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87. *Noronhia verticillata* H. Perrier in Mém. Inst. Sci. Madagascar, Sér. B, Biol. Vég. 2: 284. 1949 (Fig. 67D).

Typus: MADAGASCAR. Prov. Antsiranana: Forêt du Sambirano, à la base du massif de Manongarivo, [18°54'30"S 48°37'30"E], 500 m, VI.1909, Perrier de la Bâthie 4596 (holo-: P [P00418105]!).

= *Noronhia cruciata* H. Perrier in Mém. Inst. Sci. Madagascar, Sér. B, Biol. Vég. 2: 285. 1949. **Lectotypus** (designated here): MADAGASCAR. Prov. Toamasina: Rapides de l'Anosivola, 300 m, X.1927, Perrier de la Bâthie 18082 (P [P00413220]!; isolecto-: P [P00413221]!). **Syntypi:** MADAGASCAR. Prov. Toamasina: Ambatondrazaka, Onibe, [17°50'S 48°25'E], 1000 m, XI.1938, Cours 1027 (P [P00701245]!); Analamazaotra RS, [18°55'48"S 48°25'48"E], 800 m, s.d., Perrier de la Bâthie 8810 (P [P00701244]!). Anivorano, Andavoranto, bords de la Sahantandra, [18°55"S 48°30'E], 600 m, 16.X.1912, Viguer & Humbert 750 (P [P03559261]!).

= *Noronhia verticilliflora* H. Perrier in Mém. Inst. Sci. Madagascar, Sér. B, Biol. Vég. 2: 284. 1949. **Typus:** MADAGASCAR. Prov. Antsiranana: Haut bassin du Mananjeby, 300 m, VII.1913, Perrier de la Bâthie 8814 (holo-: P [P00418106]!; iso-: K [K000233179] image seen, P [P00418107]!).

Description Shrubs to trees to 8 m tall, trunk to 20 cm diameter; young twigs subquadrangular to quadrangular, 1.7-5.7 mm diameter, glabrous; bark medium gray to brownish, smooth to rugose. Leaves verticillate, persistent; bud scales persistent; blades dark green above, lighter below, linear to lanceolate, 5.5-22 × 0.8-4.2 cm, coriaceous, glabrous, domatia casual, base acute, margin flat to slightly revolute, apex retuse to acute, the point 1-8 mm long, midrib slightly sunken above, distinctly raised below, secondary veins conspicuous, 9-24 per side, 5-17 mm apart, looping 0.8-3 mm from the margin; petiole medium gray, 5-21 × 1.2-3 mm, entirely woody, glabrous. Thyrses geminate to fasciculate, multiflorous, somewhat diffuse; peduncle 5-38 mm long, very sparsely pubescent; pedicel 2-15 mm long, very sparsely pubescent; calyx very sparsely pubescent outside, glabrous inside, lobes deltate, 0.7-2 × 0.6-1.6 mm; corolla yellow, sometimes greenish, cupuliform to subrotate, 2.5-5.5 mm long, slightly tomentose outside, glabrous inside, the tube 1-2.5 mm long, lobes ovate, apex slightly acute; corona present, 1-2.2 mm long, undivided; stamens 1.6-2.8 mm long, anthers obconical, 1.1-1.7 mm long; pistil 1.5-2.8 mm long, stigma capitate. Fruiting pedicel 5-45 × 0.7-3.1 mm; young fruits green, brownish to dark red when mature, ovoid to subglobose, 9-22 × 6.5-18 mm, covered with white dots, apex flat to apiculate; dry pericarp 0.4-1.5 mm thick; endocarp woody; seed 6.5-14.5 × 3-11 mm.

Distribution, ecology and phenology

Noronhia verticillata occurs in low- to mid-elevation humid forests in the Sambirano region and along the east, from Vohémar to Fort-Dauphin (Fig. 68). It produces flowers and fruits throughout the year except in April and May.

Conservation status

The assessment included 52 collections representing 45 localities and indicated an EOO of 195,817 km², an AOO of 164 km², and 36 subpopulations representing 27 locations, of which 13 occur within protected areas (Ampasindava, Analamazaotra, Andohahela, Anjanaharibe-Sud, Corridor Ankeniheny-Zahamena, Manongarivo, Marojejy, Masoala, Ranomafana, Tsaratanana, Tsitongambarika, and Zahamena). With such a large distribution and presence within many protected areas, *N. verticillata* is assigned a preliminary status of “Least Concern”.

Notes

Noronhia verticillata can be recognized by its verticillate leaves and somewhat punctate fruits. Although *Noronhia cruciata* and *N. verticilliflora*, both of which have verticillate leaves, were distinguished from *N. verticillata* by PERRIER DE LA BÂTHIE (1949, 1952) based on a rotate corolla and verticillate flowers, respectively, they are placed here in synonymy because these character states fall within the range of variation of *N. verticillata*, as circumscribed here. PERRIER DE LA BÂTHIE (1949, 1952) also mentioned the presence of four stamens and the absence of a corona in *N. verticilliflora*, which he only knew from the type specimen, but these features were not observed in any other collections and their presence is ambiguous in the type. *Noronhia cruciata* was based on four syntypes: Cours 1027, Perrier de la Bâthie 8810 and 18082, and Viguier 750. Perrier de la Bâthie 18082 has been chosen as the lectotype as it comprises the best material.

Additional specimens examined

MADAGASCAR. Prov. Antsiranana: Antalaha, Ambohitralalana (Cap-Est), Tanandava-hely, 15°18'S 50°29'E, 0-15 m, 8.IX.1994, Bernard et al. 5 (K, MO, P, TAN); Tsaratanana Massif, 13°52'03"S 48°50'43"E, 557 m, 13.XI.2001, Birkinshaw 1024 (MO, TAN); Besinkara, Ambalafary, 350 m, 24.IV.1994, Gautier 2436 (G, P, TAN); Ampasindava, 13°47'17"S 47°59'04"E, 242 m, 6.XI.2009, Gautier et al. 5323 (G, K, MO, P, TEF, WAG); Maroambihy, Mandena, Marojejy PN, 14°26'13"S 49°46'32"E, 460 m, 20.III.2009, Hong-Wa et al. 634 (MO, P, TAN); Massif du Marojejy, [14°18'S 49°33'E], 100-300 m, 14-15.III.1949, Humbert 23398 (MO, P); Antongondriha, [14°12'S 49°52'E], 100-250 m, 1-24.XI.1951, Humbert & Capuron 23957 (G, P); Marojejy PN, base of Mt. Beondroka, 14°27'S 49°47'E, 180-230 m, 20.X.1989, Miller & Randrianasolo 4306 (MO, P, TAN); Ambodimanga, Tsaratanana RNI, 13°52'04"S 48°50'39"E, 900 m, 5.X.1998, Rabenantoandro & Birkinshaw 43 (G, K, MO, P, TAN); Marojejy PN, Mandena, Maroambihy, 14°26'13"S 49°46'32"E, 460 m, 9.X.1996, Rakotomalaza et al. 720 (G, K, MO, P); Anketrakabe, Manongarivo RS, 13°55'03"S 48°27'04"E, 180 m, 23-25.VII.1998, Ranaivojaona et al. 211 (G, MO, P, TAN); Andapa, Marojejy PN, 14°31'S 49°38'E, 603 m, 1-3.II.1994, Rasoavimbahoaka et al. 61 (MO, P, TAN); Anjanaharibe-Sud RS, 14°46'S 49°30'E, 985 m, 10.VII.1996, Razafimandimbison et al. 237 (K, MO, P, TEF); Ambanja, Marovato, [13°58'S 48°50'E], 15.VII.1953, Réserves Naturelles 5739 (P, TAN, TEF); Sambava, Andrah-

anjo, [14°18'30"S 49°49'00"E], 200 m, 3.XI.1950, *Service Forestier* 741 (P, TEF); Ambanja, Ankaramy, Antsambalahy-Beraty, [14°01'30"S 48°14'40"E], 100-200 m, 4.XI.1950, *Service Forestier* 1612 (P, TAN, TEF); Sambava, Antelimena, [14°27'30"S 49°42'30"E], 75-2123 m, 26.III.1953, *Service Forestier* 7251 (MO, P, TEF); Beampongy, [13°40'30"S 48°27'00"E], 0-100 m, 4.X.1953, *Service Forestier* 7714 (MO, P, TEF); Andapa, Doany, Androranga, bord de Bemarivo, [14°11'30"S 49°52'00"E], 100 m, 20.X.1953, *Service Forestier* 7781 (P, TEF); Antsalahalava, [14°04'30"S 48°16'00"E], 360 m, 19.VII.1954, *Service Forestier* 10455 (P, TEF); Andapa, Doany, Androranga, 14°27'30"S 49°42'30"E, 75-2123 m, 23.VII.1988, *Service Forestier* 34007 (TEF); Ampasindava, forêt de Betsistsika, 13°40'37"S 47°59'16"E, 110 m, 24.I.2009, Tahinarivony et al. 279 (G, MO, TEF); Ambahatra, cours supérieur, 13°57'S 48°26'E, 350 m, 11.VIII.1998, Wohlhauser 60024 (G, MO, P, TEF). **Prov. Fianarantsoa:** Ranomafana PN, [21°10'S 47°29'E], 1955, Rauh 689 (TAN); Ambohimanga, Antanjona, [21°20'S 47°35'E], 30.IX.1955, *Service Forestier* 16292 (P, TEF). **Prov. Toamasina:** Ambatovy, 18°50'24"S 48°18'15"E, 1092 m, 16.V.2010, Bernard et al. 1570 (MO, P, TAN); Androrangabe, 1200 m, 9.X.1945, Cours 2776 (MO, P); Analamazaotra RS, 18°55'21"S 48°25'23"E, 876 m, 3.V.2010, Hong-Wa & Ortiz 654 (MO, P, TAN); Andasibe, 18°56'S 48°25'E, 860 m, 20.X.1996, Miller 8747 (K, MO, TAN); Vatomandry, Ambalabe, Tobin'i Foara, 19°11'18"S 48°33'08"E, 500 m, 17.III.2005, Razanatsima et al. 14 (MO, P, TAN); Ambatondrazaka, Manakambahiny Est, [17°46'S 48°39'E], 21.X.1963, Réserves Naturelles 12629 (TEF); Soanierana Ivongo, [16°54'30"S 49°35'00"E], 0-50 m, 27.XII.1949, *Service Forestier* 2347 (P, TEF); Andriantantely, Brickaville, [18°44'S 48°38'E], 200-300 m, 21.IV.1955, *Service Forestier* 13177 (TEF). **Prov. Toliara:** Andohahela PN, Parcelle 3, 24°40'S 46°48'E, 200-700 m, 9-26.VIII.1993, Randriamampionona 589 (K, MO, P); Bevoay, Fenoambany, Androranga, 24°29'39"S 47°05'39"E, 171 m, 15.XI.2009, Razakamalala et al. 4532 (G, MO, P, TAN); Fort-Dauphin, Enaniliha, [24°39'S 46°52'E], 15.VII.1956, *Service Forestier* 17334 (TEF).