

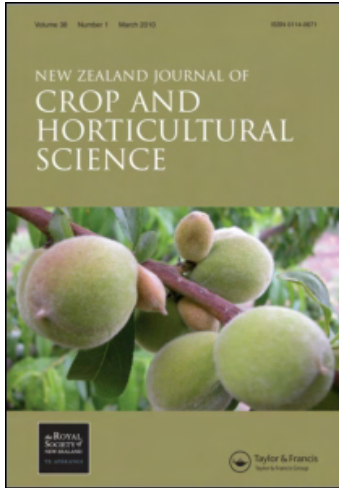
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### 'Rajah' lentil (*Lens culinaris* Medik.)

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## Cultivar release

### 'Rajah' lentil (*Lens culinaris* Medik.)

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**Abstract** 'Rajah' (*Lens culinaris* Medik.) is a new red lentil cultivar developed for the New Zealand lentil export industry. This cultivar has a larger seed size than the only other commercially available red cotyledoned lentil cultivar grown in New Zealand—'Titore'. 'Rajah' has improved tolerance to ascochyta blight caused by *Ascochyta fabae* f.sp. *lentis*. In spring-sown regional evaluation trials conducted in Canterbury by Crop & Food Research, over three successive seasons, 'Rajah' produced seed yields consistently higher than 'Titore' and exhibited a higher level of tolerance to ascochyta blight.

**Keywords** 'Rajah'; red lentil; *Lens culinaris*; ascochyta blight

#### ORIGIN AND SELECTION

'Rajah' (*Lens culinaris* Medik.) originates from a single plant selection made at Crop & Food Research at Lincoln, New Zealand in 1987/88 from lentil Accession Number 'ILL 6243', which originated from the International Centre for Agricultural Research in the Dry Areas (ICARDA), Syria. The parentage of 'Rajah' is 'ILL 4400' × 'ILL 703', both of which are breeding lines from the ICARDA lentil improvement programme. 'Rajah' was selected for resistance to ascochyta blight caused by *Ascochyta fabae* f.sp. *lentis* combined with early maturity and a large seed size.

The resultant seeds from this selection were multiplied in a glasshouse for two generations during 1988 and concurrently screened for resistance to ascochyta blight in a glasshouse environment by inoculating seedlings with ascochyta blight isolated from locally grown lentil seed. From 1988/89 to 1992/93 'Rajah' was included in spring-sown, on-farm regional trials in Canterbury where its agronomic performance was assessed against commercial standards.

Single plant selections were bulked in 1990/91 and multiplied in Washington State, United States, during 1991 to speed up the seed multiplication procedure. After further multiplication during 1991/92 in New Zealand, semi-commercial evaluations were conducted in Canterbury during 1992/93 in association with a local seed exporting company (Peter Cates Ltd).

#### MORPHOLOGICAL DESCRIPTION

The dry seed of 'Rajah' has a mean 1000 seed weight of 50 g (c. 30% larger than 'Titore'). The cotyledon colour is orange and the testa colour brown, with 1–3 seeds produced per inflorescence. Seedling emergence is slower than 'Titore' occurring c. 5 days later. The leaflets of 'Rajah' are slightly smaller than 'Titore' and are a darker green colour. 'Rajah' produces on average five branches above ground level compared with 'Titore's' three, and reaches a similar height to 'Titore' when sown in late spring in Canterbury. Two or three flowers are produced per peduncle.

Under spring-sown conditions in Canterbury, 'Rajah' flowers, on average, 8 days earlier than 'Titore' (71 days after sown). Dry seed harvest can occur up to 2 weeks earlier than 'Titore'. A purple pod pigmentation is present at the green, flat pod stage of development but is absent on dry pods. 'Rajah' seed pods are larger than those produced by 'Titore' and have a blunt distal end. 'Rajah' exhibits a higher level of tolerance to ascochyta blight caused by *Ascochyta fabae* f.sp. *lentis* than 'Titore'. Like

**Table 1** Mean performance of 'Rajah' and 'Titore' in 12 regional evaluation trials conducted in Canterbury, New Zealand from 1990/91 to 1992/93. (Means followed by the same letter are not significantly different ( $P < 0.01$ ). CV% (derived from combined analysis) seed yield 13.7, LSD (1%) 0.65 t/ha.)

Cultivar	Days from sowing to full flower	Lodging <sup>a</sup> score	Seed yield (t/ha)	Tolerance to ascochyta blight <sup>b</sup> resistance score	Seed weight (g/100 seeds)
Rajah	71	3	2.70 <sup>a</sup>	4	50
Titore	79	2	1.96 <sup>b</sup>	7	38

<sup>a</sup>Plot lodging was measured before harvest on a scale of 1 (erect) –4 (prostrate).

<sup>b</sup>Tolerance to ascochyta blight was scored on a scale of 1 (highly resistant) –9 (highly susceptible).

'Titore', it is susceptible to botrytis caused by *Botrytis cinerea* and Cucumber Mosaic Virus. The reaction of 'Rajah' seedlings and adult plants to these two pathogens is similar to 'Titore'.

## PERFORMANCE

'Rajah' has been evaluated in 12 regional evaluation trials in Canterbury between 1990/91 and 1992/93, where its performance has been compared with the commercial standard cultivar 'Titore'. Statistical analysis indicates that seed yields from 'Rajah' were significantly higher than 'Titore' (Table 1). Rajah tends to lodge more than 'Titore' but this is not seen as a significant disadvantage as it is still able to be mechanically harvested.

## UTILISATION

'Rajah' has been developed for the New Zealand domestic and export lentil markets where it will be used for splitting and consumption as unprocessed seed. The larger seed size of 'Rajah' compared to 'Titore' is seen as a significant improvement by

New Zealand's main export markets. Regional trials in Canterbury indicate that 'Rajah' is more suited to spring planting than autumn planting. All regional trials have been conducted in Canterbury where almost 100% of New Zealand's lentil production occurs.

## ACKNOWLEDGMENTS

I acknowledge the ICARDA Legume Improvement Programme for supplying Crop & Food Research with the Lentil International Yield Trial form which 'Rajah' was selected; Dr Mathew Cromey for assisting with ascochyta blight screening tests; Mr Ross Hanson for conducting regional evaluation trials; Mr Allan Lill for conducting seed multiplication and on-farm evaluations; and staff of Peter Cates Ltd for conducting commercial evaluations and providing marketing expertise, which has greatly assisted in the development and commercialisation of this cultivar.

## REFERENCE

International Board for Plant Genetic Resources and ICARDA 1985: Lentil descriptors. Rome. 15 p.