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Project "Lupi-Breed": Improving yield potential, yield stability and seed quality of lupins as protein plants
Work package: Weed suppression and intercropping

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State of art and aim: The overall goal of the project, which has been started in spring 2015, is to improve productivity of narrow-leafed sweet lupin (*Lupinus angustifolius*) and yellow sweet lupin (*L. luteus*) with regard to kernel yield, yield stability, and seed composition. In addition, the question shall be addressed whether the narrow genetic basis of current breeding materials may be broadened by including genebank accessions as plant genetic resources. Another task is to optimize lupin cultivation systems for non-chemical weed control by optimizing intercropping cultivation and the establishing of a system for testing the weed suppression of new varieties resp. pre-breeding lines.
These aims should be achieved in the joint project, carried out at the Julius Kühn Institute with the Institute for Breeding Research on Agricultural Crops (coordination) and the Institute of Resistance Research and Stress Tolerance, the Thünen-Institute of Organic Farming, the Leibniz Institute of Plant Genetics and Crop Plant Reseach and Saatzucht Steinach & Co. KG.
The project is expected to provide fillips to lupin breeding, to improving agricultural practice and to enhancing acceptance of lupins as protein sources for feed and food applications.

Results and discussion: A field experiment was carried out in the years 2006 – 2008 with two varieties (*cv.* Boruta, determinated type and *cv.* Bora, branched type) and different row distances (12.5, 25.0 and 37.5 cm). The results showed a better weed suppression of the branched variety Bora (Böhm & Aulrich 2011). An experiment carried out in the years 2005-2007 at two sites and different seed ratios of the two blue lupin varieties Boruta and Bora intercropped with wheat or barley showed that the yield percentage of blue lupins was very low and did not reach more than 25 % (Böhm et al. 2008). On basis of these results we would like to integrate the question of fitness of pre-breeding lines with respect to their weed suppression and their suitability for intercropping. At the Thünen Institute of Organic Farming (i) a test system will be developed for the detection and evaluation of the weed suppressive effect of blue lupins, (ii) this test system will be tested with pre-breeding lines of blue lupin and (iii) the intercropping of blue lupin will be optimized with regard to weed suppressive effects and the highest possible yield of lupin. For this purpose, (i) in the first project year 2015 two phenological different varieties will be cultivated combined with selected "artificial weeds" and different seed rates, (ii) in the second and third project year this test system will be tested with eight selected pre-breeding lines in field trials and (iii) different seed densities of the mixing partners will be cultivated in combination with the selected pre-breeding lines. The realized lupin yield, as well as the accumulated weed biomass and the PAR measurements, will be evaluated. First results will be presented in a poster at the conference.

References:

Böhm H *et al.* (2008) Proc. 12th International Lupin Conference, Perth 42-46.
Böhm H, Aulrich K (2011) Proc. 13th International Lupin Conference, Poznan 144-148.

Tags: *Lupinus angustifolius*, intercropping, weed suppression, breeding

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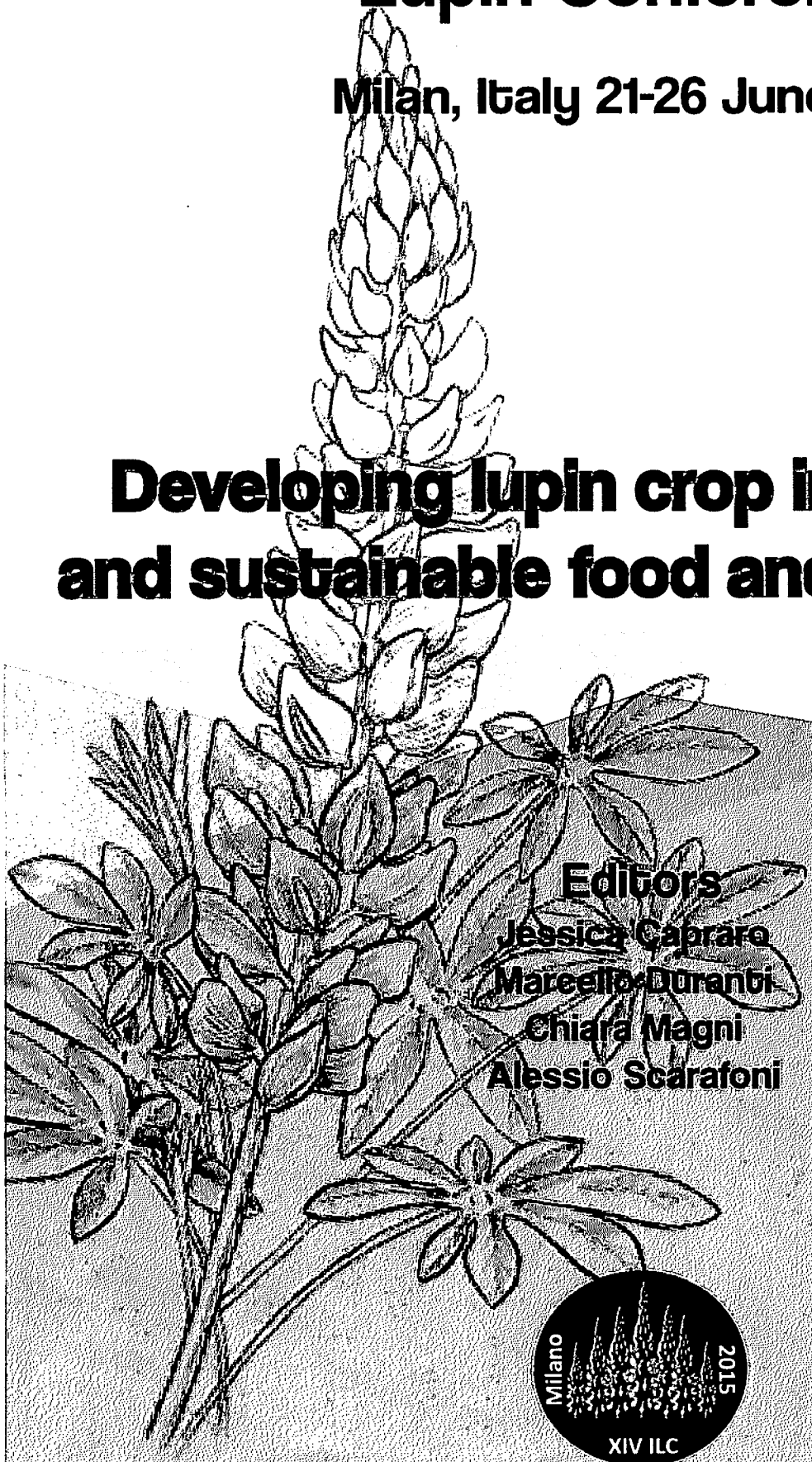

Developing lupin crop into a major and sustainable food and feed source

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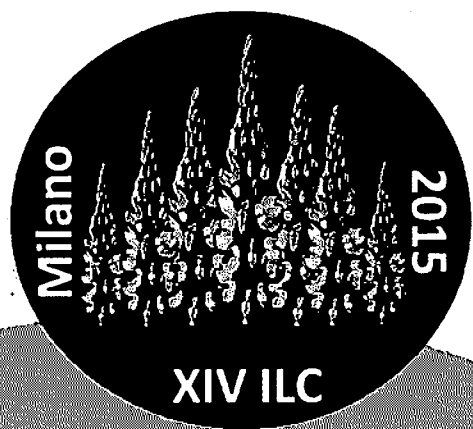

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