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46. *Noronhia louvelii* H. Perrier in Mém. Inst. Sci. Madagascar, Sér. B, Biol. Vég. 2 : 296. 1949 (Fig. 31A).

Typus: MADAGASCAR. **Prov. Toamasina:** Centre E, forêt d'Analamazoatra, [18°56'S 48°26'E], s.d., *Louvel 79* (holo-: P [P00573411]!).

Description *Trees* to 30 m tall, trunk to 45 cm diameter; young twigs cylindrical, 0.8-2.1 mm diameter, glabrous; bark medium gray, slightly rugose. *Leaves* opposite, persistent; bud scales persistent; blades dark green above, lighter below, elliptic, 3-12 × 1.5-5 cm, coriaceous, glabrous, domatia rare, base acute to attenuate, margin flat to slightly revolute, apex acute to acuminate, the acumen 1-11 mm long, midrib slightly sunken above, slightly raised below, secondary veins conspicuous, 6-11 per side, 3-17 mm apart, looping 1-5 mm from the margin; petiole medium gray, 2.5-10 × 0.8-2.4 mm, entirely woody, glabrous. *Thyrse*s fasciculate, pauciflorous, compact; peduncle 2.5-10 mm long, moderately pubescent; pedicel 3-13 mm long, moderately pubescent; calyx moderately to sparsely pubescent outside, glabrous inside, lobes oblong, 1-2.5 × 1-2.5 mm; corolla red, cupuliform, 2-7 mm long, glabrous on both sides, the tube 1.5-4.5 mm long, lobes widely ovate, apex cucullate; corona present, (0-)1-2 mm long, undivided; stamens 1.2-2.8 mm long, anthers widely obovate, 1-1.3 mm long; pistil 1.5-3 mm long, stigma capitate. *Fruiting* pedicel 2-21 × 0.7-2.4 mm; young fruits green, dark red when mature, subglobose, 14-23 × 11-20.5 mm, surface smooth, apex flat to bluntly pointed, style persistent; dry pericarp 0.6-1.4 mm thick; endocarp crustaceous; seed 7-14 × 6-16 mm.

Distribution, ecology and phenology *Noronhia louvelii* occurs in low- to high-elevation humid forests in the east, from Daraina to Vatomandry and in the Centre-West near Tsiroanomandidy (Fig. 27). It produces flowers and fruits throughout the year except in March.

Conservation status Known from 61 collections representing 57 localities, *Noronhia louvelii* is quite widespread. With an EOO of 141,234 km², an AOO of 192 km², and 39 subpopulations representing 26 locations, of which 10 occur within protected areas (Analamazoatra, Anjanaharibe-Sud, Anjozorobe-Angavo, Betampona, Loky-Manambato, Makira, Marojejy, Masoala, Tsaratanana-Ambohimirahavavy-Corridor Marojejy, and Zahamena), it is assigned a preliminary status of "Least Concern".

Notes *Noronhia louvelii* can be recognized by its coriaceous, elliptic leaf blades, cupuliform, red flowers, and crustaceous, subglobose fruits subtended by short pedicels. It differs from *N. luteola* by its woody (vs. non-woody) petiole, elliptic (vs. oblong to ovate) leaf blades, cupuliform (vs. subrotate), red (vs. white) flowers, and crustaceous (vs. woody) endocarp. The collection *Morat 4627* from humid forest around

Tsiroanomandidy in the Bongolava region extends the range of this species to the west. A collection of another species bears the same number as the type specimen of *N. louvelii*: viz. *Dalbergia maritima* R. Vig. (holo-: Louvel 79 [P00060529], from eastern Madagascar).

**Additional specimens
examined**

MADAGASCAR. Prov. Antananarivo: Anjozorobe, 18°24'30"S 47°56'15"E, 1320 m, 9.IV.1993, *Harder 1544* (MO, P, TAN); Tsiroanomandidy, [18°11'S 45°16'E], 1300 m, VII.1974, *Morat 4627* (MO, P, TAN); c. 7 km E of Anjozorobe, 18°22'S 48°00'E, 1300 m, 11.V.1987, *Schatz 1387* (K, MO, P, TAN). **Prov. Antsiranana:** Marojejy PN, 14°26'S 49°37'E, 1080 m, 23.X.2001, *Gautier 3905* (G, MO); Daraina, Ankijabe, forêt de Binara, 13°15'S 49°37'E, 1050 m, 3.XI.2001, *Gautier & Ravelonarivo 3986* (Daraina, G, MO, P, TEF); Andapa, Ambodisatrana, 14°32'S 49°26'E, 1100-1200 m, 3.VIII.1997, *McPherson 17204* (K, MO, TAN); Anjanaharibe-Sud RS, 14°48'15"S 49°26'45"E, 1000-1100 m, 6.VIII.1997, *McPherson 17252* (K, MO, TAN); Andapa, Ambodiangezoka, Antanambe, forêt de Betaolana, 14°32'18"S 49°26'18"E, 875 m, 9.X.1999, *Rakotomalaza & Ravelonarivo 1911* (G, MO, P); Antalaha, Marofinarity, Ampokafo, 15°16'49"S, 50°01'27"E, 610 m, 1-15.XII.1997, *Ranaivojaona et al. 198* (G, MO, P, TAN); Bealampona, Anjanaharibe-Sud RS, 14°44'45"S 49°29'40"E, 890-1041 m, 14.IX.1994, *Ravelonarivo et al. 378* (G, K, MO, P, TAN); Anjialavabe, Ankiakabe, Andohan'Anjialava, 14°10'47"S 49°22'01"E, 1567 m, 20.II.2007, *Ravelonarivo et al. 2198* (G, MO, P, TAN); Sambava, Andratamarina, Bemanasy, 14°23'54"S 49°50'55"E, 892 m, 23.X.2010, *Ravelonarivo & Raharivelo 3562* (MO, P, TAN); Sambava, [14°16'S 50°10'E], 21.IV.1956, *Réserves Naturelles 7954* (G, P, TAN). **Prov. Mahajanga:** Befandriana-Nord, Matsoandakana, Andranomena, forêt d'Anjiabe, 15°07'35"S 49°21'09"E, 1418-1446 m, 9.II.2008, *Ravelonarivo et al. 2704* (G, MO, P, TAN). **Prov. Toamasina:** Zahamena PN, 17°32'47"S 48°44'21"E, 1240-1400 m, 28.IX.2001, *Andrianjafy et al. 148* (CNARP, MO, P, TEF); Ambatovola, 18°55'13"S 48°30'49"E, 29.I.2005, *Andriatsiferana et al. 2584* (G, MO, P, TAN); Maroantsetra, Anjahana, Hiaraka, 15°28'42"S 49°54'32"E, 300 m, 1.IX.2002, *Antilahimena et al. 1287* (G, MO); Morafeno, Amboditavolo, 15°50'14"S 49°30'32"E, 326 m, 28.X.2003, *Antilahimena et al. 2207* (MO, P); Vinanibe, Andongona, Makira, 15°27'40"S 49°17'46"E, 1153 m, 27.XI.2003, *Antilahimena 2402* (MO); Ambinanitelo, Marovovonana, 15°18'57"S 49°25'04"E, 981 m, 1.IX.2004, *Antilahimena 2700* (G, MO); Ambatovy, 18°48'29"S 48°18'50"E, 1060 m, 16.XII.2004, *Antilahimena et al. 3012* (G, MO, P, TAN); *ibid. loc.*, 18°51'34"S 48°18'00"E, 1115 m, 8.VIII.2008, *Antilahimena et al. 6426* (G, MO, P, TAN); Andasibe, forêt d'Analamay, 18°51'16"S 48°19'35"E, 1130 m, 8.VI.2007, *Bernard 549* (G, MO, P, TAN); Ambatovy 18°50'27"S 48°18'11"E, 1117 m, 17.V.2010, *Bernard et al. 1574* (MO, P, TAN); Analamazaotra RS, 18°56'12"S 48°25'09"E, 953 m, 2.V.2010, *Hong-Wa & Ortiz 642* (MO, P, TAN); Betampona RNI, 17°54'46"S 49°12'20"E, 427 m, 20.XI.2001, *Rabehevitra et al. 14* (G, MO, P); Moramanga, Ambatovy-Beroy, 18°49'44"S 48°19'59"E, 6.V.2011, *Rajaonary 121* (MO, P, TAN); Zahamena PN, Antanandava, Ankosy, 17°28'58"S 48°44'10"E, 997 m, 12.VII.2000, *Rakotonan-*

drasana et al. 417 (G, MO, P); Vavatenina, Savaharina, Zahamena PN, 17°41'08"S 48°59'43"E, 650 m, 12.VI.2001, *Rakotonandrasana et al. 489* (G, MO, P); Manakambahiny Est, Sahamalaza, Zahamena RNI, 17°43'30"S 48°44'35"E, 800-900 m, 20.VII.2003, *Rakotonandrasana et al. 695* (MO, P); Vavatenina, Ambodimangavalo, Antevibe-Sahandrazana, 17°32'S 48°48'E, 800-900 m, 30.VII.2003, *Rakotonandrasana et al. 717* (G, MO, P); Lakato, Anivorano, Agnalatsara, 19°07'29"S 48°23'32"E, 815 m, 1.VI.2007, *Ranaivojaona et al. 1723* (MO, P, TAN); Vatomandry, Ambalabe, 19°09'33"S 48°34'40"E, 21.XI.2004, *A. Randrianasolo et al. 904* (G, MO, P); Lakato, 19°03'43"S 48°22'16"E, 1062-1100 m, 2.VI.2007, *A. Randrianasolo et al. 1132* (MO, P); Zahamena PN, 17°28'28"S 48°44'12"E, 880 m, 16.VII.2000, *Randrianjanaka et al. 562* (G, MO, P); Manakambahiny, Zahamena PN, 17°39'20"S 48°54'22"E, 750 m, 6.X.2001, *Randrianjanaka et al. 649* (CNARP, G, MO, P, TEF); Analamay, 18°48'38"S 48°20'30"E, 1100 m, 9.XI.2008, *Ratolojanahary et al. 155* (MO, P, TAN); Ambodimangavalo, Moango, 17°33'57"S 48°53'58"E, 740-1200 m, 25.X.2000, *Ratovoson et al. 333* (CNARP, MO, P, TEF); Ambatovy, Menalamba, 18°48'28"S 48°20'57"E, 1000 m, 7.VI.2007, *Ravelonarivo 2511* (G, MO, P, TAN); Ankeniheny, 19°07'50"S 48°32'10"E, 922 m, 3.VIII.2007, *Razanatsima et al. 296* (G, MO, P, TAN); Ambalabe, Ambinanindrano II, forêt de Vohibe, 19°09'31"S 48°34'40"E, 536 m, 19.II.2009, *Razanatsima et al. 664* (MO, TAN); Moramanga, Ampitambe, Sahaevo, 18°50'00"S 48°17'45"E, 1139 m, 11.XII.2006, *J. Razanatsoa & Marcellin 285* (G, MO, P, TAN); Périnet, Beravina, [18°58'S 48°16'E], 8.VI.1951, *Service Forestier 3779* (TEF); Moramanga, Ampasimazava, 10.VI.1954, *Service Forestier 12224* (MO, P); Sandrangato, [19°06'30"S 48°14'30"E], 900 m, 18.XI.1965, *Service Forestier 25491* (MO, P, TEF).



Fig. 31. Photographs of *Noronhia* Stadtm. ex Thouars.
A. *Noronhia louvelii* H. Perrier [Razanatsima 843]; **B.** *Noronhia lowryi* Hong-Wa [Lowry 5906].

Photos: A: A. Razanatsima; B: G. Schatz