

NEW SPECIES IN *MALLOTUS* AND *CROTON* (*EUPHORBIACEAE*) FROM NEPAL

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Two new species of *Euphorbiaceae* (*sensu stricto*), *Mallotus bicarpellatus* (*Acalyphoideae*) and *Croton nepalensis* (*Crotonoideae*), are described from Nepal. *Mallotus bicarpellatus* is closely related to *M. philippensis* but differs in having 1 or 2 pairs of leaf glands distinctly separated from the petiole attachment, pistillate flowers with staminodes and longer pedicels, and fewer locules and stigmas. *Croton nepalensis* differs from *C. tiglium* in having leaves with truncate, subcordate or rounded base, smaller, broadly ovoid capsules, and smaller seeds. A table is provided showing how *Croton nepalensis* differs from other closely related species. *Croton himalaicus* is here regarded as a synonym of *C. tiglium*, though it has been treated variously as a distinct species or a synonym of *C. tiglium* or *C. birmanicus* by recent authors. Distribution maps and graphs of altitudinal distribution are given for the new species.

Keywords. *Croton*, *Euphorbiaceae*, the Himalaya, *Mallotus*, Nepal, new species.

INTRODUCTION

Nepal extends from the Gangetic plain at about 60m altitude to the highest Himalayan peak exceeding 8000m, and the vegetation changes with increasing altitude (Stearn, 1978). Euphorbiaceous species are found in various vegetation types, from tropical forest to alpine meadow. About twenty years ago, 83 *Euphorbiaceae* species from Nepal were enumerated by Short & Vickery (1982). This number will probably eventually exceed a hundred (Kurosawa, 2002, and in press). Here, two new species are described. They are restricted to relatively small areas at medium altitude in the Himalaya.

***Mallotus bicarpellatus* T.Kuros., sp. nov. Figs 1, 2.**

A *M. philippensi* (Lam.) Müll.Arg. glandulis foliorum 1–2 geminalibus e basibus 0.5–3.5mm distantibus, pedicellis florum femineorum 1.2–2mm longis, staminodiis 0.4–0.7mm longis, capsulis 2 vel 3-cellularibus differt.

Type: Nepal, Bagmati Zone, Bhaktapur District, Gokarna forest, 7mi ENE from Kathmandu, 1350m, near marshy ground, 10 ix 1966 (fr.), *D.H. Nicolson* 2282 (holo. TI; iso. BM, KATH).

Dioecious shrub or small tree to 7m; branchlets stellate-tomentose. *Leaves* alternate; petioles 1.6–6.5cm, with stellate hairs; blade ovate or narrowly ovate, 5.1–14 × 1.9–5.5cm, base acute, obtuse or rounded, margin entire, apex acuminate or caudate,

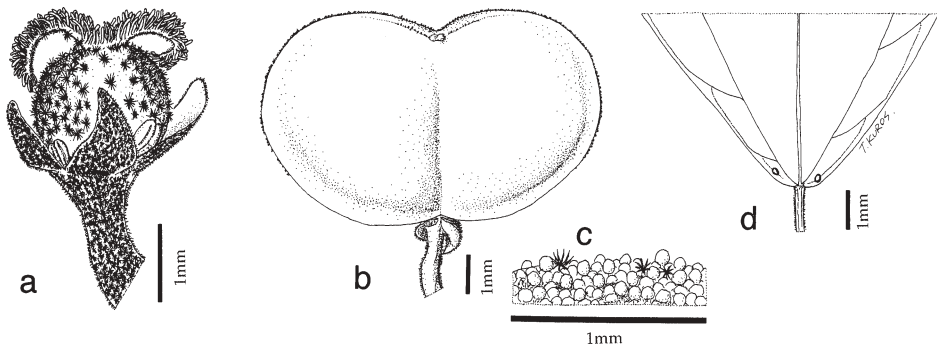


FIG. 1. *Mallotus bicarpellatus* T.Kuros.: a, pistillate flower; b, fruit; c, fruit surface; d, base of leaf with two adaxial glands. a: Drawn from *H. Kanai et al.* 25078, TI; b-d from *D.H. Nicolson* 2282, TI.

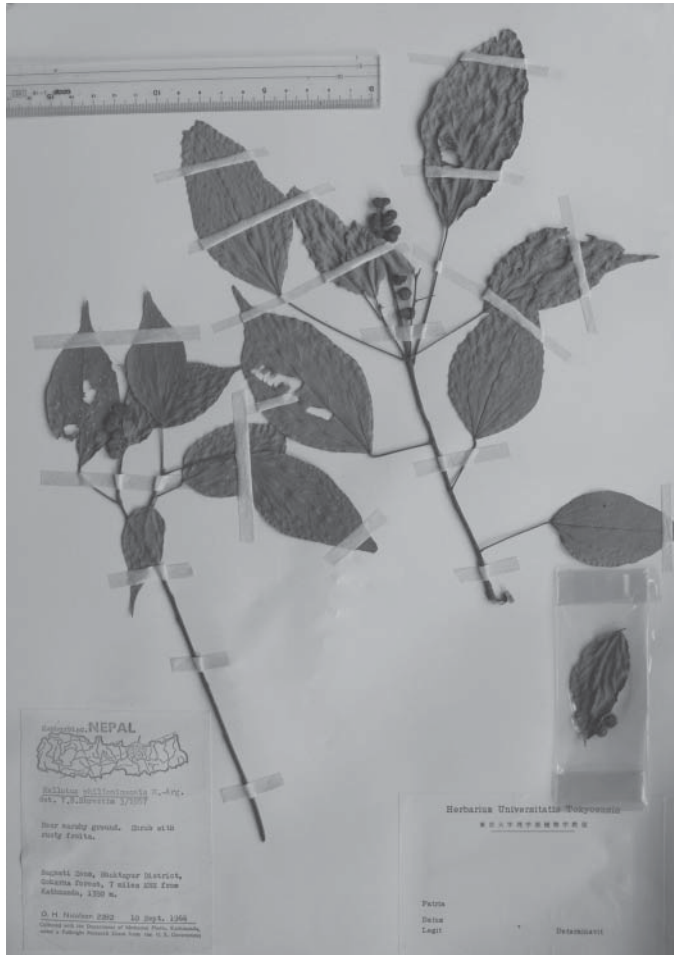


FIG. 2. Holotype of *Mallotus bicarpellatus* T.Kuros. (*D.H. Nicolson* 2282).

glabrous above, obscured by stellate tomentum below; secondary veins pinnate, 5–7 pairs; basal glands 1 or 2 pairs on upper surface, 0.5–3.5mm from petiole attachment, widely elliptic or circular, 0.3–1 × 0.2–0.7mm. *Inflorescences* terminal or axillary, racemose or 1–2-branched at base, erect, stellate-tomentose. *Bracts* triangular, 0.7–0.9 × 0.6–0.8mm, stellate-tomentose, apex acute or obtuse. *Staminate inflorescences* not seen. *Pistillate inflorescences* 4–7cm × 0.8–1.1mm, 1 flower per node. *Pistillate flowers*: pedicel 1.2–2mm; calyx lobes 3 or 4, 1.5–1.9 × 0.9–1.4mm, persistent, ovate, apex acute, stellate-tomentose outside; ovary spheroid, 2 or 3-locular, with stellate indumentum and minute red glands; stigmas 2 or 3, sessile, c.2 × 0.4mm, with papillae to 0.5mm long; staminodes 0.4–0.7mm long. *Capsules* dehiscent, densely red-glandular; pedicels 1.5–2.5mm long; pericarp 0.2–0.3mm thick. *Seeds* depressed-globose, c.3.5 × 3 × 3–3.2mm, smooth, dark brown.

Distribution. Endemic to Gandaki Zone in western Nepal and Bagmati Zone in central Nepal. Fig. 3.

Habitat. Mixed evergreen forest, 1270–2100m.

Phenology. Flowers: April–August; fruits: July–October.

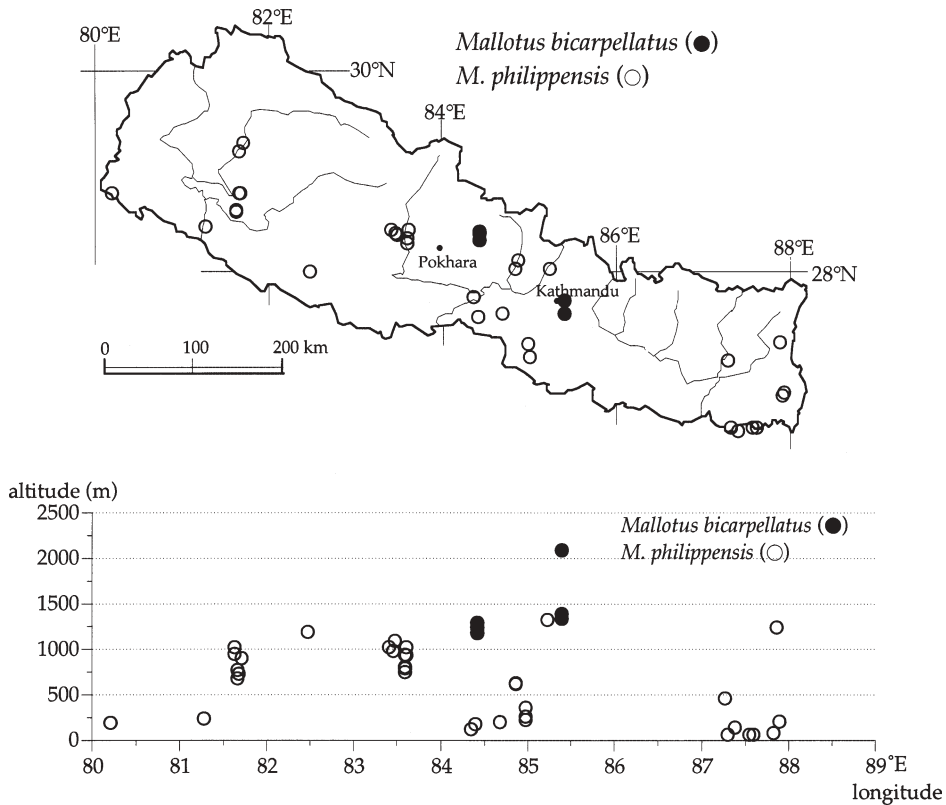


FIG. 3. Map of Nepal showing distribution of *Mallotus bicarpellatus* T.Kuros. and *M. philippensis* (Lam.) Müll.Arg., and graph showing their altitudinal distribution in Nepal.

Key characters. Leaf blades ovate or narrowly ovate, basal glands 1 or 2 pairs, situated 0.5–3.5mm from petiole attachment (Fig. 1d), pedicels of pistillate flowers to 2mm long, ovary spheroid, 2 or 3-locular, with stellate hairs and minute red glands, stigmas 2 or 3, staminodes 0.4–0.7mm long (Fig. 1a), capsule densely red-glandular (Fig. 1c).

Similar to *M. philippensis* (Lam.) Müll.Arg. in having a red-glandular ovary and capsule, but the latter has 1 pair (rarely 2 pairs) of leaf glands 0–2mm from petiole attachment, pistillate pedicels 0.5–1.5mm, and usually 3 (rarely 2 or 4) locules and stigmas. The presence of staminodes also distinguishes *M. bicarpellatus* from *M. philippensis*. *Mallotus bicarpellatus* is restricted to mixed broad-leaved forests in the warm temperate zone of western and central Nepal, while *M. philippensis* is widely distributed in tropical and subtropical forest at lower altitude (up to 1340m in Nepal). These two species show an allopatric or parapatric distribution (Fig. 3).

Notes. (1) Specimens cited as *Mallotus philippensis* in Malla *et al.* (1986), Unknown collector 7478, KATH!; *D.H. Nicolson* 2282, KATH!, are referable to *M. bicarpellatus*. In Kurosawa (2002, and in press) a key and checklist for the Nepalese species of *Mallotus* are provided, *M. bicarpellatus* being referred to as *M. aff. philippensis*. Kurosawa (in press) cites voucher specimens of *M. philippensis*.

(2) Male flowers of *M. bicarpellatus* have not yet been collected; it may be an apomict or show an imbalanced male to female ratio. Further observations are needed on populations of this species.

Additional specimens examined. NEPAL. **Bagmati Zone, Bhaktapur District:** Kathmandu, Gokarna, 1400m, 22 vi 1967 (female fl.), *H. Kanai et al.* 25078 (BM, TI); Gokarna, 7 viii 1966 (female fl.), *P. Pradhan & R. Jhapa* 6436 (KATH); Gokarna, iv 1966 (female fl.), *P. Pradhan & R. Jhapa* 4440 (KATH). **Lalitpur District:** Phulchoki, Kukhure Dote, 7000ft, 5 x 1967 (fr.), Collector unknown 7478 (KATH). **Gandaki Zone, Lamjung District:** Lampata – Shange, 1220–1270m, 8 vii 1973 (fr.), *D.P. Joshi & M.M. Amatya* 731337 (KATH); Marsyandi Khola, Jaghat – Shangy – Kani Gaon – Bahundanda, 9 viii 1983 (female fl.), *H. Ohba et al.* 8340373 (TUS); Marsyandi Khola, Jaghat – Shangy – Kani Gaon, 1300m, 9 viii 1983 (female fl.), *H. Ohba et al.* 8311188 (E, TUS); Jaghat – Shangy – Kani Gaon, 1300m, 9 viii 1983 (female fl.), *H. Kanai* 11188 (BM). **Zone unknown:** Locality unknown (fr.), *Wallich* list no. 7832C (K).

***Croton nepalensis* T.Kuros., sp. nov. Figs 4, 5.**

A *C. tiglium* L. foliis basi truncatis vel subcordatis vel rotundatis, floribus minoribus, capsularis ovalibus 0.8–1cm longis 0.8–1cm latis differt.

Type: Nepal, Gandaki Zone, Gorkha District, Tatopani to Dovan, 970m, 28°13'51"N, 84°52'23"E–28°18'39"N, 84°54'10"E, 22 vii 1994 (fr.), *M. Suzuki et al.* 9455100 (holo. TI; iso. E, KATH, TUS).

Monoecious shrub to 4m, 4–6cm in diameter. *Twigs* stellate-tomentose. *Leaves* alternate; petioles 2–6.7cm long, with a pair of stalked glands at apex, c.1 × c.0.8mm; blades narrowly ovate or ovate, acuminate at apex, truncate, subcordate or rounded at base, 8–13 × 4.5–8cm, serrulate, without glands between teeth, 3-veined, sometimes with 2 additional weaker veins, glabrous to sparsely stellate-hairy above, stellate-hairy below. *Inflorescences* terminal and at upper nodes, racemose, 7–20cm

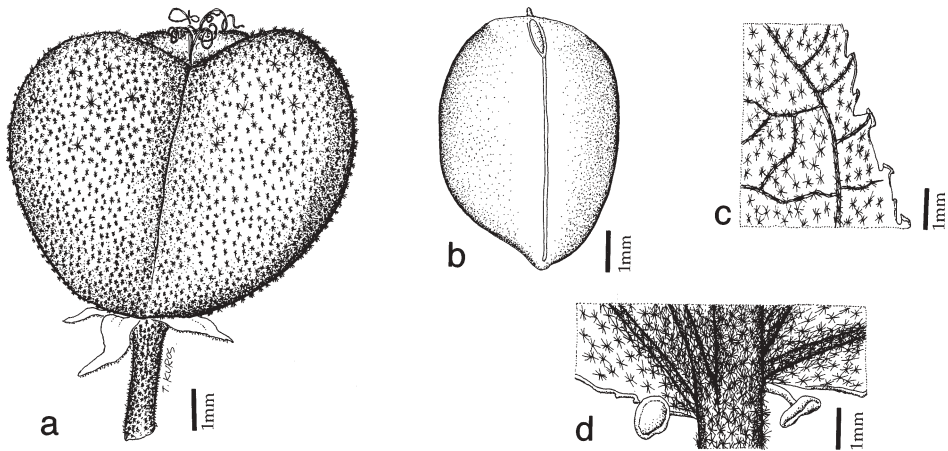


FIG. 4. *Croton nepalensis* T.Kuros.: a, fruit; b, seed; c, leaf margin with marginal glands; d, base of leaf with two stalked glands. Drawn from M. Suzuki et al. 9455100, T1.

long, with many staminate flowers above and 4–7 pistillate flowers below. *Staminate flowers*: pedicels 2–3.5mm, stellate-hairy; sepals 5, ovate, c.1.5 × c.1mm, acute, stellate-tomentose outside, almost glabrous inside; petals 5, elliptic, c.1.5 × c.0.8mm, rounded; stamens 10–13, filaments 1.5–2mm long, anthers ellipsoid, c.0.5mm long. *Pistillate flowers*: pedicels 1–1.5mm, densely stellate-tomentose; sepals 5, ovate, 2–2.5 × 1.5–1.8mm, acute, stellate-tomentose outside, almost glabrous inside; petals 5, elliptic, 1–1.5 × 0.3–0.6mm, rounded or acute, stellate-hairy or almost glabrous on both sides; ovary depressed-globose, c.1.5 × 2mm, densely stellate-tomentose; styles 3, 3–4mm long, bifid. *Capsule* broadly ovoid, 8–10 × 8–10mm, densely stellate-hairy; columella persistent after dehiscence, 5–6mm long; pericarp 0.2–0.4mm thick. *Seeds* broadly ellipsoid, c.6 × 4mm, smooth, carunculate.

Distribution. Endemic to Gandaki Zone in western Nepal and Bagmati Zone in central Nepal. Fig. 6.

Habitat. Relatively common in rocky places, on slopes, or in forest, 970–1800m.

Phenology. Flowers and fruits: July–August.

Key characters. Leaf blades narrowly ovate or ovate, truncate, subcordate or rounded at base, without marginal glands between teeth, 3-veined, sometimes with 2 additional weaker veins, capsule broadly ovoid, not exceeding 10 × 10mm, seeds c.6 × 4mm.

Similar to *C. tigilium* L. in its eglandular leaf margin, but different in having leaves with truncate, subcordate or rounded bases, and smaller, broadly ovoid capsules. *Croton nepalensis* is similar to *C. caudatus* Geiseler in having broadly ovoid capsules, but differs in its eglandular leaf margin, smaller capsules and seeds, and thin pericarp. It also differs from *C. birmanicus* Müll.Arg. in its eglandular leaf margin,



FIG. 5. Holotype of *Croton nepalensis* T.Kuros. (*M. Suzuki et al.* 9455100).

and from *C. calococcus* Kurz in having leaves with basal glands always stalked and an eglandular margin. Details of the differences among *C. nepalensis* and its allied species in Nepal are shown in Table 1.

Notes. (1) Herbarium specimens of this species are often identified as *Croton caudatus* Geiseler, and the specimen cited as *C. caudatus* in Kitamura (1955) is also referable to *C. nepalensis* (*S. Nakao* s.n., 30 vii 1953, KYO!). This species is referred to as *Croton* sp. in Kurosawa (1998) and *Croton* aff. *caudatus* in Kurosawa (in press).

(2) *Croton himalaicus* D.G.Long was described from the eastern Himalaya (Long, 1986), and has been treated variously by different authors. It was maintained as a distinct species by Long (1987). Chakrabarty & Balakrishnan (1988), having compared its description and specimens cited by Long (1986) with numerous

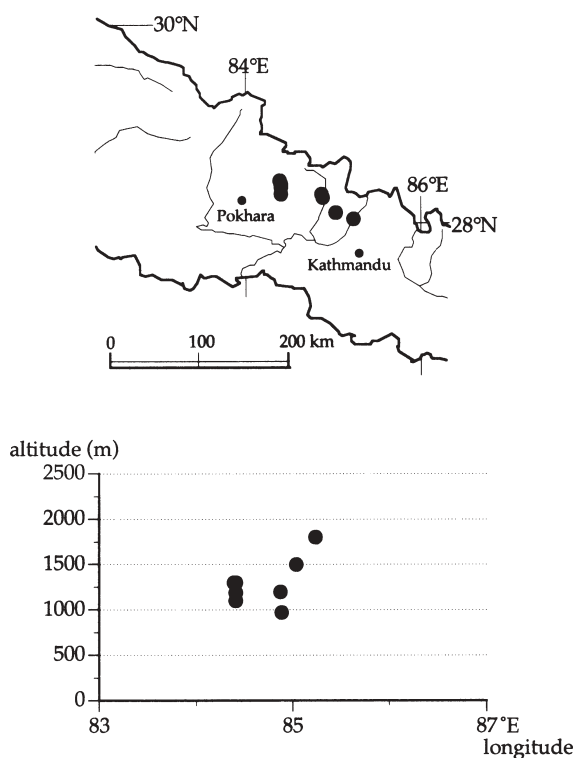


FIG. 6. Map of west-central Nepal showing distribution of *Croton nepalensis* T.Kuros., and graph showing its altitudinal distribution.

TABLE 1. Comparison of *Croton nepalensis*, *C. tigilium* and *C. caudatus* in Nepal

| | <i>C. nepalensis</i> | <i>C. tigilium</i> | <i>C. caudatus</i> |
|-------------------------|---------------------------------|--------------------|------------------------------|
| Leaf margin | Serrulate | Serrulate | Serrate or duplicate-serrate |
| Marginal glands | Absent | Absent | Present |
| Leaf base | Truncate, subcordate or rounded | Cuneate or obtuse | Cordate or subcordate |
| Pistillate sepal (mm) | 2–2.5 × 1.5–1.8 | c.2.5 × 1.5–2 | c.4 × c.3 |
| Capsule shape | Broadly ovoid | Broadly ellipsoid | Broadly ovoid |
| Capsule size (mm) | 8–10 × 8–10 | 15–20 × 15–20 | 17–20 × 16–18 |
| Pericarp thickness (mm) | 0.2–0.4 | c.0.1 | 1.5–2 |

herbarium specimens of *C. tigilium* from southern Asia, concluded that it represented a slightly divergent variant and was not specifically distinct from *C. tigilium* and they synonymized it with *C. tigilium*. Govaerts *et al.* (2000, p. 525), on the other hand, treated *C. himalaicus* as a synonym of *C. birmanicus* Müll.Arg. from Myanmar. Having examined the holotype (*Haines* 828, E!), I agree with Chakrabarty &

Balakrishnan (1988), and *C. himalaicus* is here treated as a synonym of *C. tiglium*. *Croton birmanicus* differs from them in its leaves with marginal glands and smaller capsules. Further synonymy and taxonomic notes on *Croton* in Nepal are given in Kurosawa (in press).

Additional specimens examined. NEPAL. **Gandaki Zone, Lamjung District:** Banjhakhet, 835m, 7 viii 1983 (fr.), *N.P. Manandhar* 9508 (KATH); Marsyandi Khola, Jagat, 1300m – Shangy, 1070m – Kani Gaon, 1150m – Bahundanda, 1300m, 9 viii 1983 (fr.), *H. Ohba et al.* 8331384, 8340378 (TI); Marsyandi Khola, Chams – Jagat, 1300m, 84°23'E, 28°26'N, 8 viii 1983 (fr.), *H. Ohba et al.* 8311175 (TI); Marsyandi Khola, Jagat – Shangy – Kani Gaon, 1100m, 84°24'E, 28°22'N, 9 viii 1983 (fr.), *H. Ohba et al.* 8311205 (TI); Jagat – Hosdoban, 1300m, 30 vii 1953 (fr.), *S. Nakao* s.n. (KYO, TI); Letephant – Laupata, 920–1270m, 7 vii 1973 (fl., fr.), *D.P. Joshi & M.M. Amatya* 731303 (KATH); Buri Gandaki Gorge, south of Jagat, 4000ft, 28°18'N, 84°52'E, 5 vii 1962 (fl.), *J.D.A. Stainton* 3936 (BM, KATH). **Gorkha District:** Yaru – Dovan, 1130m, 9 vii 1983 (fl., fr.), *P.R. Shakya et al.* 7790 (KATH). **Bagmati Zone, Dhading District:** Jharlang, 5000ft, 25 vii 1977 (fl.), *N.P. Manandhar* 258 (KATH). **Rasuwa District:** Thade (Nar Garang), 6000ft (fl.), *M.S. Bista* 3561 (KATH).

ACKNOWLEDGEMENTS

I thank Dr Petra Hoffmann (Royal Botanic Gardens, Kew) for critically reading the manuscript, and the reviewers and editor for their suggestions. Thanks are also due to Dr Koji Yonekura (Botanical Garden, Tohoku University, Sendai) and Dr Acharya Nabin (National Herbarium and Plant Laboratories, Godawari, Kathmandu) for valuable information on Nepalese collectors and localities, and to Dr Shuichi Noshiro (Forestry & Forest Products Research Institute, Tsukuba) for help in producing the maps. I am indebted to the curators of BM, E, K, KATH, KYO, TI and TUS for the opportunity to study their collections. This study was partly supported by Grant-in-Aid No. 06041043 and No. 09041143 from the Ministry of Education, Science and Culture of Japan to Dr Mitsuo Suzuki and a grant from the Midori-ikusei-zaidan to Dr Hideaki Ohba.

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Received 30 October 2002; accepted after moderate revision 13 July 2004