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Species of Philippine *Ardisia* Sw. (Primulaceae)

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| **Received:** 24 August 2020 | **Accepted:** 14 October 2020 |

How to cite: Molina-Magtoto L, Buot IE, Jr. 2020. Species of Philippine *Ardisia* Sw. (Primulaceae). J New Biol Rep 9(3): 289 – 298.

ABSTRACT

Ardisia Sw. is the largest genus of the family Primulaceae. Nomenclatural changes and synonymies make the genus taxonomically complex, hindering the complete revision of the genus and affecting the reliability of ethnobotanical and pharmacological studies. This study was aimed to provide a list of *Ardisia* species recorded in the Philippines along with their distribution, related ethnobotanical and pharmacological notes. The information from herbarium specimens and publications were the primary sources of nomenclatural correctness, distribution and related ethnobotanical notes. Seventy-four *Ardisia* species were recorded in the Philippines, of which 62 are endemic. Despite its diversity, only a limited number of ethnobotanical and pharmacological studies were locally conducted. It is therefore, imperative to have a systematic list of accepted species names to be used as reference for future local revision of the genus and other related studies such as the discovery of bioactive compounds.

Key words: *Ardisia*, Primulaceae, Myrsinaceae, Malesia, checklist, ethnobotany.

INTRODUCTION

With approximately 720 accepted species around the world (POWO 2019), *Ardisia* Sw. is the largest genus in the family Primulaceae. This is far more than the 235 species listed by Mez (1902) in his monograph of Myrsinaceae, which is now grouped with Primulaceae in APG III (2009). Mez (1902) grouped these species into 14 subgenera. Most of these are native in the tropics and subtropics, with approximately 300 species within the Flora Malesiana (Hu 1999). With the attempt to come up with a World Flora, several authors did some regional revisions that led to more discoveries and establishment of new subgenera, including *Scherantha* (Stone 1993) that is endemic to the Philippines.

Merrill (1923) enumerated 69 species of *Ardisia* in the Philippines, while three more species

were added after his work (Merrill 1925, Stone 1993, Stone 1994). This was updated and reduced to 56 species by Pelter et al. (2011), citing 45 endemic and 4 vulnerable. Some species names enumerated by Merrill (1923) were found to be referring to a single specimen; hence, synonyms were proposed by Hu (1999), who attributed such mistakes to studies that are based on limited materials from limited sampling areas.

The great number of names makes the genus *Ardisia* taxonomically complex. It had caused much taxonomic confusion (Hu 1999) and impedes the complete revision of the genus (Julius and Utteridge 2012). Having the correct names of plants is significant not only in the field of systematics but also in ethnobotany and medicine as different species may

have different applications and therapeutic effects. With the nomenclatural changes, previously published references on medicinal plants may not be reliable enough as main references for related pharmacological studies (Carag & Buot Jr. 2017). This problem applies to the genus *Ardisia*, as some species are known as sources of food and medicine (Kobayashi & de Mejía 2005), with increasing interest on their chemotherapeutic and chemoprevention effects (de Mejía & Ramírez-Mares 2011). This paper aims to present a list of accepted species of *Ardisia* in the Philippines as a contribution to the future revision of the genus in the country and as reference for other related studies. In addition, ethnobotanical and pharmacological notes are provided.

MATERIALS AND METHODS

The following is a list of *Ardisia* species recorded in the Philippines. This is based on the published works of Merrill (1910, 1915, 1917, 1918, 1922, 1923, 1925) and other botanists (De Candolle 1844, Mez 1902, Mez 1906, Merrill and Merritt 1910, Mez 1920, Stone 1993, Stone 1994) who previously worked on Philippine flora. In the list, species are arranged alphabetically. Nomenclatural correctness and status of each species were checked against the International Plant Names Index (2020) and the Plants of the World Online (2019). The accepted taxon name is in bold followed by the author, protologue citation and synonyms (=). The distribution of each specimen was based on the published type locality, the Plant of the World Online (2019) and/or herbarium collections that are deposited at the Philippine National Herbarium (PNH) and the University of the Philippines Los Baños (UPLB) herbaria—CAHUP and LBC. Distributions in the Philippines are indicated following the Philippine Pleistocene Aggregates Island Complexes. Reference numbers of examined specimens from the three herbaria (PNH, CAHUP and LBC) are also provided. In last, ethnobotanical purposes of some species based on herbarium notes are presented.

RESULTS AND DISCUSSION

List of *Ardisia* species recorded in the Philippines

There are 74 accepted species of *Ardisia* recorded in the Philippines. These are all native species (Fig. 1) and 62 are endemic to the country. A number of these species are known only from publications, as herbarium samples are no longer available, probably dilapidated and/or lost with the destruction of the old Philippine herbarium during the World War II.

1. *A. alvarezii* Merr., Philipp. J. Sci. 26: 484 (1925)
Distribution – Endemic to the Philippines (GREATER LUZON (Cagayan), BABUYAN ISL.)
Specimen examined – PNH 150215
2. *A. basilanensis* Merr., Philipp. J. Sci., C 12: 153 (1917)

Distribution – Endemic to the Philippines (GREATER MINDANAO (Basilan, Zamboanga))
Specimen examined – PNH 97144

3. *A. brevipetiolata* (Merr.) Merr., Enum. Philipp. Fl. Pl. 3: 256 (1923) = *A. serrata* var. *brevipetiolata* Merr.
Distribution – Endemic to the Philippines (MINDORO)
Specimens examined – PNH 3381, PNH 2000

4. *A. calavitensis* Merr., Philipp. J. Sci. 20: 423 (1922)
Distribution – Endemic to the Philippines (MINDORO)
Specimens examined – PNH (*Bursley 122*), PNH (*Ridsdale 1713*)

5. *A. castaneifolia* Mez, Pflanzenr. (Engler) 4, 236: 138 (1902)
Distribution – Endemic to the Philippines (GREATER LUZON (Bulacan))
There is no specimen in the herbaria studied.

6. *A. centenoi* S. Vidal, Sin. Gen. Pl. Leños. Filip., Atlas: 30 (1883)
Distribution – Endemic to the Philippines
There is no specimen in the herbaria studied.

7. *A. cincta* Mez, Repert. Spec. Nov. Regni Veg. 16: 312 (1920)
Distribution – Endemic to the Philippines (GREATER LUZON)
There is no specimen in the herbaria studied.

8. *A. confertiflora* Merr., Philipp. J. Sci., C 5: 213 (1910)
Distribution – Endemic to the Philippines (BATANES ISL., BABUYAN ISL., MINDORO)
Specimens examined – PNH 111104, PNH 113223, PNH 79501

9. *A. copelandii* Mez., Philipp. J. Sci. 1(Suppl. 4): 272 (1906)
Distribution – Native to the Philippines (GREATER MINDANAO (Bukidnon, Davao, Lanao), Borneo, Sulawesi)
Specimen examined – PNH 9843

10. *A. crenata* Sims, Bot. Mag. 45: t. 1950 (1817) = *A. bicolor* E. Walker, *A. crenata* var. *crenata*, *A. crenata* var. *bicolor* (E. Walker) C.Y. Wu & C. Chen, *A. crenata* f. *hortensis* (Migo) W.Z. Fang & K. Yao, *A. crenata* subsp. *mouretii* (Pit) C.M. Hu & J.E. Vidal, *A. densa* Miq., *A. elegans* Andrews, *A. konishii* Hayata, *A. kusukusensis* Hayata, *A. labordei* H. Lévl., *A. lentiginosa* Ker Gawl., *A. linangensis* C.M. Hu, *A. mouretii* Pit, *Bladhia crenata* (Sims) H. Hara, *B. elegans* (Andrews) Koidz, *B. kusukusensis* (Hayata) Nakai, *B. lentiginosa* (Ker Gawl.) Nakai, *Tinus densa* (Miq.) Kuntze.



Fig. 1. Some *Ardisia* species native to the Philippines: (A) *A. rivularis* (by M.A.K. Pranada, www.philippineplants.org); (B) *A. verrucosa* (by L. Molina-Magtoto); (C) *A. macropus* (by M.N. Tamayo); (D) *A. serrata* (by P.B. Pelsler & J.F. Barcelona, www.philippineplants.org)

Distribution – Native to the Philippines, Assam, Cambodia, China South-Central, China Southeast, Hainan, India, Japan, Korea, Laos, Malaya, Myanmar, Sri Lanka, Taiwan, Thailand, Tibet, Vietnam; Introduced into Alabama, Florida, Georgia, Hawaii, Lesser Sunda Is., Louisiana, Mauritius, New South Wales, Puerto Rico, Queensland, Réunion, Seychelles, Texas

There is no specimen in the herbaria studied.

11. *A. crispera* (Thunb.) A. DC., Trans. Linn. Soc. London 17(1): 124 (1834) = *A. crispera* f. *xanthocarpa* (Nakai) H. Ohashi, *A. dielsii* H. Lév., *A. henryi* Hemsl., *A. hortorum* Maxim., *A. multicaulis* Z.Y. Zhu, *A. simplicicaulis* Hayata, *A. undulate* C.B. Clarke, *Blaudia crispera* Thunb., *Tinus crispera* (Thunb.) Kuntze, *Tinus henryi* (Hemsl.) Kuntze, *Tinus undulate* (C.B. Clarke) Kuntze

Distribution – Native to the Philippines (GREATER LUZON (Ilocos Norte, Benguet, Mountain Province, Nueva Vizcaya, Pangasinan, Zambales), NEGROS-PANAY (Negros Oriental)), China South-Central, China Southeast, East Himalaya, Japan, Korea, Laos, Nansei-shoto, Taiwan, Vietnam, Borneo, Sumatra, Java; Introduced into Queensland and Windward Isl.

Specimens examined – PNH 6693, PNH 150623, PNH 150522

12. *A. cumingiana* A. DC., Prodr. [A.P. de Candolle] 8: 136 (1844) = *Tinus cumingiana* (A. DC.) Kuntze
Distribution: Endemic to the Philippines (GREATER LUZON (Cagayan, Ilocos Sur, Benguet, Batangas))
There is no specimen in the herbaria studied.

13. *A. curranii* Merr., Philipp. J. Sci. C 5: 214 (1910)

- Distribution: Endemic to the Philippines (GREATER LUZON (Camarines Sur))
There is no specimen in the herbaria studied.
14. *A. curtiflora* Elmer, Leafl. Philipp. Bot. 8: 2778 (1915)
Distribution: Endemic to the Philippines (GREATER MINDANAO (Agusan))
There is no specimen in the herbaria studied.
15. *A. cymosa* Blume, Bijdr. Fl. Ned. Ind. 13: 689 (1826) = *A. argenticaulis* Y.P Yang, *A. cagayanensis* Merr., *A. chinensis* Benth., *A. jaijaniensis* Z.Y. Zhu, *A. nutans* A. DC., *A. perakensis* King & Gamble, *A. singaporensis* Ridl., *A. suffruticosa* Rdl., *A. triflora* Hemsl., *A. umbrosa* Zoll. & Moritzi, *A. undulatodentata* H.R. Fletcher, *Bladhia chinensis* (Benth.) Nakai, *B. triflora* (Hemsl.) Nakai, *Tinus chinensis* (Benth.) Kuntze, *T. nutans* (A. DC.) Kuntze, *T. triflora* (Hemsl.) Kuntze
Distribution: Native to the Philippines (GREATER LUZON (Cagayan, Catanduanes)), Borneo, China South-Central, China Southeast, Jawa, Malaya, Sumatera, Taiwan, Thailand, Vietnam
There is no specimen in the herbaria studied.
16. *A. darlingii* Merr., Philipp. J. Sci., C 5: 215 (1910) = *A. gitingensis* Elmer
Distribution – Endemic to the Philippines (GREATER LUZON (Abra, Apayao, Benguet, Isabela, Laguna, Quezon, Nueva Ecija), ROMBLON ISL (Sibuyan), GREATER MINDANAO (Samar))
Specimens examined – PNH 39386, PNH 6400, PNH 89137, PNH 78204.
17. *A. diffusa* Merr., Philipp. J. Sci., C 5: 216 (1910)
Distribution – Endemic to the Philippines (GREATER MINDANAO (Misamis Oriental, Zamboanga del Norte))
Specimens examined – PNH 20340, PNH 37968, PNH 38100, PNH 38151
18. *A. disticha* A. DC., Prodr. [A.P. de Candolle] 8: 129 (1844) = *Pimelandra disticha* (A. DC.) Fern.-Vill., *Tinus disticha* (A. DC.) Kuntze
Distribution – Endemic to the Philippines
There is no specimen in the herbaria studied.
19. *A. elliptica* Thunb., Nov. Gen. Pl. [Thunberg] 8: 119 (1798) = *A. kotoensis* Hayata, *A. littoralis*, *A. sorsogonensis*, *A. squamulosa* C. Presl., *A. umbellata* Roxb., *Bladhia elliptica* (Thunb.) Nakai, *B. kotoensis* (Hayata) Nakai, *B. squamulosa* (Andrews) Nakai, *Climacandra littoralis* (Andrews) Kurz, *Icacorea humilis* Britton, *I. solanacea* Britton, *I. zeylanica* Lam. Ex Schult., *Tinus squamulosa* (C. Presl) Kuntze
Distribution – Native in the Philippines (GREATER LUZON (Laguna, Camarines Sur, Sorsogon), MINDORO, NEGROS-PANAY (Antique), GREATER MINDANAO), Bangladesh, Borneo, Cambodia, India, Jawa, Laos, Malaya, Maldives, Nansei-shoto, New Guinea, Nicobar Isl, Sri Lanka, Sulawesi, Sumatera, Taiwan, Thailand, Vietnam;
- Introduced into Bermuda, Cook Is., El Salvador, Florida, Guyana, Jamaica, Mauritius, Northern Territory, Puerto Rico, Queensland, Seychelles, Society Is., Trinidad-Tobago, Venezuela, Winwards Isl.
Specimens examined – LBC 2301, LBC 852, PNH 196587, PNH 196589
20. *A. elmeri* Mez, Philipp. J. Sci. 1 (Suppl. 4): 273 (1906)
Distribution: Endemic to the Philippines (GREATER LUZON (Benguet, Rizal, Sorsogon, Albay, Camarines Sur))
Specimens examined: PNH 18298, PNH 2825, PNH 196583
21. *A. fragrans* Elmer, Leafl. Philipp. Bot. 2: 664 (1910)
Distribution – Endemic to the Philippines (GREATER MINDANAO (Davao))
There is no specimen in the herbaria studied.
22. *A. geissanthoides* Mez, Repert. Spec. Nov. 16: 412 (1920)
Distribution: Endemic to the Philippines (GREATER LUZON (Laguna), MINDORO)
Specimen examined: LBC 8387
23. *A. glauca* Mez, Repert. Spec. Nov. Regni Veg. 16: 412 (1920) = *Icacorea glauciflora* (Mez) Britton
Distribution: Endemic to the Philippines (MINDORO)
There is no specimen in the herbaria studied.
24. *A. grandidens* Mez, Pflanzenr. (Engler) IV, 236: 137 (1902)
Distribution: Endemic to the Philippines (GREATER LUZON (Benguet, Nueva Ecija, Rizal))
There is no specimen in the herbaria studied.
25. *A. ilocana* Merr., Philipp. J. Sci. 14: 443 (1919)
Distribution: Endemic to the Philippines (GREATER LUZON (Ilocos Norte))
There is no specimen in the herbaria studied.
26. *A. iwahigensis* Elmer, Lefl. Philipp. Bot. 5: 1817 (1913)
Distribution: Endemic to the Philippines (GREATER PALAWAN)
Specimens examined: PNH 156814, PNH 156620
27. *A. keithleyi* Merr., Philipp. J. Sci., C 10: 335 (1915) = *A. oblongifolia* Merr.
Distribution: Endemic to the Philippines (NEGROS-PANAY (Negros Oriental), GREATER MINDANAO (Lanao del Sur, Agusan del Norte, Surigao del Sur, Zamboanga))
Specimens examined: LBC 1339, PNH 128254, PNH 6676, PNH 41959, PNH 86034
28. *A. laxiflora* Merr., Philipp. J. Sci., C. 12: 153 (1917)

- Distribution: Endemic to the Philippines (GREATER LUZON (Quezon), GREATER MINDANAO (Lanao del Norte))
Specimens examined: LBC 4909, LBC 8503
29. *A. leytenis* Merr., Philipp. J. Sci., C 8: 386 (1913)
Distribution: Endemic to the Philippines (GREATER MINDANAO (Leyte))
There is no specimen in the herbaria studied.
30. *A. loheri* Merr., Philipp. J. Sci., C 12:152 (1917)
Distribution: Endemic to the Philippines (GREATER LUZON (Laguna, Rizal), NEGROS-PANAY (Negros Occidental, Cebu), GREATER MINDANAO (Bukidnon))
Specimens examined: PNH 196600, PNH 9577, PNH 22014, PNH 92048
31. *A. longipetiolata* Merr., Philipp. J. Sci. 14: 444 (1919)
Distribution: Endemic to the Philippines (GREATER LUZON (Camarines))
There is no specimen in the herbaria studied.
32. *A. luzonensis* C. Presl., Reliq. Haenk. 2: 65 (1835) = *Tinus luzonensis* (C. Presl.) Kuntze
Distribution: Endemic to the Philippines (GREATER LUZON (Sorsogon))
There is no specimen in the herbaria studied.
33. *A. macgregorii* Merr., Philipp. J. Sci., C 5: 217 (1910)
Distribution: Endemic to the Philippines (GREATER LUZON (Ilocos Norte), NEGROS-PANAY (Cebu), GREATER MINDANAO (Samar))
There is no specimen in the herbaria studied.
34. *A. macropus* Mez, Repert. Spec. Nov. Regni Veg. 16: 415 (1920)
Distribution: Endemic to the Philippines (GREATER LUZON (Ilocos Norte, Bulacan, Rizal), NEGROS-PANAY (Negros Oriental))
Specimens examined: PNH 161090, PNH 11625.
35. *A. magnifica* Mez, Repert. Spec. Nov. Regni Veg. 16: 413 (1920)
Distribution: Endemic to the Philippines (GREATER PALAWAN)
There is no specimen in the herbaria studied.
36. *A. marginata* Blume, Bijdr. Fl. Ned. Ind. 13: 688 (1826) = *A. apoensis* Elmer, *A. parviflora* Blume ex Scheff., *Tinus marginata* (Blume) Kuntze
Distribution: Native to the Philippines (GREATER LUZON (Cagayan, Abra, Benguet, Rizal, Nueva Ecija, Laguna, Quezon, Camarines Norte), GREATER MINDANAO (Lanao del Sur, Davao, Biliran)), Jawa, Borneo
Specimens examined: PNH 9756, PNH 196596.
37. *A. membranifolia* Mez, Repert. Spec. Nov. Regni Veg. 16: 415 (1920)
Distribution: Endemic to the Philippines (MINDORO)
There is no specimen in the herbaria studied.
38. *A. mezii* Elmer, Leafl. Philipp. Bot. ii. 440 (1908)
Distribution: Endemic to the Philippines (GREATER LUZON (Quezon, Laguna, Sorsogon))
Specimen examined: PNH 3617.
39. *A. milleflora* Mez, Repert. Spec. Nov. Regni Veg. 16: 410 (1920)
Distribution: Endemic to the Philippines (GREATER MINDANAO (Misamis Occidental))
There is no specimen in the herbaria studied.
40. *A. mindanaensis* Mez, Pflanzenr. (Engler) Myrsin. 107 (1902)
Distribution: Endemic to the Philippines (GREATER MINDANAO (Bukidnon, Agusan del Norte, Lanao, Davao))
Specimen examined: PNH 11146, PNH 1116, PNH 10609, PNH 10151, PNH 11578.
41. *A. mirandae* Merr., Philipp. J. Sci., C 12: 154 (1917)
Distribution: Endemic to the Philippines (GREATER LUZON (Camarines Sur))
There is no specimen in the herbaria studied.
42. *A. negroensis* Mez, Repert. Spec. Nov. Regni Veg. 16: 411 (1920)
Distribution: Endemic to the Philippines (NEGROS-PANAY (Negros Occidental))
43. *A. nigromaculata* Merr., Philipp. J. Sci., C 13: 49 (1918)
Distribution: Endemic to the Philippines (GREATER LUZON (Quezon, Camarines Sur), NEGROS-PANAY (Negros Oriental, Negros Occidental))
Specimens examined: PNH 7261, PNH 21999, PNH 2862.
44. *A. ochracea* Elmer, Leafl. Philipp. Bot. 5: 1819 (1913) = *Kokoona ochracea* Merr.
Distribution: Endemic to the Philippines (GREATER PALAWAN)
There is no specimen in the herbaria studied.
45. *A. oreophila* C.M. Hu, Blumea 47(3): 496 (2002)
Distribution: Endemic to the Philippines
There is no specimen in the herbaria studied.
46. *A. palawanensis* Merr., Philipp. J. Sci., C 5: 220 (1910)
Distribution: Endemic to the Philippines (GREATER PALAWAN)
Specimen examined: PNH 12336.
47. *A. pirifolia* Mez, Pflanzenr. (Engler) 4, 235: 129 (1902)
Distribution: Endemic to the Philippines (GREATER LUZON (Quezon, Rizal, Aurora, La Union))
There is no specimen in the herbaria studied.

48. *A. polysticta* Miq., Fl. Ned. Ind., Eerste Bijv. 3: 576 (1861) = *A. evonymifolia* Pit., *A. jagorii* Mez, *A. lenticellata* H.R. Fletcher, *A. maculosa* Mez., *A. nemorosa* Pit., *A. oldhamii* Mez, *A. pardalina* Mez, *A. patens* Mez, *A. perpunctata* Elmer ex Merr., *A. radians* Hemsl. & Mez, *A. ramosii* Merr., *A. rectangularis* Hayata, *A. sinuato-crenata* Mez, *A. stellifera* Pit., *A. tonkinensis* Aug. DC., *A. virens* Kurz, *Bladhia virens* (Kurz) Nakai, *Tinus polysticta* (Miq.) Kuntze, *Tinus virens* (Kurz) Kuntze
Distribution: Native to the Philippines (GREATER LUZON (Cagayan, Ilocos Norte, Mountain Province, Benguet, Nueva Vizcaya, Rizal, Bataan, Laguna, Camarines, Albay, Sorsogon), MINDORO, NEGROS-PANAY (Panay), GREATER MINDANAO (Biliran Isl, Leyte, Samar, Bukidnon)), Assam, Bangladesh, Borneo, Cambodia, China South-Central, China Southeast, Hainan, Laos, Malaya, Myanmar, Sumatera, Taiwan, Thailand, Vietnam
Specimens examined: CAHUP 62526, LBC 7291, PNH 1839, PNH 3616, PNH 1831, PNH 9998, PNH 4309, PNH 166599, PNH 35570.
49. *A. pulchella* Mez, Repert. Spec. Nov. Regni Veg. 16: 410 (1920)
Distribution: Endemic to the Philippines (GREATER LUZON (Benguet, Mountain Province)
Specimens examined: PNH 7713, PNH 92373.
50. *A. purpurea* Reinw. ex Blume, Bijdr. Fl. Ned. Ind.: 684 (1826) = *A. boissieri* A. DC., *A. clementis* Elmer, *A. hasseltii* Blume ex Scheff., *A. lanaensis* Mez, *A. lanceolata* Roxb., *A. lanceolata* var. *asahanensis* C.M. Hu, *A. leschenaultii* A. DC., *A. mucronata* Blume, *A. plagioneura* Scheff., *A. sarasinii* Mez, *A. speciosa* Blume, *A. sumbavana* Miq., *A. tenuiramis* Miq., *Tinus lanceolata* Kuntze, *T. plagioneura* (Scheff.) Kuntze, *T. sumbavana* (Miq.) Kuntze, *T. tenuiramis* (Miq.) Kuntze
Distribution: Native to the Philippines (GREATER LUZON (Sorsogon), GREATER MINDANAO (Lanao del Sur, Davao, Zamboanga, Basilan)), Borneo, Jawa, Lesser Sunda Isl., Malaya, Sulawesi, Sumatera, Thailand
Specimens examined: PNH 196586, PNH 1044.
51. *A. pusilla* A. DC., Trans. Linn. Soc. London 17(1): 126 (1834) = *A. villosa* (Thunb.) Mez, *Bladhia villosa* Thunb.
Distribution: Native to the Philippines, China South-Central, China Southeast, Japan, Korea, Nansei-shoto, Taiwan, Thailand
There is no specimen in the herbaria studied.
52. *A. pyramidalis* (Cav.) Pers., Syn. Pl. 1: 233 (1805) = *A. perrottetiana* A. DC.
Distribution: Native to the Philippines. Introduced into Brazil.
Specimen examined: PNH 196592, PNH 196593, LBC 4993, LBC 6248, CAHUP 2119, CAHUP 19802.
53. *A. racemoso-paniculata* Mez, Philipp. J. Sci. 1 (Suppl. 4): 273 (1906)
Distribution: Endemic to the Philippines (GREATER MINDANAO (Davao, Surigao del Norte))
Specimen examined: PNH 10478.
54. *A. reptans* Merr., Philipp. J. Sci., C 5: 220 (1910)
Distribution: Endemic to the Philippines (GREATER LUZON (Pampanga)
There is no specimen in the herbaria studied.
55. *A. reynosoi* B.C. Stone, Sida 16(2): 263 (1994)
Distribution: Endemic to the Philippines (ROMBLON ISL.)
There is no specimen in the herbaria studied.
56. *A. rivularis* Merr., Philipp. J. Sci., C 13: 50 (1918)
Distribution: Endemic to the Philippines (GREATER LUZON (Quezon)
There is no specimen in the herbaria studied.
57. *A. romanii* Elmer, Leaflet Philipp. Bot. 5: 1820 (1913)
Distribution: Endemic to the Philippines (GREATER PALAWAN)
Specimens examined: PNH 226, PNH 12337.
58. *A. saligna* Mez, Pflanzenr. (Engler) IV, 236: 143 (1902)
Distribution: Endemic to the Philippines (GREATER LUZON (Ilocos Norte, Abra, Benguet, Quezon, Nueva Ecija, Bataan, Bulacan, Batangas, Rizal, Cavite, Laguna), NEGROS-PANAY (Negros Oriental)
Specimens examined: PNH 6673, PNH 17919, PNH 21664, PNH 171102.
59. *A. samarensis* Merr., Philipp. J. Sci., C 12: 151 (1917)
Distribution: Endemic to the Philippines (GREATER MINDANAO (Samar)
Specimens examined: PNH 165649, PNH 117569
60. *A. scabrida* Mez, Pflanzenr. (Engler), IV, 236: 118 (1902)
Distribution: Endemic to the Philippines (NEGROS-PANAY (Negros), GREATER MINDANAO (Misamis, Bukidnon, Davao), CAMIGUIN, GREATER SULU).
There is no specimen in the herbaria studied.
61. *A. scalaris* Mez, Pflanzenr. (Engler) IV, 236: 142 (1902)
Distribution: Endemic to the Philippines (GREATER LUZON (Rizal, Quezon)
There is no specimen in the herbaria studied.
62. *A. serrata* (Cav.) Pers., Syn. Pl. [Persoon] 1: 233 (1805) = *A. abanii* B.C. Stone, *A. angustifolia* A. DC., *A. curtipes* Merr., *A. dataensis* Mez, *A. mindorensis* Merr., *A. oligocarpa* Merr., *A. whitfordii* Mez, *Anguillaria pyramidalis* Cav., *A. serrata* Cav., *Tinus*

- candolleana* Kuntze, *T. pyramidalis* (Cav.) Kuntze, *T. serrata* (Cav.) Kuntze.
Distribution – Native to the Philippines (GREATER LUZON (Cagayan, Apayao, Benguet, Mountain Province, Ifugao, Laguna, Rizal, Quezon, Zambales), GREATER PALAWAN, MINDORO, GREATER MINDANAO (Biliran, Leyte, Samar), NEGROS-PANAY (Panay)), Borneo, Jawa
Specimens examined – PNH 1849, PNH 7480, PNH 14923, PNH 168419, CAHUP 60312.
63. *A. sibulanensis* Elmer, Leafl. Philipp. Bot. 2: 661 (1910)
Distribution: Endemic to the Philippines
There is no specimen in the herbaria studied.
64. *A. sibuyanensis* Elmer, Leafl. Philipp. Bot 4: 1497 (1912)
Distribution: Endemic to the Philippines (ROMBLON ISL. (Sibuyan))
There is no specimen in the herbaria studied.
65. *A. stichantha* B.C. Stone, Pacific Sci. 47(3): 290 (1993)
Distribution: Endemic to the Philippines
There is no specimen in the herbaria studied.
66. *A. sulcata* Mez, Pflanzenr. (Engler), IV, 236: 112 (1902)
Distribution: Endemic to the Philippines (GREATER LUZON (Cagayan, Apayao, Quezon, Camarines Sur), GREATER MINDANAO (Biliran Isl, Samar, Leyte))
Specimens examined: CAHUP 61495, PNH 21510.
67. *A. tayabensis* Merr., Philipp. J. Sci., C 12: 156 (1917)
Distribution: Endemic to the Philippines (GREATER LUZON (Quezon))
There is no specimen in the herbaria studied.
68. *A. taytayensis* Merr., J. Arnold Arbor. 35: 148 (1954)
Distribution: Endemic to the Philippines (GREATER PALAWAN)
There is no specimen in the herbaria studied.
69. *A. tomentosa* C. Presl, Reliq. Haenk. II. 66 = *A. cuprea* Elmer, *A. peninsula* Elmer, *A. philippinensis* A. DC., *Tinus philippinensis* (A. DC.) Kuntze, *T. tomentosa* (C. Presl) Kuntze
Distribution: Native to the Philippines (GREATER LUZON (Ilocos Norte, Benguet, Isabela, Nueva Ecija, Bulacan, Zambales, Rizal, Laguna, Batangas, Albay, Camarines Sur), NEGROS-PANAY (Panay), GREATER MINDANAO (Agusan, Surigao)), Borneo
Specimens examined: PNH 128314, PNH 6136, PNH 78313, PNH 2878.
70. *A. verrucosa* C. Presl, Reliq. Haenk. 2: 65 (1835) = *Tinus verrucosa* (C. Presl.) Kuntze
Distribution: Endemic to the Philippines (GREATER LUZON (Ilocos Norte, Cavite, Pangasinan, Batangas, Quezon, Sorsogon, Zambales), MINDORO, GREATER PALAWAN, NEGROS-PANAY (Panay), GREATER MINDANAO (Surigao del Norte))
Specimens examined: PNH 91466, PNH 10367, PNH 4754.
71. *A. villosa* Roxb., Fl. Ind. 2: 274 (1824) = *A. coccinea* Jungh., *A. dolichosepala* Merr., *A. dumetosa* Tucher, *A. glabrata* Blume, *A. mollis* Blume, *A. rabii* H.R. Fletcher, *A. tavoyana* A. DC., *A. tawaensis* Masam., *A. trichocarpa* Merr., *A. vestita* Wall.
Distribution: Native to the Philippines, Borneo, Cambodia, China South-Central, China Southeast, Hainan, Jawa, Laos, Malaya, Myanmar, Sumatera, Taiwan, Thailand, Vietnam
There is no specimen in the herbaria studied.
72. *A. warburgiana* Mez, Pflanzenr. (Engler) IV, 236: 143 (1902) = *A. proteifolia* Mez
Distribution: Endemic to the Philippines (GREATER LUZON (Apayao, Cagayan, Isabela, Benguet, Pampanga, Zambales, Sorsogon), MINDORO, NEGROS-PANAY (Panay), GREATER MINDANAO (Agusan, Bukidnon, Lanao, Davao, Samar))
Specimens examined: PNH 19764, PNH 78179, PNH 4823, PNH 196585.
73. *A. yatesii* Merr., Philipp. J. Sci., C 12: 155 (1917)
Distribution: Endemic to the Philippines (GREATER LUZON (Quezon))
There is no specimen in the herbaria studied.
74. *A. zambalensis* Merr., Philipp. J. Sci., C 10: 334 (1915) = *A. biflora* Merr.
Distribution: Endemic to the Philippines (GREATER LUZON (Zambales))
There is no specimen in the herbaria studied.

Several species are documented only with limited early herbarium collections and no recent collection and/or reports available. For instance, samples of *A. warburgiana* were collected from as early as 1916 (Merrill 16471, PNH 196585) while the latest is in 1961 (Gutierrez 61-195, PNH 78179). From the 383 collections that were examined, the oldest collection is by Merrill in 1911 (PNH 196592), labeled as *A. perrottetiana* but was determined by J. Pipoly in 2006 as *A. pyramidalis*. In UPLB, the oldest collection is by F.C. Gates in 1913 (CAHUP 2119), also labeled as *A. perrottetiana* but was determined by J.S. Panelo in 1968 as *A. pyramidalis*. A lot of collections deposited in UPLB are unidentified, probably due to the complexity of the genus and its diversity in the country. Some species descriptions are also overlapping, such as the case of *A. squamulosa*, *A. verrucosa* and *A. elliptica*. This present status of *Ardisia* documentations in the country needs to be updated with more present-day collections adopting the most recent nomenclature.

Ethnobotanical uses and medicinal properties of Philippine *Ardisia* species

Some herbarium collections included notes on the species' ethnobotanical uses. The ripened fruits of *Ardisia crispa* (PNH 150522), *A. elliptica* (PNH 39168, as *A. squamulosa*) and *A. polysticta* (PNH 166599, PNH 35570) are edible. Fruits of *A. elliptica* are also used for flavoring (LBC 3979, as *A. squamulosa*) while its stems are used as firewood and house posts (PNH 41728). Similarly, the stems of *A. pyramidalis* are used as firewood and as source of timber (CAHUP 10638, CAHUP 19802) in addition to being cultivated as an ornamental (CAHUP 51747, CAHUP 10526, CAHUP 5637, CAHUP 10549, LBC

6248). Boiled roots of *A. diffusa* are also noted as treatment for asthma (PNH 38100).

A few ethnobotanical literatures cited the use of *Ardisia* species in the Philippines. *Ardisia confertiflora* has horticultural potential (Madulid and Ago 2009) while the ash of its leaves, mixed with coconut oil, is used as treatment for skin eruptions (Abe & Ohtani 2013). *Ardisia elliptica* is reported to treat wounds (Carag and Buot Jr. 2017).

Despite the diversity of *Ardisia* species in the country, only a limited number of species has been pharmacologically studied, and this includes *A. iwahigensis*, *A. elliptica* (as *A. squamulosa*) and *A. pyramidalis* (Table 1).

Table 1. Pharmacological properties of *Ardisia* species that are recorded in the Philippines.

Species	Part used	Pharmacological Property	Reference
<i>Ardisia crenata</i>	Root	cAMP phosphodiesterase inhibition	Jia et al. (1994)
		Cytotoxic	Zheng et al. (2008)
	Unknown	Antithrombin activity	Chistokhodova et al. (2001)
	Whole plant	Vasorelaxant	Zaima et al. (2013)
	Leaf	Cytotoxic and topoisomerase II catalytic inhibition	Newell et al. (2010)
Unknown	Apoptosis and microtubule-disassembly induction	Li et al. (2008)	
<i>Ardisia crispa</i>	Unknown	Antimetastatic	Kang et al. (2001)
	Root	Anti-inflammatory and anti-hyperalgesic	Roslida & Kim (2008)
		Antitumor	Roslida et al. (2011)
	Chemopreventive	Roslida et al. (2013)	
<i>Ardisia cymosa</i>	Whole plant	Antiviral (as <i>A. chinensis</i>)	Su et al. (2006)
<i>Ardisia elliptica</i>	Leaf	Sperm count reduction	Raga et al. (2011a)
		Platelet aggregation inhibition	Ching et al. (2010)
	Stem and leaf	Anti-adenovirus (as <i>A. squamulosa</i>)	Chiang et al. (2003)
		Anti- <i>Salmonella</i>	Phadungkit & Luanratana (2006)
Fruit	Anti-proliferative effect against HCT-116 cells	Ondee et al. (2020)	
<i>A. iwahigensis</i>	Stem and leaf	Cytotoxic	Horgen et al. (1997)
<i>A. pusilla</i>	Unknown	Apoptosis induction	Zhang et al. (2010)
	Whole plant	Cytotoxic	Tang et al. (2009)
<i>A. pyramidalis</i>	Leaf	Anti-angiogenic	Raga et al. (2011b)
		Anti-angiogenic	Herrera & Amor (2011)

With the potential of *Ardisia* as source of food and bioactive compounds, it is imperative to have a reliable identification and naming of the species. The taxonomic confusions are exacerbated by the fact that *Ardisia* species are identified into a number of vernacular names around the country, such as “katagpo” (Tag.), “bahagion” (Bisaya) and “kolen” (Iloko) for *A. elliptica* (as *A. squamulosa*), one of the

most studied species in terms of its medicinal properties (Lim 2012).

CONCLUSION

Seventy-four accepted species of *Ardisia* are recorded so far in the Philippines, and most of these are endemic to the country. Recent taxonomic treatments

within the region resulted in the establishment of synonyms. It is noted, however, that these treatments rely on preserved specimens, some of which do not represent the entire plant and/or are collected from limited areas. With the growing interest on *Ardisia* as source of bioactive compounds, it is therefore necessary to come up with an updated list of species based on current treatments coupled with samples newly collected from different areas in the country, especially type localities. This will also lead to updating the current conservation status of *Ardisia* species in the country.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the assistance provided by the herbaria personnel - Prof. Annalee S. Hadsall (CAHUP), Ms. Michelle D. Alejado (CAHUP), Mr. Ariel Laroya (LBC), For. John Rey Callado (PNH), Ms. Sheila Marey Librao (PNH) and Dr. Luisito T. Evangelista (PNH). The authors are also thankful to Dr. Pieter Pelser, Mr. Mac Andrew Pranada and Mr. Maverick Tamayo for allowing us to use their photos. The first author also acknowledges the University of the Philippines Faculty, REPS and Administrative Staff Development Program for her fellowship grant.

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