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Lichen phytochemistry II: some species of *Calopadia*

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Australasian Lichenology 65 (July 2009), 7–9

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Abstract: New chemical data are reported for 12 species of *Calopadia* (Pilocarpaceae). Chemical constituents were identified by thin-layer chromatography (Elix & Ernst-Russell 1993), high-performance liquid chromatography (Elix *et al.* 2003) and comparison with authentic samples.

1. ***Calopadia foliicola*** (Fée) Vězda, *Folia Geobot. Phytotax.* **21**, 215 (1986)
Chemistry: 2,7-dichlorolichexanthone [major], pannarin [trace].

SPECIMEN EXAMINED

Brazil. *Bahia*: • Chapada Diamantina, Serra do Tombador, between Mundo Novo and Morro do Chape, on leaves in dense rainforest, K. Kalb & M. Marcelli, 10.vii.1980 (CANB), det. A. Vězda.

2. ***Calopadia fusca*** (Müll.Arg.) Vězda, *Folia Geobot. Phytotax.* **21**, 215 (1986)
Chemistry: pannarin [major], dechloropannarin [trace], thiophanic acid [minor], asemone [trace], isoarthothelin [minor], 3-*O*-methylasemone [minor], 2,5-dichloro-3-*O*-methylnorlichexanthone [minor], 2,5,7-trichloro-3-*O*-methylnorlichexanthone [minor], 2,5,7-trichlorolichexanthone [minor], 2,7-dichlorolichexanthone [trace].

SPECIMEN EXAMINED

Australia. *Queensland*: • Brisbane area, Mistake Mountains, 28°19'S, 152°22'E, on leaves of *Lomandra* sp., R.W. Rogers & H.T. Lumbsch 5707a, 29.ix.1987 (CANB), det. H.T. Lumbsch.

3. ***Calopadia isidiosa*** Kalb & Vězda, *Folia Geobot. Phytotax.* **22**, 293 (1987)
Chemistry: atranorin [minor].

SPECIMEN EXAMINED

Brazil. *Matto Grosso*: • Between Jaciara and São Vicente, c. 100 km SE of Cuiaba, 750 m, on leaves in a cerrado, K. Kalb, 2.vii.1980 (CANB), det. A. Vězda.

4. ***Calopadia lecanorella*** (Nyl.) Kalb & Vězda, *Folia Geobot. Phytotax.* **22**, 296 (1987)
Chemistry: atranorin [major], 2,7-dichlorolichexanthone [minor].

SPECIMEN EXAMINED

Brazil. *São Paulo*: • Praia do Lázaro near Ubatuba, 3 m, on leaves in a dry and very open resting sand-dune forest, K. Kalb & G. Plöbst, 29.ix.1979 (CANB), det. K. Kalb.

5. ***Calopadia lucida*** (Nyl.) R.Sant. & Lücking, *Lichenologist* **33**, 111 (2001)
Chemistry: 3-*O*-methylasemone [minor], 5,7-dichloro-3-*O*-methylnorlichexanthone [major].

Previous reports: chodatol? (Kalb 2001); 2,7-dichlorolichexanthone (Lücking & Santesson 2001).

SPECIMEN EXAMINED

Tanzania. • Pwam Region, Rufiji District, Rufiji River delta, Nyamisati Village, 7°46'S, 39°17'E, 5 m, on leaves of tree and bark of mangrove, A. Frisch, 9.x.1999 (K. Kalb *Lichenes Neotropici* no. 538, CANB), det. R. Lücking.

6. **Calopadia nymanii** (R.Sant.) Vězda, *Folia Geobot. Phytotax.* **21**, 215 (1986)
Chemistry: 2,7-dichlorolichexanthone [major].

SPECIMENS EXAMINED

Australian Commonwealth Territory. *Christmas Island*: • North-South Baseline Road, 1 km S of Airport, 10°28'S, 105°41'24"E, 230 m, on leaves in moderately dense primary forest, P.M. McCarthy 1670, 1674, 31.vii.2000 (CANB), det. P.M. McCarthy.

7. **Calopadia perpallida** (Nyl.) Vězda, *Folia Geobot. Phytotax.* **21**, 215 (1986)
Chemical race 1: chodatol [major], demethylchodatol [minor], isoarthothelin [minor], 2,4,7-trichloro-3-O-methylnorlichexanthone [minor], 5,7-dichloro-3-O-methylnorlichexanthone [minor], 2,5,7-trichloro-3-O-methylnorlichexanthone [minor], 3-O-methyl-asezone [minor], 3-O-methylthiophanic acid [minor], 2,7-dichloro-3-O-methylnorlichexanthone [minor], thiophanic acid [trace], arthothelin [trace], asezone [trace], 5,7-dichloronorlichexanthone [trace].

SPECIMENS EXAMINED

Cuba. • 'Ad corticem', C. Wright (H-NYL 18052, specimen to the right, lectotype).
Guadeloupe. • Basse-Terre, Mamelle de Petit-Burgh, 300 m, on bark of undetermined tree, D.O. Øvstedal, xi.1988 (BG).

Chemical race 2: atranorin [minor].

SPECIMEN EXAMINED

Malaysia. • Kuala Lumpur, Kepong Park, 15 km NE of Kuala Lumpur, 300 m, on leaves, F. Ceni & A. Vězda, 6.v.1997 (A. Vězda, *Lichenes Rariores Exsiccati* no. 301, CANB), det. A. Vězda.

8. **Calopadia phyllogena** (Müll.Arg.) Vězda, *Folia Geobot. Phytotax.* **21**, 215 (1986)
Chemistry: 4,5-dichlorolichexanthone [major].

SPECIMEN EXAMINED

Brazil. *São Paulo*: • Serra do Mar, Serra do Garrãozinho, between Mogi das Cruzes and Bertioiga, 850 m, on leaves in a very moist, shady, primary rainforest, K. Kalb, 28.x.1980 (K. Kalb *Lichenes Neotropici* no. 413, CANB), det. A. Vězda.

9. **Calopadia psoromoides** Kalb & Vězda, *Folia Geobot. Phytotax.* **22**, 301 (1987)
Chemistry: atranorin [minor].

SPECIMEN EXAMINED

Brazil. *Matto Grosso do Sul*: • Between Rio Verde do matto Grosso and Coxim, 400 m, on sandstone in a moist cerradão, K. Kalb, 28.vi.1980 (CANB), det. A. Vězda.

10. **Calopadia puiggarii** (Müll.Arg.) Vězda, *Folia Geobot. Phytotax.* **21**, 215 (1986)
Chemistry: 2,7-dichlorolichexanthone [major], 2-chlorolichexanthone [minor], usnic acid [minor].

SPECIMEN EXAMINED

Tanzania. • Ngorongoro region, Karatu, Humpai Forest, 1660-1700 m, on leaves, T. Pócs 89032 & S. Chuwa, 20.i.1989 (A. Vězda, *Lichenes Rariores Exsiccati* no. 1, CANB), det. A. Vězda.

11. **Calopadia subcoerulescens** (Zahlbr.) Vězda, *Lich. Sel. Exsicc.* **88**, [2185] (1988)
Chemical Race 1: atranorin [trace].

Previous report: atranorin [trace] (Kalb 2001).

SPECIMEN EXAMINED

Dominican Republic. • La Vega, 'Balneario Confluentia', a few km NE of Jarabacoa,

19°10'N, 70°38'W, 500 m, on bark of a broad-leaved tree in a small wood, K. & A. Kalb, 21.viii.1996 (K. Kalb *Lichenes Neotropici* no. 539, CANB), det. K. Kalb.

Chemical Race 2: 2,7-dichlorolichexanthone [major], di-O-methylthiophanic acid [major], 2-chlorolichexanthone [minor], arthothelin [minor], 6-O-methylarthothelin [minor].

SPECIMEN EXAMINED

United States of America. *Florida*: • Hillsborough County, Lettuce lake Park, near Tampa, 28°05'N, 82°07'W, 15 m, on palm leaf in open *Quercus*-dominated woodland, H. Streimann 40177, 11.i.1984 (CANB), det. A. Vězda.

12. **Calopadia subfusca** Kalb & Vězda, *Folia Geobot. Phytotax.* **22**, 304 (1987)
Chemistry: atranorin [trace].

SPECIMEN EXAMINED

Australia. *New South Wales*: • Border Ranges National Park, Forest Tops, 26 km NNE of Kyogle, 28°23'S, 153°04'E, 700 m, on leaves of semi-shaded shrub in temperate forest, H. Streimann 61037A, 28.iv.1998 (CANB), det. A. Vězda.

Acknowledgements

We thank the curators of the following herbaria for their assistance with the loan of specimens: BG, CANB, H.

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