614. **Effects of Sowing Measures on Weeds and Yield of Organically Grown Wheat.** Arnd Verschwele[1]; [1]Julius Kühn Institute, Braunschweig, Niedersachsen, Germany

Weed control by harrowing is an essential measure in organically grown cereals, but it is also known to be less effective against perennial weeds. Such problems might be solved by using a more effective hoeing which needs wider row spaces. On the other hand, there is a risk of low competitiveness in wide crop stands, particularly if mechanical control effects are unsatisfying.

Therefore, a new approach has been investigated by using a crop design with alternating crop bands and crop-free bands. Using hoes in the crop-free band as well as a higher crop competitiveness within the crop band are two possible effects in order to make weed control more effective.

Three winter wheat experiments were conducted in 2005, 2006 and 2007 (year of harvest) at the organic farming research area. The trials were performed in a block design with 4 replications and a plot size of 120 m^2 including the following row spacings:

(a) narrow spacing: row distance of 100 mm,

(b) band spacing: bands of 4 rows (400 mm width) alternate with crop-free bands (300 mm width),

(c) wide spacing: row distance of 400 mm.

As a second factor we tested two winter wheat cultivars with different crop competitiveness (1. Ludwig, 2. Pegassos). Pegassos is known as a cultivar fairly adapted to the conditions of organic farming. It is characterised by prostrated and large leaves whereas Ludwig can be described by a more upright growth and consequently a low weed suppressing ability.

Because of a very high initial weed infestation it was not possible to keep plots weed free. Depending on the weed density all plots have been harrowed 2-3 times, additionally the plots with the crop bands and wide rows (variant b and c) have been hoed two times. Among others, the following parameters have been assessed: weed coverage, weed biomass, weed number, crop yield and crop quality. Data were analysed by a multifactor analysis process using Statgraphics Plus, version 5.1. Based on all data, mean values and confidence levels were calculated by considering the 3 tested factors row spacing, cultivar and year.

The initial weed density varied from 225 to 451 weeds m^2 . The most frequent weed species were *Lamium* spp., *Veronica* spp. *Stellaria media* and *Urtica urens*. The weed density assessed before mechanical control measures was not effected by row spacing (P = 0,737) and year (P = 0,069) but by cultivar (P = 0,006). There were no significant interactions between these factors. However, compared to the number of weeds there were stronger effects on the weed biomass. Row distance and year did effect the weed dry matter assessed at growth stage BBCH 61-65 significantly (P = 0,016 and 0,000). The following weed biomass was estimated at the 3 row spacings: (a) 21.9, (b) 2.61, (c) 45.9 g/m^2. Differences between (a) and (b) were not significant, but the wide spacing (c) resulted in significant higher weed infestation. In 2005 and 2006 there was also a cultivar effect on weed infestation: Corresponding to a higher crop cover, Pegassos showed a stronger weed suppression rather than Ludwig, especially in the wide spaced crop stand. No differences between both cultivars have been observed in 2007 and at the band spacing.

All factors (row spacing, cultivar, year) had a significant effect on the grain yield of winter wheat ($P<0.001$). The highest grain yield averaged over the 3 years (6.24 t/ha) was measured at band spacing (b) compared 5.85 t/ha at narrow spacing (a) and 5.28 t/ha at wide spacing (c). This indicates the high compensating ability of the both wheat cultivars. The results show that, at least under favourable soil and weather conditions, good weed control efficacy can be combined with high grain yield by using a band sown crop stand.