

## Cover crops in maize (*Zea mays*) enable reduced herbicide use

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**Summary** A 4-year study investigated weed control in maize following four different cover crops compared to winter fallow. Trial site was at Tamahere near Hamilton NZ on a sandy loam soil. The four winter cover crops; gland clover (*Trifolium glanduliferum*) cv Prima, faba bean (*Vicia faba*) cv Ben, oats (*Avena sativa*) cv Milton, and ryegrass (*Lolium multiflorum*) cv Tama were first planted on 2 June 2016 then on 11 June 2017, 29 May 2018 and 22 May 2019 on the same plots. Each year the cover crops were terminated 3-4 days prior to direct drilling maize by spraying with glyphosate (2.16 kg ai/ha + Pulse 0.1%). Five herbicide regimes were evaluated on each of the cover crops and fallow each year, viz. no herbicide, pre-emergence only, pre- and post-emergence, a single post-emergence and two post-emergence herbicide applications. Maize production for both silage and grain were measured each year. Establishment of all cover

crops was excellent in the first year, but the small seeded gland clover failed in years 2 and 3 due to a build-up of maize residue and these plots were cultivated in year 4 to enable establishment. Ryegrass failed to establish in year 3 and plots were cultivated in year 4. For maize silage, Gland clover, faba beans and oats all shared the highest yield on different years while for grain, the legumes always performed best. Yields in the untreated fallow plots dropped each year. For faba beans and oats, maize yields were never significantly improved by any of the herbicide regimes compared to untreated whereas in all but the first year, yields in the fallow plots were. Gland clover and ryegrass gave variable results, but these reflect the establishment difficulties. Overall, post-emergence weed control tended to result in higher yields than regimes involving a pre-emergence application.

**Keywords** Cover crops, maize, weed control