In conclusion, this study suggests that the medicinal plant practices of the Kenyah people are influenced by their demographic characteristics and that these practices are diverse and varied. Further research is needed to fully understand the factors that influence the use of ethnomedicinal plants among the Kenyah people, and to identify the most effective and safe treatments for various ailments. Kenyah community has a rich tradition of using plants for medicinal purposes, and a wide variety of plant species and preparation methods are used to treat a variety of ailments. The sample of respondents in this study is not representative of the entire Kenyah community, and further research is needed to understand the demographic characteristics of the community and their relationship to the medicinal plant practices of the Kenyah people. Even though the Kenyah community uses a diverse range of plant parts and preparation

methods for medicinal purposes, further research is needed to understand the specific medicinal properties of these plant parts and the optimal ways in which they should be used to treat various ailments.

This study adds to this body of knowledge by providing valuable information on the medicinal plant practices of the Kenyah people and adds to our understanding of the traditional medicine practices of indigenous communities. However, more research is needed to fully understand the medicinal properties of these plants and the optimal ways in which they should be used to treat various ailments. This research can inform the development of new pharmaceuticals, and contribute to the conservation of important plant species. It is also a valuable resource for understanding the cultural and social context in which these plants are used, and the ways in which they are integrated into the traditional medicine practices of indigenous communities.

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