

# Ethnobotany of traditional medicine in Dayak Jangkang Tribe, Sanggau District, West Kalimantan, Indonesia

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**Abstract.** *Supiandi MI, Ege B, Julung H, Zubaidah S, Mahanal S. 2021. Ethnobotany of traditional medicine in Dayak Jangkang Tribe, Sanggau District, West Kalimantan, Indonesia. Biodiversitas 22: 5417-5424.* The Dayak Jangkang tribe has local knowledge about the use of medicinal plants that have been going on for a long time. Unfortunately, the local knowledge of the Dayak Jangkang tribe is currently threatened to disappear because it is delivered orally; there are no written documents and a wasteful lifestyle. The study aimed to document traditional medicinal plants that are utilized by the Dayak Jangkang tribe. The research approach used was qualitative descriptive using the field survey. The study interviewed three informants categories, i.e., the main informant (one customary chairman), key informant (one village head), and recommended informant (eight people who were knowledgeable about medicinal plants). The data were obtained through in-depth interviews and participatory observations. Data analysis used qualitative descriptive. The study got 40 plants that are used for traditional medicine with Zingiberaceae as the most used family. The parts of plants used by the Dayak Jangkang tribe for treatments were roots, bulbs, rhizomes, stems, bark, banana hump, fruit, fruit skins, leaves, fruit, and seeds. The mode of preparation is still considered simple.

**Keywords:** Dayak, Jangkang, local knowledge, medicinal, traditional

## INTRODUCTION

West Kalimantan is the fourth largest province in Indonesia, with a population dominated by Dayak (Sardana et al. 2011; Supiandi et al. 2019). The Dayak tribe in West Kalimantan consists of 151 sub-ethnics (Alloy et al. 2008). One of them is the Dayak Jangkang tribe located in Jangkang Village, Balai Sebut Sub-district, Sanggau District. The Dayak Jangkang tribe still coexists with the forest and has a good interaction pattern with the surrounding environment. Dayak Jangkang people who live around the forest still maintain customs and traditions in utilizing forest products. Forests provide resources that the community can use as food, buildings, craft materials, natural dyes, cosmetics, and medicine (Setyawan 2010; Takoy et al. 2013; Fadilah et al. 2015; Roslinda 2016; Andesmora et al. 2017; Nurcahyani et al. 2019; Supiandi et al. 2019). It is also true that the Dayak Jangkang people use plants in the forest to meet their daily needs.

Customs and traditions in utilizing forest natural resources by certain tribes, including the Dayak Jangkang tribe, are local wisdom. Local wisdom can be interpreted as a view of life, knowledge, and various life strategies in activities carried out by local communities to answer multiple problems in meeting daily life needs (Suparmini et al. 2013). Anand et al. (2021) mentioned local wisdom is a specific practice developed in ancient times and maintained from generation to generation through knowledge, essentially limited to certain tribes, local communities, or

family lineages. Sartini (2004) also mentioned the function of local wisdom, namely: (i) for the conservation and preservation of natural resources, (ii) serves for the development of culture and science. Local knowledge related to culture for biodiversity conservation is a repository of alternative options that safeguard cultural and biological diversity (Virginia 2006). One form of local wisdom of the Dayak Jangkang tribe uses plant values as traditional medicine, food, clothing, boards, customary rituals, natural dyes, and natural pesticides.

However, socio-cultural changes threaten the local wisdom of the people in certain tribes, including the Dayak Jangkang tribe, about using plant values in everyday life. First, the threat can be in the form of consumptive forces that can erode the norms of local wisdom in the community (Suhartini 2009). Second, delivery of information about the use of plant values using only verbal communication (Yusro et al. 2014; Julung et al. 2018; Nurcahyani et al. 2019; Supiandi et al. 2019; Supiandi and Leliavia 2020), and has no written documentation (Gurib-Fakim 2006; Namsa et al. 2011; Rashid et al. 2018). Third, foreign cultural influence and forest degradation due to shifting cultivation, plantations, and forest fires (Kustiawan 2007; Setyawan 2010).

The need to study ethnobotany and local wisdom (local knowledge) becomes essential. Ethnobotanical studies play a role not only to uncover local knowledge but also have many benefits, including (i) plant conservation (Byg and Baslev 2001; Muthu et al. 2006; De la Torre et al. 2012;

Sop et al. 2012; Kewessa et al. 2015; Marin et al. 2015; Nahdi et al. 2016; Akgul et al. 2018), (ii) cultural conservation, recognition of local people's rights, traditional wisdom, and traditional knowledge (Albuquerque et al. 2006; Ajesh et al. 2012; Marin et al. 2015). The general public does not widely know Dayak Jangkang people's knowledge about medicinal plants, so research studies must be informed. This study describes local wisdom related to the ethnobotany of medicinal plants in the Dayak Jangkang tribe.

## MATERIALS AND METHODS

### Study area

The study was conducted from August 2021 to September 2021 in Kobang hamlet, Jangkang Benua Village, Sanggau District, West Kalimantan Province, Indonesia. The distance to the city of the Jangkang Subdistrict is 11 km. The road body is not entirely concrete, with a width that can only be traversed by motorcycles with hilly contours. Thus agricultural products cannot be marketed effectively. The air temperature in the Kobang hamlet ranges from 18 to 20°C due to the hills surrounded. The hamlet consists of 48 families with 177 inhabitants comprised of 102 men and 75 women. The majority of the people are indigenous Dayak Jangkang and generally work as rice and vegetable farmers (Direktorat Jenderal Kependudukan dan Pencatatan Sipil 2020).

### Data collection

The study employed a qualitative descriptive approach. This approach was used because the data obtained were descriptive in written and oral words from the Dayak Jangkang people who understand plant species for traditional medicine. We collected field data related to the medicinal plant used by the Dayak Jangkang tribe. Data were obtained from informants, events or activities, places or locations, objects, images, and recordings, as well as written or unwritten documents. The study consisted of three informants: the main informant, the key informant, and the recommended informant. The purposive sampling techniques determined the main informant. Key and recommended informants were selected using snowball sampling. Snowball sampling is an informant selection technique from previous informant recommendations (Bernard 2002). The total number of informants was ten people consisting of one customary chairman (main informant), one village head (key informant), and eight people who were willing and knowledgeable about medicinal plants (informants recommendations). We received the information through in-depth interviews. First, in-depth interviews were obtained by asking open-ended questions that allowed informants to provide broad answers (Kabir 2016). Questions were directed to reveal the life of the Dayak Jangkang community about the medicinal plants used in everyday life. The next stage continued with participatory observation, where informants and we conducted plants documentation in the Bengkawan forest

and then verified using plants of the world online (POWO 2021).

### Data analysis

Medicinal plants data were analyzed using qualitative descriptive with several stages: data collection, data reduction, presentation of data, and withdrawal of conclusions based on Miles and Huberman (2007).

## RESULTS AND DISCUSSION

### Results

The study obtained 40 plant species used as traditional medicine in the Dayak Jangkang tribe community, presented in Table 1.

Table 1 showed that the Dayak Jangkang people use plants as traditional medicine in everyday life. The community used as many as 40 plant species to treat various diseases. The use parts were roots, rhizomes, stems, leaves, seeds, and fruits. However, the Dayak Jangkang people still employed a simple way of processing plants for traditional medicine.

### Discussion

Based on in-depth interviews and participatory observations with respondents in the Dayak Jangkang tribe community obtained as many as 40 plant species were used as traditional medicine. The medicinal plants were obtained around the forest near the housing of the Dayak Jangkang tribe. The discovery of various species of medicinal plants shows that the community area still has a naturalness. According to Purwoko (2004), forests have the potential as a source of medicine. According to Simamora (2018), forests are natural resources with many benefits, including ecology, socio-culture, economy, and medicine.

The Dayak Jangkang tribe use medicinal plants derived from the families of Zingiberaceae (7 species), Lamiaceae (4 species), Piperaceae (3 species), Poaceae (3 species), Araceae (2 species), Arecaceae (2 species), Fabaceae (2 species), Lamiaceae (2 species), Myrtaceae (2 species), Rubiaceae (2 species), and the following are one species each, including Acoraceae, Annonaceae, Apocynaceae, Caricaceae, Compositae, Convolvulaceae, Cyperaceae, Dilleniaceae, Phyllanthaceae, Leguminosae, Iridaceae, Meliaceae, Malvaceae, and Musaceae. The most widely used family was Zingiberaceae. The family has many benefits for medicinal and seasoning dishes. Previous studies revealed that Zingiberaceae could be used for drugs, dyes, perfumes, and herbs (Sirirugsa 1998; Habsah et al. 2000). Laokor and Juntachai (2021) mentioned that the family has long been used in traditional medicine to treat fungal skin disorders. Zingiberaceae family contains flavonoids, saponins, and essential oils that serve as antioxidants, antibacterial, and antiinflammatory (Ozaki et al. 1991; Jitoe et al. 1994; Habsah et al. 2000; TPC 2012).

**Table 1.** The list of medicinal plants used by Dayak Jangkang communities, Sanggau District, West Kalimantan, Indonesia

Family	Local name	Scientific name	Part used	Mode of preparation	Use
Acoraceae	Jerongo	<i>Acorus calamus</i> L.	Rhizome	Mashed, mixed with water, drunk	Antidotes to poison and treat cough
Annonaceae	Nangka belanda	<i>Annona muricata</i> L.	Leaves and seeds	The leaves are boiled and drunk. Seeds are ground mixed with water and drunk.	Lower cholesterol and treat complex bowel movements
Apocynaceae	Jita	<i>Alstonia scholaris</i> (L.) R. Br.	Leaves	Pounded, drunk	Treating diarrhea
Araceae	Tungun	<i>Homalomena occulta</i> (Lour.) Schott	Tuber, leaves	Pounded, taped	Treating the bite of a venomous animal (centipede)
	Kudok betawi	<i>Xanthosoma sagittifolium</i> (L.) Schott.	Tuber	Boiled, eaten	Decrease hypertension
Arecaceae	Buntan ijau	<i>Cocos nucifera</i> L.	Fruit	Green coconut fruit that has been used as oil mixed with onions "Dayak" that have been mashed then applied	Nourishing hair
Caricaceae	Uwai	<i>Areca catechu</i> L.	Fruit	Boiled, drunk	Treating vaginal discharge
	Stela	<i>Carica papaya</i> L.	Leaves	Boiled, drunk	Treating malaria fever
Compositae	Lidah kambing	<i>Elephantopus scaber</i> L.	Leaves	Boiled, drunk	Treating malaria, headaches accompanied by fever chills
	Kidong	<i>Ipomoea batatas</i> (L.) Lam.	Leaves	Pounded, affixed to the wounded part	Treating burns
Cyperaceae	Siet	<i>Cyperus longus</i> L.	Leaves	Pounded, smeared	Treating minor injuries from sharp objects
Dilleniaceae	Pangan	<i>Dillenia suffruticosa</i> (Griff.) Martelli.	Leaves	Boiled, drunk	Facilitate breast milk and postpartum recovery
Fabaceae	Golingsang	<i>Cassia alata</i> L.	Leaves	Pounded, smeared	Treating ringworm, scabies, and <i>Pityriasis versicolor</i>
Iridaceae	Bawang ruma	<i>Eleutherine americana</i> (Aubl.) Merr. ex K. Heyne.	Tuber	Boiled and drunk or ground, taped with added green coconut oil	Treating gout
Lamiaceae	Kumis kucing	<i>Orthosiphon stamineus</i> Benth.	Leaves	Boiled, drunk	Treating kidney pain and difficulty defecating
	Berbuas	<i>Premna cordifolia</i> Roxb.	Leaves	Boiled, drunk	Treating body odor
Leguminosae	Ngarut	<i>Vitex pinnata</i> L.	Leaves	Pounded, taped	Treating headaches
	Selasih	<i>Ocimum basilicum</i> L.	Leaves, flower	Pounded, smeared	Treating <i>Pityriasis versicolor</i> , scabies, and ringworm
Meliaceae	Rohtak borobuh	<i>Psophocarpus tetragonolobus</i> (L.) DC.	Fruit	Pounded, mixed with water, dripped	Treating ears that secrete white or yellow fluid
	Rosat	<i>Lansium domesticum</i> Corrêa.	Root, leaves, stem skin, fruit skin, and seeds	Boiled, drunk	Treating headaches accompanied by malaria fever
Malvaceae	Pota pongayoh	<i>Sida rhombifolia</i> L.	Leaves	Pounded, pasted	Treating sprains
Musaceae	Koding	<i>Musa textilis</i> Née.	Hump, stem, leaves	Pounded, take water, and drop it on the wounded body	Stop bleeding from sharp object wounds and speed healing
Myrtaceae	Bungkang	<i>Syzygium polyanthum</i> (Wight.) Walp.	Leaves	Pounded mixed with water, and the water is dripped on the bodies that are sick.	Treating scabs on the skin
	Risak	<i>Rhodomyrtus tomentosa</i> (Aiton.) Hassk.	Leaves	Mashed, taped	Treating wounds and scabs
Phyllanthaceae	Cangkok	<i>Sauropus androgynus</i> (L.) Merr.	Leaves	Pounded, smeared	Treating whitish and red diseases of the baby's mouth and tongue

Piperaceae	Boik	<i>Piper betle</i> L.	Leaves	Boiled, water vapor is directed to blurred eyes or eyes soaked in boiled water that has cooled	Treating blurred eyes
	Boik remaung	<i>Piper crocatum</i> Ruiz & Pav.	Leaves	Pounded, drunk/pasted	Treating jaundice/liver/hepatitis
	Sahang	<i>Piper nigrum</i> L.	Fruit	Mashed, mixed with water, drunk	Treating colds
Poaceae	Lalang	<i>Imperata cylindrica</i> (L.) Raeusch.	Root	Pounded, smeared	Treating the throat
	Sorai	<i>Cymbopogon citratus</i> (DC.) Stapf.	Stem	Chopped, boiled, drunk	Treating cough
	Sorai wangi	<i>Cymbopogon nardus</i> (L.) Rendle.	Stem, leaves	Pounded, smeared	Treating colds
Rubiaceae	Engkudu	<i>Morinda citrifolia</i> L.	Leaves	Boiled, drunk	Treating yellow pain
	Tobang	<i>Psychotria viridis</i> Ruiz & Pav.	Leaves	Boiled, drunk	Treating stomach pain
Zingiberaceae	Bongah	<i>Curcuma domestica</i> Valetton.	Rhizome	Mashed, boiled, drunk	Treating heartburn, hepatitis, speeding up postpartum recovery, treating swelling due to impact
	Bongah raya hitam	<i>Curcuma aeruginosa</i> Roxb.	Rhizome	Mashed, boiled, drunk	Treating cough
	Bongah raya kunyit	<i>Curcuma amada</i> Roxb.	Rhizome	Mashed, boiled, drunk	Treating hepatitis
	Bongah raya putih	<i>Curcuma zedoaria</i> Roxb.	Rhizome	Mashed, boiled, drunk	Treating worms
	Longkas	<i>Alpinia galanga</i> (L.) Willd.	Rhizome	Pounded, smeared	Treating ringworm, scabies and <i>Pityriasis versicolor</i>
	Loyak joronang	<i>Zingiber officinale</i> Roscoe.	Rhizome	Pounded, mixed water, drunk	Treating swelling from injury and postpartum recovery
	Tabau	<i>Kaempferia galanga</i> L.	Rhizome	Pounded, smeared	Treating colds in babies

Dayak Jangkang people use *Alpinia galanga* for ringworm, scabies, and *Pityriasis versicolor* drugs. *Curcuma aeruginosa* for cough medicine. *Curcuma amada* for hepatitis medication. *Curcuma domestica* heartburn medication, hepatitis, accelerates postpartum recovery, treats swelling due to impact; *Curcuma zedoaria* to treat worms; *Kaempferia galanga* to treating colds in babies; and *Zingiber officinale* to treat swelling due to injury and postpartum recovery. Verma et al. (2011) revealed that *A. galanga* has been recognized for traditional medicine as antifungal, antitumor, antidiuretic, heart disease, rheumatism, chest pain, fever, diabetes, liver disease, and kidney. Reanmongkol et al. (2006) reported that *C. aeruginosa* is used as a prescription component of traditional medicine because it has antipyretic and antiinflammatory activity. Policegoudra et al. (2011) wrote that *C. amada* could cure itching, skin diseases, bronchitis, asthma, and inflammation due to injury because it has biological activities including antioxidants, antibacterial, antiinflammatory, antifungal, inhibition of platelet aggregation, and analgesics. Muniyappan and Nagarajan (2014) reported that *C. domestica* has biological activity such as antibacterial, antiinflammatory, and good antioxidants. Chen et al. (2011) reported that *C. zedoaria* could be used for traditional herbs because it presents antiangiogenic activity capable of suppressing the growth of melanoma and lung metastasis. Labrooy et al. (2018) mentioned that *K. galanga* is widely used as ethnomedicinal. John et al. (2021) reported that *Z.*

*officinale* plays a role in reducing some types of cancer, diabetes, and blood pressure because it has antiinflammatory properties.

Dayak Jangkang people also utilized plants from the Lamiaceae family for traditional medicine. The Lamiaceae family used by the Dayak Jangkang tribe were *Orthosiphon stamineus* for kidney pain drugs and difficulty defecating; *Premna cordifolia* to treat body odor; *Vitex pinnata* for headache medication; *Ocimum basilicum* to treat *Pityriasis versicolor*, scabies, and ringworm; and *Premna cordifolia* to treat inflammation, stomach upsets, wound healing, skin diseases, and immune-related diseases (Dianita and Jantan 2017). Also, *V. pinnata* for postnatal herbal baths, treating jaundice and abdominal pain (Goh et al. 2017). *Orthosiphon stamineus* contains phenolic compounds and flavonoids that serve as antioxidants, antimicrobials, and anti-proliferative (Ashraf et al. 2020) and treat glucose intolerance in pregnancy (Lokman et al. 2019). *Ocimum basilicum* contains phenolic compounds, is rich in antioxidants, has an inhibitory effect on bacterial growth (Gürkan and Adiloğlu 2021), and is used as antidiabetic (Othman et al. 2021).

The Dayak Jangkang tribe also used plants from the family Piperaceae for traditional medicine. *Piper* is an important medicinal plant used in various systems of medicine (Naim and Mahboob 2020). The species of Piperaceae are widely used for antibacterial, antifungal, and antiprotozoal (Oyededeji et al. 2005; Sauter et al. 2012). Arunachalam et al. (2020) reported that *Piper* is widely

used as a folk remedy to treat gastrointestinal, gastroprotective, and inflammatory disorders. Alves et al. (2019) said that *Piper* is popularly used to treat various health conditions such as abdominal pain, skin sores, measles, and kidney problems. The plants of the Piperaceae family used by the Dayak Jangkang tribe were *Piper betle* to treat blurred eyes, *P. crocatum* to treat jaundice/liver/hepatitis, and *P. nigrum* to treat colds.

*Piper betle* has been used as a folk remedy because it has a fabulous stimulating effect on the pancreas, improves digestion, helps cure lung diseases, and constipation (Thja et al. 2021). The plant contains bio-compounds, such as antibacterial, antiinflammatory, antioxidant, and anticancer, and has positive effects in treating diabetes and burns (Durani et al. 2017; Majumdar and Subramanian 2019). *Piper crocatum* is one of the popular traditional herbal remedies and empirically has been empirically used as an herbal remedy to treat diabetic wounds (Setyawati et al. 2021), coroner heart disease prevention, and contains biological activities as antihyperglycemic, antiproliferative, and antiinflammatory (Arbain et al. 2018). *Piper nigrum* exhibit various biological activities such as antihypertensive, antioxidant, antitumor, antiasthma, analgesic, antiinflammatory, antidiarrheal, antispasmodic, antidepressant, immunomodulator, anticonvulsant, antithyroid, antibacterial, and antifungal (Damanhoury and Ahmad 2014).

Dayak Jangkang people used plants from the Poaceae family to treat various diseases traditionally. *Imperata cylindrica* is used to treat sore throats; *Cymbopogon citratus* is used to treat cough; and *Cymbopogon nardus* is used to treat colds. Rong-hua et al. (2013) reported that *I. cylindrica* is a popular herbal remedy used as a diuretic and antiinflammatory agent. Li et al. (2021) reported that *C. citratus* is used in local and traditional medicine to treat inflammatory diseases. Kumar et al. (2021) also reported that the plant is a perennial herb that has been widely consumed for traditional medicine. Saputra et al. (2020) reported that *C. nardus* is one of the medicinal plants containing active compounds of essential oils that serve as antioxidants and antifungals.

Dayak Jangkang people also utilized plants from the Araceae family. The family contains alkaloids, flavonoids, and polyphenols (Iwashina et al. 2020). Plants within the family are rich in bioactive compounds of specific secondary metabolites such as alkaloids, flavonoids, tannins, and polyphenols. The plants contain various biological effects and are used as a traditional medicine to cure various diseases (Cahyaningsih et al. 2021; Prasathkumar et al. 2021). Alkaloids provide antioxidant, antidiabetic, antimicrobial, antiinflammatory, and anticancer (Kukulka-Koch and Widelski 2017; Singh et al. 2021). Flavonoids show excellent antifungal activity (Ahmed et al. 2017), besides tannins have antiinflammatory, and antioxidant pharmacological activity (Xiong et al. 2021). Polyphenols have biological activity for antioxidants, antiinflammatory, antimicrobial, and antidiabetics (Lescano et al. 2019). The plant species of the Araceae family used by the Dayak Jangkang tribe were *Homalomena occulta* to treat venomous animal bites and

*Xanthosoma sagittifolium* to treat hypertension. *Homalomena occulta* is used medically to treat fractures, abdominal pain, and intestinal parasites (POWO 2021). In addition, *X. sagittifolium* has antimicrobial, antioxidant, antidiabetic, and hypolipidaemic (Hossain et al. 2017).

The Dayak Jangkang tribe utilized roots, bulbs, rhizomes, stems, bark, hump, fruit, fruit skins, leaves, fruits, and seeds to treat diseases. We obtained that the Dayak Jangkang tribe utilized plant organs through traditions that have long been carried out, through previous parents orally, and even dream. According to Julung et al. (2018) and Supiandi and Leliavia (2020), public knowledge related to the use of plants for medicine is obtained from ancestors through dreams and from parents delivered orally. Garvita (2015) mentioned that the traditions and knowledge of rural local people about the use of medicinal plants could not be separated from the local culture that has been practiced for a long time.

The results of previous studies mentioned several reasons for the use of plant organs (roots, stems, leaves, flowers, fruit, seeds) in the treatment of diseases traditionally as follows. Roots have high efficacy in medicine if accompanied by certain incantations (Supiandi et al. 2020). Stems as a place of food hoarding, so that contain many substances that are good for the body (Sofiah 2014), leaves contain secondary metabolite compounds such as flavonoids, saponins, tannins, alkaloids, and morphine that serve as drugs (Lee et al. 2014; Ahmad et al. 2015). Flowers contain steroid, terpenoid, and phenolic compounds that act as antiinflammatory, antibacterial, and antimicrobial activities (Oktavia 2015). Fruit as a source of vitamins and minerals (Tarwotjo 1998), seeds containing secondary metabolite compounds of alkaloids, flavonoids, terpenoids, polyphenols, phenolic hydroquinone, and saponins (Adawiah 2016). In general, the active compounds that found in plant organs in the form of secondary metabolites could act as antiviral, anticancer, antiinflammatory, antioxidant, anti hepatotoxic, and antidiabetic (Adfa 2005).

Dayak Jangkang people employed a simple mode of preparation, i.e., pounded and smeared, pounded and taped, chopped, boiled and drunk, boiled and eaten, mashed, mixed with water and drunk, pounded, mixed with water and dripped. The reasons people use these methods are (i) not challenging to do, (ii) do not require expensive tools, (iii) the cost is cheap, (iv) anyone can do it. Previous studies also revealed that Dayak people generally process medicinal plants easily and simply (Adyana 2012; Supiandi et al. 2019). Another study reported that the way plants are used by pounding and smeared generally treats external diseases and reacts when applied to the sick part (Efremila et al. 2015). The treatment process by taping will accelerate the response of drugs in the sick body (Nurhaida et al. 2015). The boiling process can produce active substances; in other words, it can increase antioxidants activity (Uzlifah 2014). The preparation mode through boiled and then eaten generally treats internal diseases and positively impacts healing (Syah et al. 2014).

The knowledge of Dayak Jangkang people about using plants to treat various diseases needs to be practiced

continuously and passed down to the younger generation. This phenomenon is an effort to maintain local people's knowledge about medicinal plants and the cultural identity of the local community so that they will not become extinct. The effort is also part of introducing locally used medicinal plants to the broader audience because medicinal plants are valuable for people in need. Cahyaningsih et al. (2021) mentioned that medicinal plants are valid and useful.

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