A participatory approach to variety trials for organic systems

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Participatory methods help resolve the practical problems experienced by farmers and growers. This project is using a participatory methodology to assess:

1. The influence of local environment on wheat varietal performance;
2. The agronomic merits of a range of cereal varieties grown under organic conditions and their suitability for the end user;
3. Which seed-borne diseases exist above thresholds for farm saved seed, and thus may cause problems in the organic seed production;
4. The benefits of a range of organic seed treatments;
5. Practical guidelines for the production of quality organic seed; and
6. A novel approach to knowledge analysis, evaluation and dissemination to implement technological developments.

Yield survey

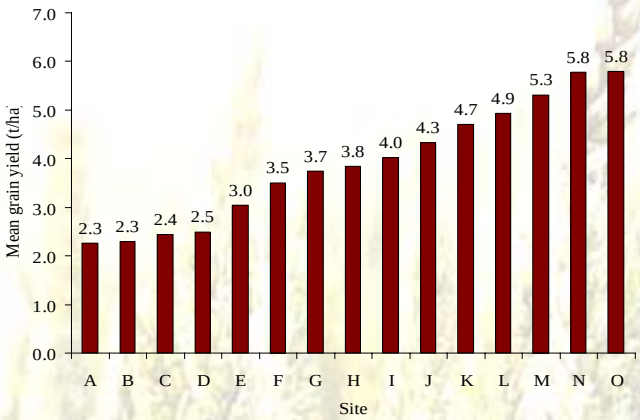


Figure 1: Variety trials at 15 trial sites across a wide geographical range in 2004. The wheat varieties Hereward, Xi-19, Solstice and their mixture were trialled at 15 field sites across the country. Mean grain yield (15% moisture content) plotted against field site (l.s.d. 0.62). There was a 2.5 fold spread of yield across sites.

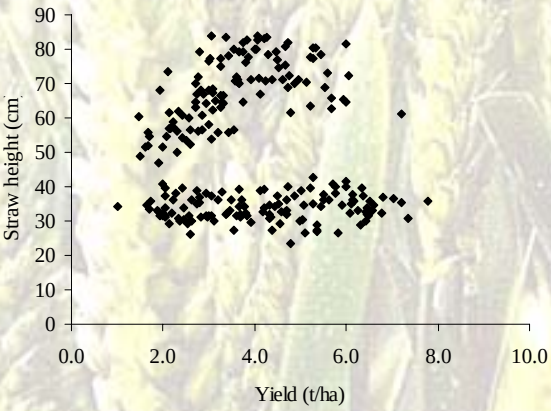


Figure 2: Straw height plotted against grain yield at 15 trial sites across a wide geographical range in 2004. Sites fell into two distinct categories, those with "short" plants (<40cm; western sites) and those with "tall" plants (>50cm; eastern sites). It is also apparent that "short" plants were on average higher yielding relative to "tall" plants.

Seed-borne disease

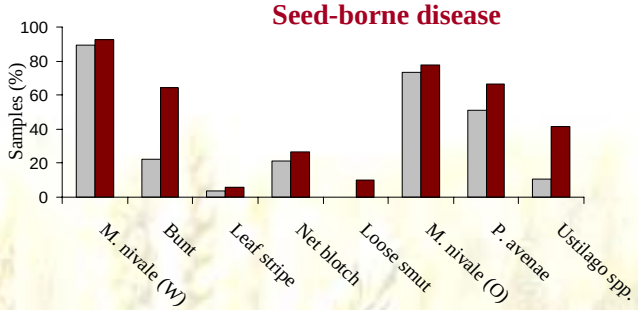
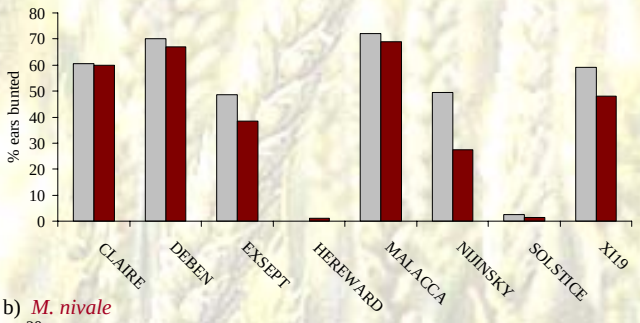


Figure 3: Seed for organic multiplication, supplied by merchants and farmers was tested for seedling blight *(Microdochium nivale)*, bunt *(Tilletia tritici)*, ear blight *(Fusarium sp.)*, glume blotch *(Septoria nodorum)* and smut *(Ustilago nuda)*. *There was no* significant difference between organic (grey) and conventional (red) seed.

a) Bunt



b) *M. nivale*

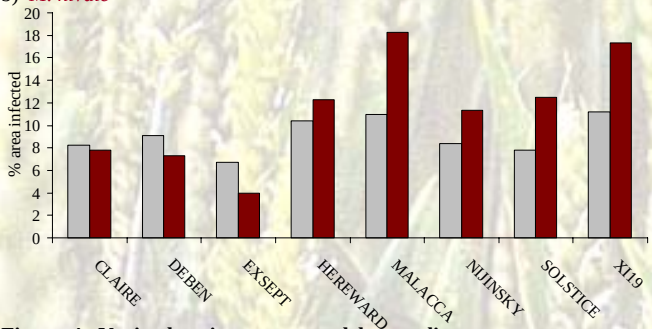


Figure 4: Varietal resistance to seed borne disease. The level of bunt (a) and *Microdochium nivale* (b) infection was recorded in years 2003 (grey) and 2004 (red) in inoculated outdoor trials. Some varieties offered some resistance to certain diseases.

Seed treatments for organic systems. Among a range of seed treatment for organic systems, only garlic seed treatment has shown promise in terms of yield improvement. This needs to be confirmed in 2005.

Conclusions

1. Environmental variation was more important as a determinant of wheat yield and plant form than either farming system or variety (Figure 1 and 2).
2. The 15 participatory trial sites divided into two major clusters either with "short" straw (all in the West of the country) or "tall" straw (all in the East of the country). This effect may have been due to an environment x crop interaction. The "short" sites had more stems per unit area than those at the "tall" sites, but the total straw length per unit area at short sites was less.
3. There was no evidence that seed-borne diseases occurred at higher levels in organic production, and the health status of all seed was generally good across all sites and varieties. However, occasional higher levels of bunt meant that some seed lots should be taken out of further production, and seasonal factors may increase *M. nivale*. Ergot was at high levels in many samples.
4. Garlic oil seed treatment showed some potential yield increases compared to other treatments; further field trials are being carried out in 2005.
5. A collegiate participatory method has been used to balance statistical rigour with farmers' objectives of managing a whole farm system. The knowledge and experience from this project will be evaluated critically to define how participatory approaches may be used in the future.