



ALIEN FLORA OF SUMATRA I: TEN NEW RECORDS

Wendy A. Mustaqim^{1*}, Andri Y. Persada¹, Herlina P.E. Sari¹, Kartika A. Putri¹ & Muhammad R. Hariri²

¹Program Studi Biologi, Fakultas Teknik, Universitas Samudra, Jl. Prof. Dr. Syarif Thayeb, Meurandeh, Langsa Lama, Langsa, Aceh 24416, Indonesia

²Research Center for Plant Conservation and Botanic Gardens - National Research and Innovation Agency, Jl. Ir. H. Juanda No. 13, Bogor 16612, Indonesia

Correspondence: wamustaqim@unsam.ac.id

Wendy A. Mustaqim, Andri Y. Persada, Herlina P.E. Sari, Kartika A. Putri & Muhammad R. Hariri. 2022. Flora Asing Sumatra I: Sepuluh Catatan Baru. *Floribunda* 6(8): 279–287 — Keanekaragaman tumbuhan di Sumatra dapat dikatakan kurang diketahui, tidak hanya untuk spesies asli, namun juga spesies tidak asli atau asing. Baru-baru ini, beberapa catatan baru tumbuhan asing telah ditambahkan ke flora Sumatra. Eksplorasi dilakukan untuk mencari spesies asing yang belum terdokumentasikan di Kota Langsa, Provinsi Aceh dan Kabupaten Ogan Komering Ulu, Provinsi Sumatra Selatan. Hasil menunjukkan adanya 10 tambahan catatan baru untuk tumbuhan asing di Sumatra: *Acalypha herzogiana* (Euphorbiaceae), *Coccinia grandis* (Cucurbitaceae), *Coleus monostachyus* (Lamiaceae), *Crossandra infundibuliformis* (Acanthaceae), *Ficus natalensis* subsp. *leprieurii* (Moraceae), *Melaleuca linariifolia* (Myrtaceae), *Ochna thomasiana* (Ochnaceae), *Ruellia simplex* (Acanthaceae), *Solanum diphyllum* (Solanaceae), dan *Wrightia antidysenterica* (Apocynaceae). Dua di antaranya (*C. monostachyus* dan *S. diphyllum*) telah ternaturalisasi, sedangkan spesies-spesies lainnya ditanam atau tinggalan. Sepuluh spesies tersebut disusun dalam daftar, didiskusikan, dan dilengkapi dengan foto untuk memandu identifikasi.

Kata kunci: Aceh, Sumatra, ternaturalisasi, tumbuhan asing.

Wendy A. Mustaqim, Andri Y. Persada, Herlina P.E. Sari, Kartika A. Putri & Muhammad R. Hariri. 2022. Alien Flora of Sumatra I: Ten New Records. *Floribunda* 6(8): 279–287 — The diversity of plants in Sumatra can be considered poorly known for the native species and the alien or non-native species. Recently, some new records of alien plant species have been added to the flora of Sumatra. Explorations were conducted to look for another undocumented alien plant species in this island in Langsa City, Aceh Province and Ogan Komering Ulu Regency, Sumatra Selatan Province. The results showed ten additional records of alien plants for Sumatra: *Acalypha herzogiana* (Euphorbiaceae), *Coccinia grandis* (Cucurbitaceae), *Coleus monostachyus* (Lamiaceae), *Crossandra infundibuliformis* (Acanthaceae), *Ficus natalensis* subsp. *leprieurii* (Moraceae), *Melaleuca linariifolia* (Myrtaceae), *Ochna thomasiana* (Ochnaceae), *Ruellia simplex* (Acanthaceae), *Solanum diphyllum* (Solanaceae), and *Wrightia antidysenterica* (Apocynaceae). Two of them (*C. monostachyus* and *S. diphyllum*) are already naturalized while others are in cultivation, or a few of them relicts of it. All species are listed, discussed, and provided with photographs to aid identification.

Keywords: Aceh, alien plants, naturalized, Sumatra.

Sumatra has a rich plant diversity and it is estimated that 8391 species occur on this island, with around 22 percent of them being endemics (Middleton *et al.* 2019). Many plant groups have a center of diversity in Sumatra, for instance, *Impatiens* Riv. ex L. (Balsaminaceae) (Grey-Wilson 1989), *Nepenthes* L. (Nepenthaceae) (Cheek & Jebb 2001), and *Rafflesia* R.Br. ex Gray (Rafflesiaceae) (Susatya 2001). Despite having a high number of plant species, Sumatra still has one of the lowest collection density indexes compared to

other regions in Indonesia (Middleton *et al.* 2019). This situation led to poor knowledge of the flora of Sumatra.

The poor data of the flora of Sumatra also happen for the alien species since the presence of introduced species is often not the main focus of floristic studies in Indonesia. Most of the information for this plant group primarily relies on Flora Malesiana and general floristics on ethnobotanical studies (e.g., Hasanuddin 2015, Munawaroh *et al.* 2017, Tjitrosoedirjo 2002). Therefore, it is not

surprising that several new records of alien species have been reported in recent years (*e.g.*, Mustaqim & Putra 2020; Hariri *et al.* 2020; Irsyam *et al.* 2021).

The undocumented presence of alien species can become a threat to native vegetation due to the under-estimation of plant invasion risks, especially when the species is able to spread and become invasive. Inventories in the more urbanized or disturbed ecosystems are needed to detect the early introduction or even further spread of alien species, including natural ecosystems. In the first half of 2021, several fieldwork trips have been made in Langsa City, Aceh Province and Ogan Komering Ulu Regency, Sumatra Selatan Province, yielding many first discoveries of alien plants. This paper presented formal first records on 10 alien species, either as new or noteworthy records for Sumatra, to improve the data of the alien flora of Sumatra.

MATERIALS AND METHODS

The current records were based mainly from field explorations and supplemented by herbarium examination in various institutions either directly or images (ANDA, BO, K, and L) (abbreviations follow Thiers 2021-continuously updated). Plant explorations were done in two areas of Sumatra, mainly Langsa City, Aceh Province, and Ogan Komering Ulu Regency, Sumatra Selatan Province, both of which was done in the first half of 2021. The explorations in Langsa were conducted in the urban settlements that include parks, roadside, home garden, and abandoned lands; while in Ogan Komering Ulu, Sumatra Selatan Province, explorations were made in disturbed vegetation on limestone. Standard plant collecting methods was used following Bridson & Forman (1992). Plants were collected and processed into herbarium specimens. The identification was made by comparing the collected materials to Flora Malesiana and other relevant literature. Plant specimens were deposited to FIPIA and UIDEP (Thiers 2021-continuously updated).

RESULTS AND DISCUSSION

We here report ten new records of alien plants for Sumatra. Two species are already naturalized, while eight others are only found in cultivation. The two naturalized species are *Coleus monostachyus* (P.Beauv.) A.J.Paton (Lamiaceae) and *Solanum diphyllum* L. (Solanaceae). Discussion to each species is presented below:

1. *Acalypha herzogiana* Pax & K.Hoffm. (Euphorbiaceae). Fig. 1A–D.

Description. Steinmann & Levin (2011: 502–503).

Remarks. *A. herzogiana* is an ornamental plant native to tropical South America (Steinmann & Levin 2011; Cardiel *et al.* 2013; POWO 2021). It differs from all known species, either native or introduced of *Acalypha* in Sumatra by the creeping habits or hanging when planted in hanging flower baskets. It has not been listed in Sagun *et al.* (2010), *A. herzogiana* appears to be reported for the first time in Sumatra. The red inflorescence's color of this species is similar to *A. hispida* Burm. f. which also occurs in Sumatra, but the latter is a large shrub or small tree (Sagun *et al.* 2010). In Langsa, *A. herzogiana* is only found in cultivation for ornamental purposes. According to Steinmann & Levin (2011), this species also can be recognized solely by the presence of ebracteolate pistillate flowers borne from the upper leaf axils (Figure 1C).

Specimen(s) examined. Sumatra: Aceh, Langsa, Langsa Kota District, Gampong Teungoh, cultivated, 24 Aug 2021, *Mustaqim* 2368 (UIDEP).

2. *Coccinia grandis* (L.) Voigt (Cucurbitaceae). Fig. 1E–H.

Description. Holstein (2015: 78).

Remarks. *Coccinia* Wight & Arn. is a genus consisting of about 25 species (Holstein 2015). One of them can be found in the Malesian region, named *C. grandis*. In Malesia, the genus *Coccinia* can be recognized by the pepo fruit, the white fused petals of around 25 mm long, the cup-shaped receptacle, and fused or coherent filaments, as well as tendril that usually unbranched or unequally branched at the base (De Wilde & Duyfjes 2010). *Coccinia* was not mentioned by De Wilde and Duyfjes or Holstein's monograph. This record confirms the first occurrence of the genus in Sumatra. The *C. grandis* in Langsa was collected from a cultivated individual where authors have seen at least three individuals during exploration where all of them are cultivated. Based on our study, this finding is also the first record of the genus for Sumatra. We are also aware that this genus is native to many regions in Malesia, including the adjacent areas of Sumatra like Peninsular Malaysia, Java, and Borneo. We prefer to consider that all plants in Langsa are results of cultivation, and therefore, they cannot be categorized as native. Moreover, this species is highly ornamental and possesses several benefits for humans (*e.g.* Holstein 2015; Sakharkar & Chauhan 2017; Neetu *et al.* 2020). Until the genuinely wild and native populations were found, we tentatively considered this species alien to Sumatra. Several species have a similar pattern, i.e. natively distributed in certain islands of Indonesia and become introduced in other islands, for example, *Codiaeum variegatum* Rumph. ex A.Juss. (Euphorbiaceae), *Durio zibethinus* L. (Malvaceae) and *Mangifera caesia* Jack (Anacar-

diaceae) (Nisyawati & Mustaqim 2017).

Specimen(s) examined. Sumatra: Aceh, Langsa, Meurandeh, Gampong Sidodadi, cultivated, 21 Aug 2021, *Mustaqim & Persada* 2361 (UIDEP).

3. *Coleus monostachyus* (P.Beauv.) A.J.Paton (Lamiaceae). Fig. 1I–L.

Description. Irsyam & Mountara (2018: 32).

Remarks. *C. monostachyus* is a herb native to Tropical Africa. The occurrence of this species in Southeast Asia as a naturalized species was reported from Java by Irsyam & Mountara (2018) and Singapore (Chong *et al.* 2009; Chung *et al.* 2015). The specimens collected from Langsa and Penganonan, Ogan Komering Ulu, appear to be Sumatra's first report. This species has already become naturalized and grows along the edge of an urban forest. The other species of *Coleus* native to Sumatra is *C. rotundifolius* (Poir.) A.Chev. & Perrot, but the latter has root tubers and minute inflorescence bracts (Keng 1978; Irsyam & Mountara 2018).

Specimen(s) examined. Sumatra: Aceh, Langsa, Taman Hutan Kota Langsa, 16 Jul 2021, *Mustaqim* 2359 (UIDEP); South Sumatra Province, Ogan Komering Ulu, Tanjung Pura, Panganongan, 3 Jun 2021, *MRH* 331 (FIPIA).

4. *Crossandra infundibuliformis* (L.) Nees (Acanthaceae). Fig. 1M–P.

Description. Backer & Bakhuizen van den Brink (1965: 554), Smith (1991: 126).

Remarks. This species is native to Africa and India (Vollesen 1990) and is now cultivated in many parts of Southeast Asia, including Singapore (Chong *et al.* 2009) and Java (Backer & Bakhuizen van den Brink 1965), and also in the Pacific in Fiji (Smith 1991). This species can be recognized from its spuriously verticillate leaves, the acutely tetragynous inflorescence borne on long and slender bracts, closely imbricate inflorescence bracts, the large orange corolla with slender tube (c. 2 cm long) as well as the broad limb (2.5–4 cm across), and 4 stamens each with only one locule developed (Smith 1991). The earliest collection known for this species in Sumatra dates back to 1927 (*Lörzing 11808*) from Sibolangit, said to be cultivated from the garden. In Langsa, this species also has only been found in cultivation for ornamental purposes.

Specimen(s) examined. Sumatra: Aceh, Langsa, Langsa Kota District, Gampong Teungoh, cultivated, 24 Aug 2021, *Mustaqim* 2367 (UIDEP); Sumatra Utara, Sibolangit Botanic Garden, 500 m asl, 28 May 1927, cultivated, *Lörzing 11808* (BO).

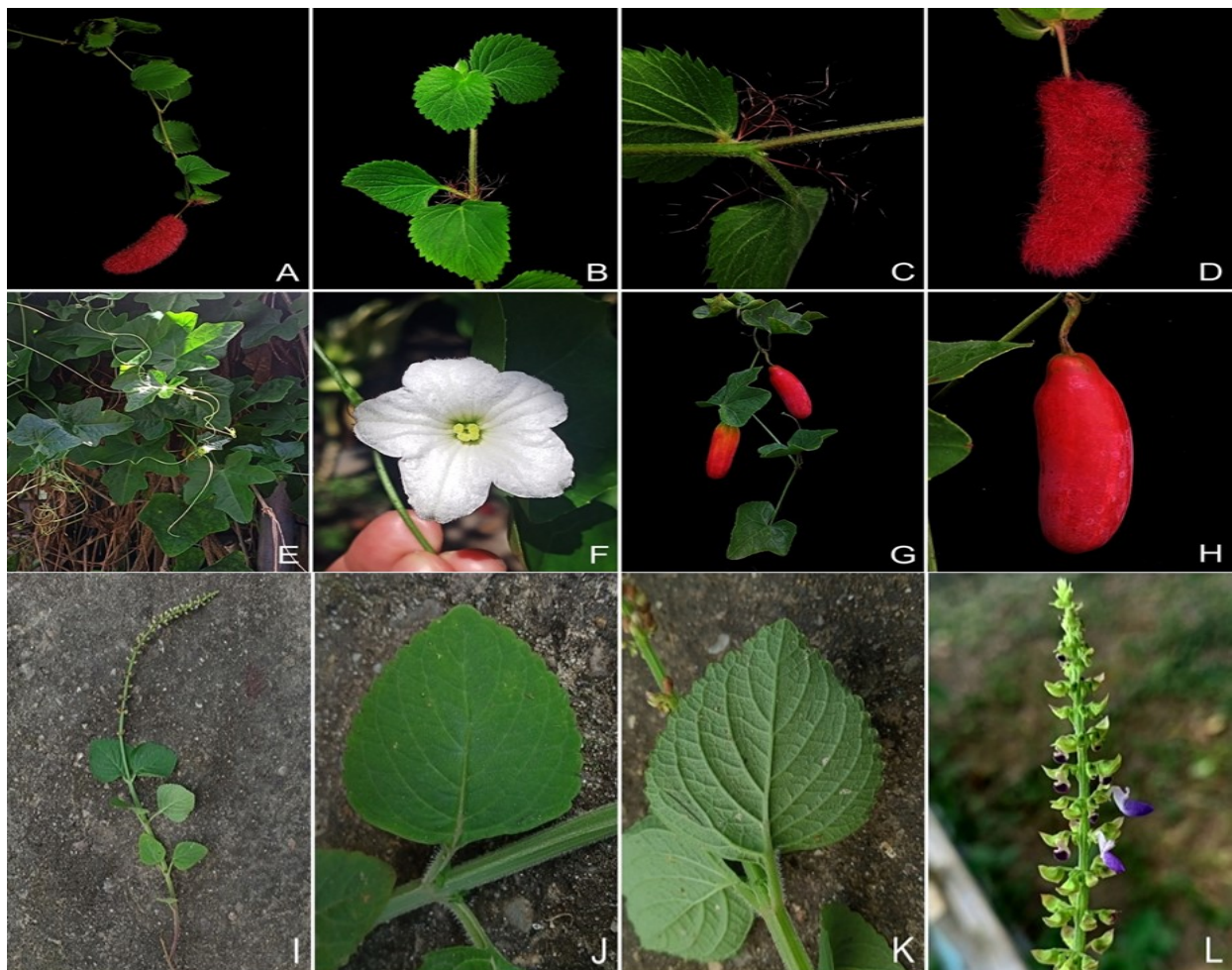




Figure 1. Four alien plants in Sumatra: A–D. *Acalypha herzogiana*; E–H. *Coccinia grandis*; I–L. *Coleus monostachyus*; K–N. *Crossandra infundibuliformis*. Photographs all by W.A. Mustaqim.

5. *Ficus natalensis* subsp. *leprieurii* (Miq.) C.C. Berg. (Moraceae). Fig. 2A–D.

Description. Peniwidiyanti *et al.* (2021: 5).

Remarks. *F. natalensis* subsp. *leprieurii* is an ornamental shrub characterized by its obdeltoid leaves. The native Malesian species with a similar morphology is the predominantly mountainous species, *F. deltoidea* Jack. However, the latter can be recognized by the presence of glands in the abaxial leaf surface (Peniwidiyanti *et al.* 2021). Our collection from Langsa appears to be the first record for Sumatra. So far, the species has only been found in cultivation for ornamental purposes despite its ability to produce fruits.

Specimen(s) examined. Sumatra: Aceh, Langsa, Langsa Kota District, Paya Bujok Tunong, cultivated in Ahmad Yani Road, 21 Aug 2021, *Mustaqim & Persada* 2363 (UIDEP).

6. *Melaleuca linariifolia* Sm. (Myrtaceae). Fig. 2E–F.

Description. Byrnes (1985: 131).

Remarks. *M. linariifolia* is a beautiful small-sized tree from the myrtle family. This species is native to Australia (Byrnes 1985). This species is the second alien species of *Melaleuca* in Sumatra, following the commonly cultivated *M. leucadendra* (L.) L. *M. linariifolia* can be recognized easily by its smaller leaf blades (1.0–3.0 × 0.1–0.3 cm (Byrnes 1985) vs. 7.5–27.0 × 0.9–2.5 cm in *M. leucadendra* (Blake 1968; Craven & Cowie 2013). In Sumatra, there is one native *Melaleuca* species named *M. cajuputi* Maton & Sm. ex R.Powell, which can also be recognized by its larger leaves (5–12 × 1–4 cm; characters from Blake (1968)) compared to *M. linariifolia*. In Langsa, this species is found only in cultivation, mainly roadside and parks.

Specimen(s) examined. Sumatra: Aceh, Langsa, Langsa Kota, Paya Bujok Tunong, cultivated as a roadside tree in Ahmad Yani Road, 21 Aug 2021, *Mustaqim & Persada* 2360 (UIDEP).

7. *Ochna thomasiana* Engl. & Gilg (Ochnaceae). Fig. 2G–J.

Description. Vedcourt (2005: 1).

Remarks. *O. thomasiana* is an ornamental plant species native to tropical Africa (Vedcourt 2005) that has never been reported for Malesia, particularly Indonesia. In Malesia, there is only one native species of *Ochna* known so far, named *O. integerrima* (Lour.) Merr. (Kanis 1971). In Sumatra, there is no record for the native species. Our finding of *O. thomasiana* existence in Langsa is the first note for the island, despite being aware that the species now has much wider distribution due to being traded as an ornamental plant. *O. thomasiana* is very similar to *O. integerrima* in general appearance, however it can be recognized by the presence of acicular teeth on the leaf margin which is longer at the base (*vs* absent and the leaf margin serrulate in *O. integerrima*) (see Fig. 2H). *O. thomasiana* appear to be evergreen in contrast to *O. integerrima*, a deciduous species (Kanis 1971).

Specimen(s) examined. Sumatra: Aceh, Langsa, Langsa Kota District, Gampong Teungoh, 21 Aug 2021, *Mustaqim & Persada* 2362 (UIDEP).

8. *Ruellia simplex* C.Wright (Acanthaceae). Fig. 2K–N.

Description. Wasshausen & Wood (2004: 103 (as *R. coerulea*), 119 (as *R. tweediana*)).

Remarks. *R. simplex* is an ornamental species native to Mexico and other tropical America (Ezcurra & Daniel 2007). This species has been introduced to SE Asia since 2009 from Singapore (Chong *et al.* 2009) and then recorded in cultivation from Java (Nisyawati & Mustaqim 2017). *R. simplex* can be recognized by some of the following characters: perennial herbs, leaves linear-lanceolate, flowers of two types, normal and cleistogamous, with large campanulate corolla, usually dark purple, but pink or white in several cultivars. In Sumatra, some collections were made after the

2000s, mainly from Sumatra Barat Province (Nurainas *et al.* 2020). Here, the species is formally reported to occur in Sumatra. So far, this species in Sumatra was only found in cultivation, usually for ornamental purposes, and wild-like individuals are possibly only relict of cultivations.

Specimen(s) examined. Sumatra: Aceh, Langsa, Langsa Kota District, roadside in Ahmad Yani Road, 21 Aug 2021, *Mustaqim & Persada* 2364 (UIDEP). Sumatra Barat, Padang, Lubuk Kilangan, Kelurahan Indarung Nagari Ladang Padi, Taman Hutan Raya Dr Mohammad Hatta, 5–7 Apr 2013, *Siti et al.* 05(a) (ANDA-image [ANDA00015735]); *ibid.* ?2013, *Icha et al.* IIB-0221 (ANDA-image [ANDA00015734]); Agam, Kec. Tanjung Raya, Nagari Koto Malintang, 100–300 m, 29 Dec 2012, *Yofi et al.* TO III-3-01 (ANDA-image [ANDA00015740]); Padang, Taman Hutan Raya Dr Mohammad Hatta, Ladang Padi, about 22 km eastern of Padang City, 500–900 m, 24 May 2008, *Wiwit et al.* 24 (ANDA-image [ANDA00015733]); *ibid.* 24 May 2006, *Fredi et al.* 63 (ANDA-image [ANDA00015739]).

9. *Solanum diphyllum* L. (Solanaceae). Fig. 3A–C.

Description. Gentry & Standley (1974: 115).

Remarks: *S. diphyllum* is a small shrub of the potato family and is native to Tropical America (Gentry & Standley 1974). In some parts of Southeast Asia and Pacific, this species has been reported in the Philippines (Pelser *et al.* 2011-onwards) or Java (Hariri & Irsyam 2018). In Southeast Asia, particularly Malesia, this species is quite similar to *S. spirale* Roxb., but the latter differs in the longer pedicel (1.5 cm or longer (Zhang *et al.* 1994) vs. up to 1 cm long in *S. diphyllum* (Hariri & Irsyam 2018) and corolla (8–10 mm vs. 2–5 mm). In the study of Indonesian eggplant species (Kurniawan

2019), this species has not been reported in Sumatra. Therefore, this study confirms that this naturalized species is reported in Sumatra, Langsa and Ogan Komering Ulu for the first time.

Specimen(s) examined. Sumatra: Aceh, Langsa, Langsa Kota District, Gampong Teungoh, cultivated, 24 Aug 2021, *Mustaqim* 2366 (UIDEP); Sumatra Selatan, Selabe Cave, Padang Bindu, Ogan Komering Ulu, 28 May 2021, *DQ* 437-438 (FIPIA).

10. *Wrightia antidysenterica* (L.) R.Br. (Apocynaceae). Fig. 3D–F.

Description. Ngan (1965: 166).

Remarks. *W. antidysenterica* is a popular ornamental shrub from the milkweed family native to Sri Lanka (Ngan 1965). This species has not been listed in Flora Malesiana (Middleton 2007), later, it was reported by Girmansyah *et al.* (2013) that this species was found in Bali, Indonesia and also recently observed from Bangka-Belitung (photograph from iNaturalist contributor 2021). In Malesia, this species is similar to *W. pubescens* R.Br. of having the non-pendulous flower with the non-infundibuliform corolla, stamens exerted from the corolla tube, and the antipetalous corona scales shallowly lobed (less than halfway down) (Middleton 2007). *W. antidysenterica* differs from the latter species by the smaller habits, usually shrubs up to 2 m tall (*vs.* large shrubs to trees reaching 15 m tall), cylindric and longer corolla tube (17 mm or longer *vs.* up to 8.1 mm), and three rows (*vs.* two rows) corona scales (characters from Ngan 1965 and Middleton 2007). In Langsa, this species is cultivated for ornamental purposes.

Specimen(s) examined. Sumatra: Aceh, Langsa, Langsa Kota, Gampong Blang, cultivated, 21 Aug 2021, *Mustaqim & Persada* 2365 (UIDEP).



Figure 2. Four alien plants in Sumatra: A–D. *Ficus natalensis* subsp. *lepriurii*; E–F. *Melaleuca linariifolia*; G–J. *Ochna thomasiiana* with acicular marginal teeth (arrows); and K–N. *Ruellia simplex*. Photographs all by W.A. Mustaqim.



Figure 3. Two alien plants in Sumatra: A–C. *Solanum diphyllum*; and D–F. *Wrightia antidysenterica*. Photographs all by W.A. Mustaqim.

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