Enhancing Yield Benefits from Intercropping of Pulse and Oilseed Crops

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**Introduction**

Intercropping pulse and oilseed crops often increases overall crop productivity, but impact varies:

**Australia**
- Fletcher et al. 2016, Crop Past. Sci. 67: 1252-1267

**Western Canada**

**Materials & Methods**

1. Crop system (main plots, 4 blocks)
   - Lentil monocrop
   - Pea monocrop
   - Oilseed monocrop (canola or yellow mustard)
   - Lentil-Oilseed intercrop
   - Pea-Oilseed intercrop
   (Intercropped pulse seeding rate = 75-100% of monocropped)

2. Subplot treatments
   - Check: 0 kg N/ha, intercropped oilseed seeding rate at 30% of monocropped
   - 50N#1: 50 kg N/ha just after seeding (¹⁵N-labelled), same seeding rates as check
   - 50N#2: 50 kg N/ha in mid-June (¹⁵N-labelled), same seeding rates as check
   - Low rate: 0 kg N/ha, intercropped oilseed seeding rate at 10% of monocropped
   - High rate: 0 kg N/ha, intercropped oilseed seeding rate at 75% of monocropped
   - 100N: 100 kg N/ha (monocrop oilseed only)

3. Sites
   - 2018: CR18 and LB18, oilseed=canola
   - 2019: LB19 and WS19, oilseed=mustard
   - LB-winter: winter pulse + spring canola

4. Land Equivalent Ratio (LER)
   - At same N rate (0 or 50 kg N/ha)
   - At standard N rate
     - 100 kg N/ha for oilseed monocrop
     - 0 kg N/ha for pulse monocrop

**Results**

**Plant Density**
- Monocrop densities below target at WS19 and LB-Winter
- Pulse intercrop densities were 60 to 100% of monocrop densities
- Oilseed intercrop densities were 75, 32, and 14% of monocrop densities

**Nitrogen Dynamics (2018)**
- Intercropped canola strongly out-competed pulse crops for fertilizer N
- Intercropping increased pulse %Ndfx, but reduced N₂ fixation

**LER**
- LER ranged from 0.98 to 1.66 using same N rates (mean = 1.20) and from 0.84 to 1.47 using standard N rates (mean = 1.10)

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*Excluding LB-winter.