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“Competition for Resources in a Changing World:  
New Drive for Rural Development”

## Generation of Adaptable Diversified Modern Genetic Resources for On-Farm Selection and Participative Breeding of Wheat

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### Abstract

Plant breeding approaches favouring genetic uniformity for all traits has drastically reduced the diversity within varieties and species in agriculture over the past 100 years. Breeders and pathologists have all along pointed out that almost all co-evolutionary processes between hosts and their pests and pathogens have been eliminated. Also, dynamic adaptation of plant populations to changing environments e.g. climatic change is much hampered. While traditional landraces usually are genetically more plastic than modern varieties they often are inferior in performance. An alternative “evolutionary breeding” approach using composite crosses (CC) of up to 20 modern wheat varieties is currently pursued by a network of scientists within Europe. Three populations consisting of all 20 parents, 12 high quality or nine high yielding parents were created in 2001 and F4 seeds were distributed in 2005 to researchers within a European network. The aim is to produce modern landraces that combine the advantages of the breeding successes of the last 120 years, while reintroducing diversity into the system. In addition, within the populations new genotypes are expected to arise constantly. Currently, the CC populations that are being maintained at University of Kassel under organic and conventional conditions are in the F7 in replicated large plots and compared to modern wheat varieties grown under the same conditions. The morphological and resistance diversity in the populations is still extremely high, indicating ongoing outcrossing and segregation. The presentation will give a general introduction into the concept of modern landraces for diversified agricultural systems and the potential of this approach for use in participatory breeding. Field data up to the F7 will be presented.

**Keywords:** Co-evolution, evolutionary breeding, modern landrace, plant protection