**Diversity and significance of medicinal Araceae species in India: A review of their food, medicinal, and ecological aspects**

**Abstract**

Present comprehensive review & field works elucidates the multifaceted significance of medicinal Araceae species in India, encompassing their ethnobotanical, pharmacological, and ecological dimensions. A total of 24 species are systematically examined, highlighting their habit, nutritional value, therapeutic applications, and ecological roles. Our analysis reveals that these species possess diverse bioactive compounds, exhibit a range of medicinal properties, and contribute significantly to ecosystem services. This review underscores the imperative for further phytochemical, pharmacological, and ecological investigations to fully harness the potential of Araceae species, while also emphasizing the need for conservation strategies to safeguard these valuable resources for sustainable utilization.

**Keywords**: Araceae, medicinal plants, India, food, medicine, ecology, conservation

**INTRODUCTION**

The Araceae family, commonly known as the aroid family. The species of this family has been utilized for centuries in traditional medicine and as food sources (Christenhusz and Byng, 2016). India, with its rich biodiversity and ancient systems of traditional medicine (Das et al., 2022), is home to a significant number of Araceae species, many of which remain understudied. About 3500 species found in the world, the family Araceae is represented by about 25 genera and about 187 taxa in India with the greatest concentration found in Western Ghats, eastern Himalaya and North Eastern states. *Arisaema*, the species of which is commonly known as cobra-lilies, is the largest genus among the Indian Araceae, exhibiting a wide range of diversity in shape, colour and ornamentation of the spathe and also exhibits s high level of endemism in the country (Sasikala, 2019). The Araceae family is incredibly diverse, with species ranging from the familiar edible tubers of *Colocasi*a and *Amorphophallus*, to the ornamental plants like *Philodendron* and *Anthurium* (Behera et al., 2014). Many of these species have been employed in traditional Indian medicine, including Ayurveda, Unani, and Siddha, for their therapeutic properties (Swain et al., 2022). However, despite their widespread use, many of these species remain poorly documented, and their medicinal properties are not well understood. In recent years, there has been a growing interest in the medicinal properties of Araceae species, driven in part by the search for new and novel therapeutic compounds. Studies have shown that many Araceae species possess bioactive compounds with potential anti-inflammatory, antimicrobial, and antioxidant activities (Ref). However, further research is needed to fully explore the medicinal potential of these species and to ensure their safe and effective use. Present study will provide an overview of the medicinal Araceae of India, including their food values, ethnobotanical uses, and ecological significance.

**METHODOLOGY**

A thorough review was conducted through a comprehensive survey of existing literature on the food, medicinal and ecological uses of plants species belonging to Araceae family in India. A range of database including PubMed, Scopus, Web of Science, NCBI, etc. were searched using keywords such as “araceae”, “medicinal uses of araceae family”, “food values of rhiomes of araceae”, “pharmacological potential of plants belonging to araceae family”, “medicinal uses”, “bioactive compounds”, and “bioactivity” (Swain et al., 2022). Field surveys were also carried out during 2023-2024 in Odisha state, India to collect the photographs and some observation on food and ecological significances.

**RESULTS AND DISCUSSION**

The present study highlights the significance of Araceae species in India, showcasing their diverse uses as food and medicine (Table 1; Plate 1). The Table 1 revealed that several species, such as *Alocasia macrorrhizos, Amorphophallus bulbifer*, and *Colocasia esculenta*, have edible parts, including rhizomes and corms, which are consumed in various parts of India. Many of the listed species have been used in traditional medicine for various ailments, including digestive issues, respiratory problems, and skin infections. *Amorphophallus bulbifer* is used to treat piles and dysentery, while *Cryptocoryne retrospiralis* is used to treat diarrhea (Table 1). Some species, such as *Arisaema tortuosum* and *Epipremnum pinnatum*, have anti-inflammatory and antimicrobial properties (Table 1). In addition to their medicinal uses, several Araceae species have ecological significance (Table 1).

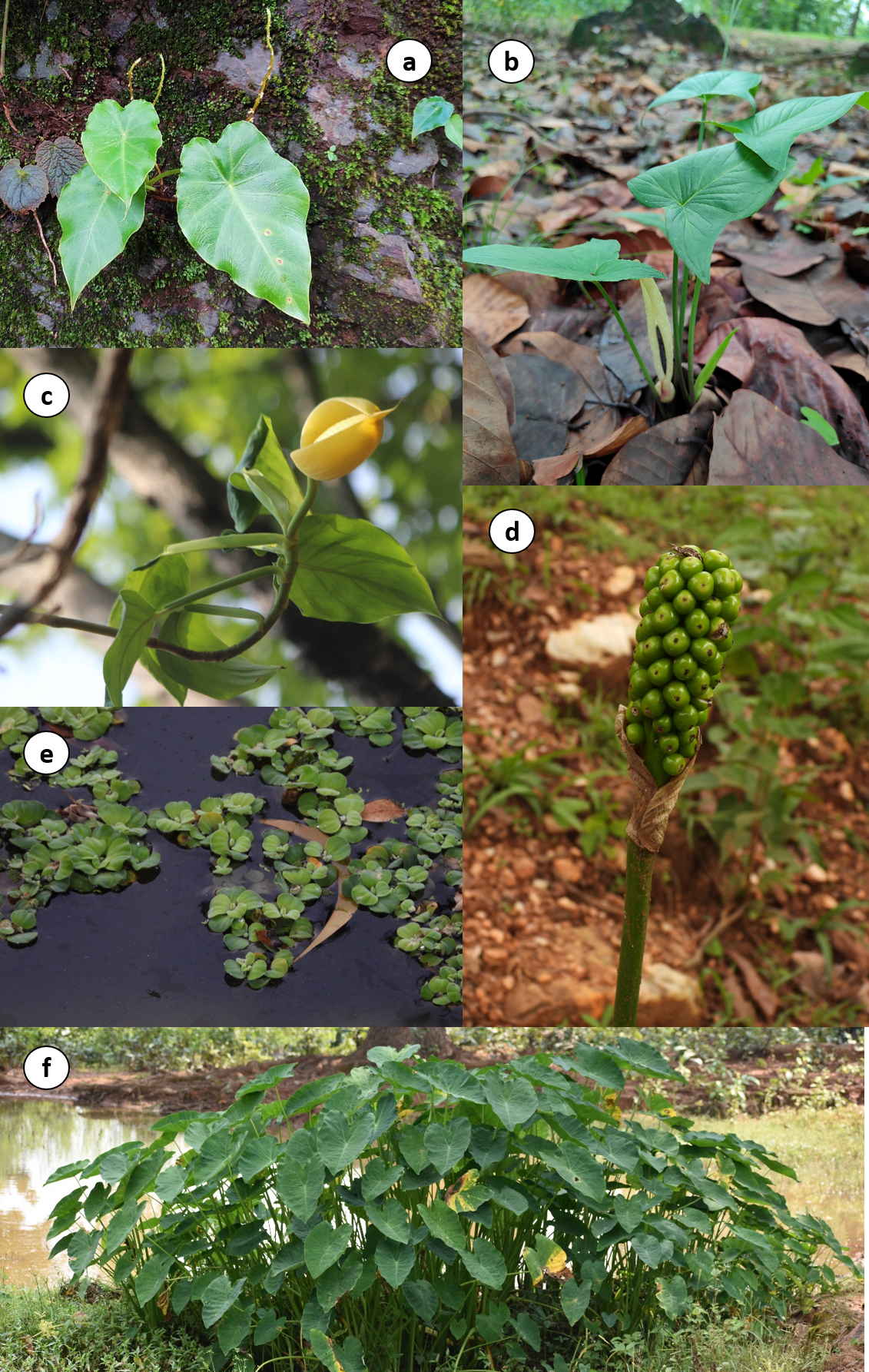


Plate 1: Some common species of Araceae of India; a) *Remusatia vivipara,* b) *Theriophonum minutum,* C) *Scindapsus officinalis,* d) *Arisaema tortuosum,* e) *Pistia stratiotes,* f) *Colocasia esculenta*

Table 1: Some common species of Araceae of India and their significances

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Habit** | **Food values** | **Medicinal use (s)** | **Ecological uses** |
| *Alocasia fornicata* (Kunth) Schott | Herb | NR/LR | Cure crack heels and prevent bleedings from cuts and wounds  (Haque et al. 2014; Karim et al. 2014) | Small birds make nest (Present study) |
| *Alocasia macrorrhizos* (L.) G.Don | Herb | Rhizomes are edible (Present study) | Treat abdominal and spleen diseases (Hridoy et al. 2024) | Sewerage treatment |
| *Amorphophallus bulbifer* (Schott) Blume | Herb | Corm is edible (Present study) | Rhizome is used to treat piles and dysentery (Reddy et al. 2012) | Create an impact on the increase in understorey plants (Wahidah et al. 2022) |
| *Amorphophallus margaritifer* (Roxb.) Kunth | Herb | NR/LR | Root paste is used to treat dysentery (Dutta 2015) | NR/LR |
| *Amorphophallus paeoniifolius* (Dennst.) Nicolson | Herb | Corm is edible (Present study) | Corm is used in treating cough, bronchitis and asthma (Dey et al. 2012) | Create an impact on the increase in understorey plants (Wahidah et al. 2022) |
| *Arisaema tortuosum* (Wall.) Schott  (Plate 1d) | Herb | NR/LR | Cure inflammation (Nile & Park 2013) | Food of frugivorous birds and porcupine (Thapa et al. 2024) |
| *Colocasia esculenta* (L.) Schott  (Plate 1f) | Herb | Rhizomes are edible (Present study) | Use to treat asthma (Baro et al. 2023) | Act as a tolerant herb |
| *Cryptocoryne ciliata* (Roxb.) Schott | Herb | NR/LR | NR/LR | NR/LR |
| *Cryptocoryne retrospiralis* (Roxb.) Kunth | Herb | NR/LR | Used in treating diarrhea (Prasad et al. 2014) | Helps to improve water quality |
| *Dieffenbachia seguine* (Jacq.) Schott | Herb | NR/LR | Use to treat haemorrhoids (Line-Edwige et al. 2009) | Use as an ornamental plant |
| *Englerarum montanum* (Roxb.) P.C.Boyce, K.Z.Hein & A.Hay | Herb | NR/LR | NR/LR | Attract pollinators and give aesthetic values |
| *Epipremnum pinnatum* (L.) Engl. | Climber | NR/LR | Cure sores and redness (Pan et al. 2019) | Helps to improve air quality as an indoor plant |
| *Lasia spinosa* (L.) Thwaites | Herb | Rhizomes are edible (Present study) | Used to treat arthritis and respiratory problems (Hossain et al. 2021) | Helps to remove common pollutant of natural water bodies |
| *Monstera deliciosa* Liebm. | Climber | NR/LR | Leaf infusion is used to cue arthritis (Sindhu et al. 2023) | Act as a air purifier |
| *Pistia stratiotes* L.  (Plate 1e) | Herb | NR/LR | Use to treat kidney problems (Tripathi et al. 2010) | Used for phytoremediation |
| *Pothos scandens* L. | Herb / Shrub | NR/LR | Used to treat diarrhea (Kim et al. 2017) | Improve air quality |
| *Remusatia vivipara* (Roxb.) Schott  (Plate 1a) | Herb | NR/LR | Used in treating reddish boils (Bhurat et al. 2021) | Home of many spiders (Present study) |
| *Rhaphidophora decursiva* (Roxb.) Schott | Climber | NR/LR | Use to treat malaria (Zhang et al. 2001) | Acts as a natural detoxifier |
| *Rhaphidophora glauca* (Wall.) Schott | Climber | NR/LR | Use to promote pregnancy (Ambu et al. 2020) | Used as both indoor and outdoor ornamental plant |
| *Rhaphidophora hookeri* Schott | Climber | NR/LR | Good for pregnant women (Ambu et al. 2020) | Improve air quality |
| *Rhaphidophora pertusa* (Roxb.) Schott | Climber | NR/LR | Use to treat bone fracture (Suneetha et al. 2011) | Use as an ornamental plant |
| *Scindapsus officinalis* (Roxb.) Schott  (Plate 1c) | Climber | NR/LR | Use in treating skin infections (Shivhare et al. 2011) | It purifies air by absorbing pollutants |
| *Theriophonum minutum* (Willd.) Baill.  (Plate 1b) | Herb | NR/LR | Cure intestinal ulcer (Bhogaonkar and Devarkar 2018) | NR/LR |
| *Typhonium trilobatum* (L.) Schott | Herb | NR/LR | Use to treat diarrhea (Ali et al. 2012) | NR/LR |

Not reported/Less reported

Some species, such as *Alocasia fornicata* and *Remusatia vivipara*, provide habitat for small birds and spiders (Table 1). Others, such as *Cryptocoryne retrospiralis* and *Pistia stratiotes*, help improve water quality and act as natural detoxifiers (Table 1). Overall, the study highlights the diverse uses and importance of Araceae species in India, ranging from food and medicine to ecological benefits. Further research is needed to fully explore the medicinal properties of these species and to ensure their safe and effective use.

**CONCLUSION**

In conclusion, present work underscores the significance of medicinal Araceae species in India, highlighting their diverse therapeutic applications, ecological importance, and cultural relevance. The findings of this study emphasize the need for further research to elucidate the phytochemical and pharmacological properties of these species, as well as their ecological roles and conservation status. To fully harness the potential of these species, interdisciplinary research collaborations and conservation efforts are essential. Present works provides a foundation for future studies aimed at unlocking the medicinal potential of Araceae species, promoting sustainable utilization, and contributing to the development of novel therapeutic agents.

**FUTURE ASPECTS**

The study of medicinal Araceae species in India is a rapidly evolving field, with many opportunities for future research and development. Some potential areas of focus are followings:

**Conservation efforts**: Many Araceae species are facing threats due to habitat loss, over-exploitation, and climate change. Conservation efforts, such as ex situ and in situ conservation, are necessary to protect these species and their habitats.

**Phytochemical analysis**: Advanced phytochemical analysis of Araceae species is needed to fully understand their medicinal properties and potential therapeutic applications. This could involve the isolation and characterization of bioactive compounds, as well as the development of new analytical methods.

**Clinical trials**: Clinical trials are necessary to fully evaluate the safety and efficacy of Araceae species for medicinal use. This could involve the development of new herbal formulations, as well as the investigation of potential interactions with conventional medications.

**Sustainable utilization**: The sustainable utilization of Araceae species is essential to ensure their long-term availability for medicinal and other purposes. This could involve the development of sustainable harvesting practices, as well as the cultivation of these species for commercial use.

**COMPETING INTERESTS DISCLAIMER:**

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

**REFERENCES**

Ali K, Ashraf A, Nath Biswas N. (2012). Analgesic, anti-inflammatory and anti-diarrheal activities of ethanolic leaf extract of *Typhonium trilobatum* L. Schott. Asian Pac Journal of Trop Biomed. 2(9):722-6. doi: 10.1016/S2221-1691(12)60217-2.

Ambu G, Chaudhary RP, Mariotti M, Cornara L. (2020). Traditional Uses of Medicinal Plants by Ethnic People in the Kavrepalanchok District, Central Nepal. Plants (Basel). 9(6):759. doi: 10.3390/plants9060759.

Baro MR, Das M, Kalita A, Das B, Sarma K. (2023). Exploring the anti-inflammatory potential of *Colocasia esculenta* root extract in in-vitro and in-vivo models of inflammation. Journal of Ethnopharmacology. 303:116021. doi: 10.1016/j.jep.2022.116021.

Behera A, Kumar S and Jena PK. (2014). Review on Amorphophallus species: important medicinal wild food crops of Odisha. International Journal of Pharmacy & Life Sciences. 5(5): 3512-3516.

Bhogaonkar PY and VD Devarkar, (2018). Anatomical characterization of *Theriophonum minutum* (Willd.) Baill. – An ethnomedicinal plant. Plant Science. 1(1): 18-24

Bhurat M, Sharma M, Budhrani A, Nagdev S, Bhurat R and Deshmukh M. (2021). A Rare Medicinal Herb *Remusatia Vivipara*. International Journal of Research in Pharmaceutical Sciences. 12(1): 203–207.

Christenhusz MJM and Byng JW. (2016). The number of known plants species in the world and its annual increase. Phytotaxa. 261 (3). 201–217. doi:10.11646/phytotaxa.261.3.1

Das L, Mishra S, Das A, Dimri R and Kumar S. (2022). Some common flora of temple city of Odisha, India: source for ethno-medico-cultural values. Indian Forester. 148(2): 207-212.

Dey YN, Ota S, Srikanth N, Jamal M, Wanjari M. (2012). A phytopharmacological review on an important medicinal plant - *Amorphophallus paeoniifolius*. Ayu. 33(1):27-32. doi: 10.4103/0974-8520.100303.

Dutta S. (2015). Traditional and folk medicinal plant and their preparation for the treatment of gastric disorders. International Journal of Multidisciplinary Educational Research. 4(7-4): 201-218.

Haque M., Jahan T., Rashid M. (2014). Antibacterial and Cytotoxic Activities of *Alocasia fornicata* (Roxb.). Int. Journal Nutr. Pharmacol. Neurol. Dis. 4 (5): 29–33. 10.4103/2231-0738.147462

Hossain R, Quispe C, Herrera-Bravo J, Islam MS, Sarkar C, Islam MT, Martorell M, Cruz-Martins N, Al-Harrasi A, Al-Rawahi A, Sharifi-Rad J, Ibrayeva M, Daştan SD, Alshehri MM, Calina D, Cho WC. (2021). *Lasia spinosa* Chemical Composition and Therapeutic Potential: A Literature-Based Review. Oxid Med Cell Longev. 2021:1602437. doi: 10.1155/2021/1602437.

Hridoy HM, Hossain MP, Ali MH, Hasan I, Uddin MB, Alam MT, Kabir SR. (2024). *Alocasia macrorrhiza* rhizome lectin inhibits growth of pathogenic bacteria and human lung cancer cell in vitro and Ehrlich ascites carcinoma cell in vivo in mice. Protein Expr Purif. 219:106484. doi: 10.1016/j.pep.2024.106484.

Karim M. R., Ferdous N., Roy N., Sharma S. C. D., Jahan M. G. S., Shovon M. S. (2014). A Study on Antidiabetic Activity of the Leaf and Stem of *Alocasia Indica* L. In Steptozotocin Induced Diabetic Rats. Int. Journal Biosci. 5 (6), 195–202. 10.12692/ijb/5.6.195-202

Kim J, Jeong SH, Lee W, Min H. (2017). In vitro anti-inflammatory activity of *Pothos scandens* extract in RAW 264.7 cells. Food Sci Biotechnol. 26(3):791-799. doi: 10.1007/s10068-017-0093-3.

Line-Edwige M, Raymond Ft, François E, Edouard NE. (2009). Antiproliferative effect of alcoholic extracts of some Gabonese medicinal plants on human colonic cancer cells. Afr Journal Tradit Complement Altern Med. 6(2):112-7. doi: 10.4314/ajtcam.v6i2.57081.

Nile SH and Park SW. (2013). HPTLC analysis, antioxidant, anti-inflammatory and antiproliferative activities of *Arisaema tortuosum* tuber extract. Pharmaceutical Biology. 52(2): 221–227.

Pan SP, Pirker T, Kunert O, Kretschmer N, Hummelbrunner S, Latkolik SL, Rappai J, Dirsch VM, Bochkov V, Bauer R. (2019). C13 Megastigmane Derivatives from *Epipremnum pinnatum:* β-Damascenone Inhibits the Expression of Pro-Inflammatory Cytokines and Leukocyte Adhesion Molecules as Well as NF-κB Signaling. Frontiers in Pharmacology. 10:1351. doi: 10.3389/fphar.2019.01351.

Prasad SK, Laloo D, Kumar R, Sahu AN and Hemalatha S. (2014). Antidiarrhoeal evaluation of rhizomes of *Cryptocoryne spiralis* Fisch. ex Wydler: Antimotility and antisecretory effects. Indian Journal of Experimental Biology 52(2): 139–114.

Reddy S.K., Kumar S.A., Kumar V.D., Ganapaty S. (2012). Anti-Inflammatory and Analgesic Activities of *Amorphophallus bulbifer* (Roxb) Kunth Whole Plant. Trop. Journal Pharm. Res. 11:971–976. doi: 10.4314/tjpr.v11i6.14.

Sasikala K. (2019). Fascicles of Flora of India: Fascicle 29: Araceae. Botanical Survey of India, West Bengal, India.

Shivhare SC, Patidar AO, Malviya KG, Shivhare-Malviya KK. (2011). Antioxidant and anticancer evaluation of *Scindapsus officinalis* (Roxb.) Schott fruits. Ayu. 32(3):388-94. doi: 10.4103/0974-8520.93921.

Sindhu DK, Ananda V, Visagaperumal D, Chandy V. (2023). Monstera deliciosa Liebem (Araceae): a review on its plant profile and pharmacological activities. International Journal for Innovative Research in Multidisciplinary Field. 9(5): 6-14.

Suneetha J, Prasanthi S, Ramarao Naidu BVA, Seetharami Reddi TVV. (2011). Indigenous phytotherapy for bone fractures from Eastern Ghats. Indian Journal of Traditional Knowledge. 10(3):550–553.

Swain J, Devi RS, Kumar S, Camelo LLA, Biswal SK and Jena PK. (2022). *Amorphophallus paeoniifolius* (Araceae): a nutraceutical for food disorders, novel bacterial & viral infections. Carpathian Journal of Food Science & Technology. 14(1): 118-136.

Tripathi P, Kumar R, Sharma AK, Mishra A, Gupta R. (2010). *Pistia stratiotes* (Jalkumbhi). Pharmacogn Rev. 4(8):153-60. doi: 10.4103/0973-7847.70909.

Wahidah BF, Afiati N and Jumari. (2022). Ecological role and potential extinction of *Amorphophallus variabilis* in Central Java, Indonesia. Biodiversitas. 23(4): 1765-1773.

Zhang HJ, Tamez PA, Vu DH, Ghee TT, Nguyen VH, Le TX, Le MH, Nguyen MC, Do TT, Soejarto DD, Fong HH, Pezzuto JM. (2001). Antimalarial compounds from *Rhaphidophora decursiva*. Journal of Natural Product. 64(6):772-7. doi: 10.1021/np010037c.