Telopea 'Levin Ena' and 'Levin Hilda' Selected for Cut-flower Production

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Additional index worak. *Telopea speciosissima*, waratah, vaselife, bloom size, bract damage, flower color

Telopea 'Levin Ena' and 'Levin Hilda' are the first releases from a clonal evaluation study initiated in 1979 to characterize selections for cut-flower production. Of the few known clonal forms of *Telopea*, none had been reported as critically evaluated for cut-flower production, even though some commercial growers had identified promising individuals from their seedling plantations. There is a need for cultivars with defined cut-flower characteristics to provide a sound basis for an industry and to provide standards for further comparisons.

The genus *Telopea* (*Proteaceae*) is endemic to southeastern Australia. Of the four known species, only *T. speciosissima* R. Br. and *T. oreades* F. Muell. have direct potential for commercial flower production. *Telopea speciosissima* has the larger, longer-lasting, and more spectacular inflorescence. It consists of a dense, terminal globe-shaped raceme of up to several hundred usually crimson florets spirally arranged on a rachis (collectively referred to as a floral cone) that is surrounded by an involucre of similarly colored bracts.

The species are distinguishable on inflorescence and leaf morphology (Willis, 1959) but also differ in flowering time and the sequence of floret dehiscence, which is acropetal in *T. speciosissima* and basipetal in *T. oreades*.

Flowering of *T. speciosissima* and *T. oreades* occurs annually over the spring to early summer (September to November in the southern hemisphere) depending on locality. Spontaneous hybridization of these species has occurred (Grace, 1984) as flowering periods overlap slightly.

This report describes two clones with *T.*

speciosissima like characteristics that have been studied for five flowering seasons and show promise for cut-flower production.

Origin

A survey of seedling forms conducted between 1979 and 1981 throughout the major growing areas in the North Island of New Zealand revealed 30 promising forms. To this collection the 10 commercially available garden forms were added. All were established in a simulated commercial plantation at the Horticultural Research Centre (lat. 40° 39'S), uniformly managed, and grown to flowering maturity. Characteristics relating to cut-flower performance and other features were assessed. These characteristics included vaselife, bloom weight, flowering time, floret color, bract color, inflorescence proportions, bract count, and bract damage susceptibility.

Based on performance in these trials, 'Levin Hilda' and 'Levin Ena' have been selected for release. They were seedlings originating from private gardens in Waikanae, a town-

ship 20 km south of Levin and were named after the donors. Both were granted Plant Selectors Rights for New Zealand.

Description

'Levin Ena' (clone 11) and 'Levin Hilda' (clone 8) are evergreen shrubs, with alternate, oblanceolate, nonglossy, indurate leaves. Flowers are borne terminally on the previous season's growth. The general vegetative and floral characteristics are typical of *T. speciosissima* (Willis, 1959).

The imposition of commercial annual pinning practices has prevented the assessment of ultimate size dimensions such as height and width. Both selections, however, averaged annual regrowth following harvest of between 650 and 730 mm in length. 'Levin Ena' has thinner stems (8.5 mm measured 200 mm from the inflorescence base) than 'Levin Hilda' (10.3 mm) and the stems tend to be held less erectly.

The stems of the current season's growth of 'Levin Ena' are glabrous, initially olive green (151 B) (Royal Horticultural Soc., 1966) with a brownish secondary cast and turning terracotta brown (164 A) at the end of the growing season. The glabrous leaves are dark green (147 A) above but a lighter green (146B) underneath, 153 to 205 mm long and 27 to 45 mm at maximum width, which is about two-thirds along its length. The leaf margin has serrations mainly confined to about the distal 40% of the length. The leaf base is attenuate and the tip acute.

The inflorescence of 'Levin Ena' has $\approx$ 160 rose-red florets surrounded by an involucre collar of cerise bracts. The outstanding features are its earliness of flowering (late Sep-

Fig. 1. *Telopea* cultivars Levin Hilda (left) and Levin Ena (right).

Table 1. Characteristics of Levin *Telopea* releases—1985 season.

Clone	Flowering time ^z (days)	Display life ^y (days)	Bloom wt ^x (g)	Bract count ^w	Cone ratio ^v	Bract ratio ^u	Floret color ^t (RHS)	Bract color ^a (RHS)	Bract browning ^r (score)
Levin Ena	27	7.4	148	18	1.3	2.4	53 B/C	53 A	1.7
Levin Hilda	35 **	12.8 **	222 **	16 *	1.6 **	2.9 **	53 B/C ---	185 A ---	2.6 *

^zFlowering time from 31 Aug. (September-October southern hemisphere spring).

^yHarvested at 35%-40% reflexed styles, assessed at 21C, 12 hr 1000-lux fluorescent light, end-point perianths shriveled on 50% of florets.

^xInflorescence and 400 mm of stem.

^wRed pigmented only.

^vRatio of cone height to width (maximum dimensions).

^uRatio of bract collar diameter to cone height (maximum dimensions).

^tSimilar proportions of both intensities.

^rOne stem in 10 deviated from the given shade.

^aSusceptibility to bract browning damage a disorder of unknown cause resulting in necrosis. 1 = no damage. 3 = 25% of bract length affected, 5 = 50% of length affected.

^{*}Significant at $P = 0.05$ or 0.01 , respectively (Mann-Whitney nonparametric test).

tember in the southern hemisphere), light weight blooms, and low susceptibility to bract browning damage (Table 1). The floral cone is prominent (Fig. 1) and the bract collar is less so. This selection, however, has superior bract display to *T. oreades*, which flowers slightly earlier and could be a competing product if grown in cooler areas than Levin. The display life (Table 1) is shorter than 'Levin Hilda' but might be improved by harvest at an earlier development stage (Faragher, 1986; Lill and Dennis, 1986). Display life was measured under standard conditions (Dennis and Borst, 1989).

'Levin Hilda' is an upright 'plant. 'Stems of the current season's growth are lightly pubescent, light green (144 B) with a pinkish cast, turning reddish-brown (175 D) toward the end of the growing season. The glabrous leaves are mid-green above (146 A) and a lighter green (146 C) underneath, 159 to 204 mm long and 30 to 40 mm at maximum width, which is located at about three-quarters along its length. The leaf margin has few serrations that are confined mainly to the distal 20% of the length. The leaf base is attenuate and the tip acute. Leaf axils show a brownish pubescence.

'Levin Hilda' flowers in early October (midseason), has a long display life -and a bloom weight slightly heavier than 'Levin Ena' (Table 1). Its susceptibility to bract browning damage is greater than that of 'Levin Ena' though markedly less than that of garden selections flowering at a similar time. The floral proportions make the bracts relatively more prominent than the floret cone (Fig. 1). The inflorescence consists of ≈ 140 rose-red florets surrounded by an involucre collar of ruby-red bracts.

The evaluations did not include comparative yield due to the time required to propagate and grow plants to flowering; *Telopea* can take 3 to 4 years to flower from cuttings. However, total flower bud production over the 1984, 1985, and 1986 seasons ranged between 32 and 43 per plant for 'Levin Ena' to 17 and 28 for 'Levin Hilda'. These counts were done for sampling purposes ≈ 2 months before anthesis, but since *Telopea* produces one crop of blooms annually, they are indicative of potential yield.

Culture

Genus *Telopea* occurs naturally on soils that are acid, infertile, well-drained, and low in organic matter (Blaxell, 1978). All species can develop proteoid roots that, on transfer to fertile soils or potting mixtures, can enhance the uptake of nutrients, particularly phosphate, and could result in toxicity symptoms and death (Lament, 1977; Nichols et al., 1979; Thomas, 1974). *Telopea* spp. should be cultivated in soils low in P (Lord and Willis, 1982). At Levin, this plant has been successfully grown in soilless media and in soils out-of-doors with P levels similar to those used for other ornamental proteaceous species (Dennis and Prasad, 1986; Prasad and Dennis, 1986).

No serious diseases of *Telopea* are recorded in New Zealand. The two major insect pests, leaf roller caterpillar and scale, were controlled by regular applications of pesticides. There was no evidence to suggest enhanced susceptibility of either selection to these pests.

In field plantations, *Telopea* are spaced between 1.5 and 2.0 m within rows and between rows from 3.0 m depending on management practice. Annual pruning at or soon after harvest is undertaken to encourage stems of a suitable length for cut flowers and can remove up to 70% of the previous season's growth.

The plants benefit by protection from strong wind that can break the rapidly produced long-flowering stems that develop in response to annual pruning.

Telopea is regarded as fairly hardy in New Zealand and Australia, tolerating frosts to -7°C (Wrigley and Fagg, 1979) but would probably only be suitable for culture in the United States in Zones 9 and above (U.S. Dept. of Agriculture, 1960) where winter minimums average not less than -7°C .

Availability

The Horticultural Research Centre, Levin, releases these selections but does not have stock available for general distribution. Releases have been made to wholesale nurseries in New Zealand and Australia and these

will be the source of plants for introduction. A list of these nurseries can be obtained from the Horticultural Research Centre, Levin.

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