

# Setting up two new EMS Populations in hexaploid wheat



Christophe Tatout\*, Xavier Titeca-Beauport\*, Jean-Bruno Beaufumé<sup>§</sup> and Sébastien Praud\*

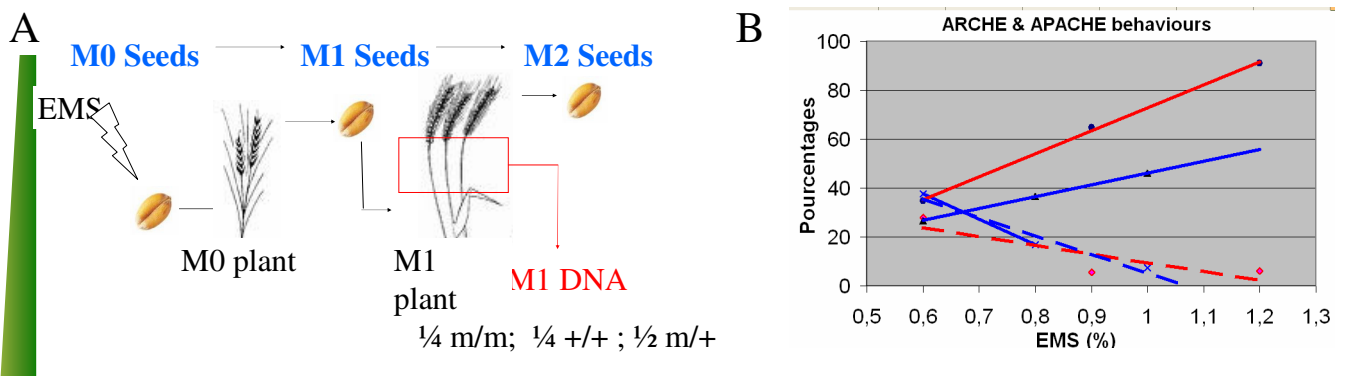


\* Biogemma: ZI du Brézet, 8, rue des frères Lumière 63028 Clermont-Ferrand Cédex 2, FRANCE  
<sup>§</sup> Limagrain Verneuil Holding: Ferme de L'étang, BP3, 77390 Verneuil L'Etang, FRANCE



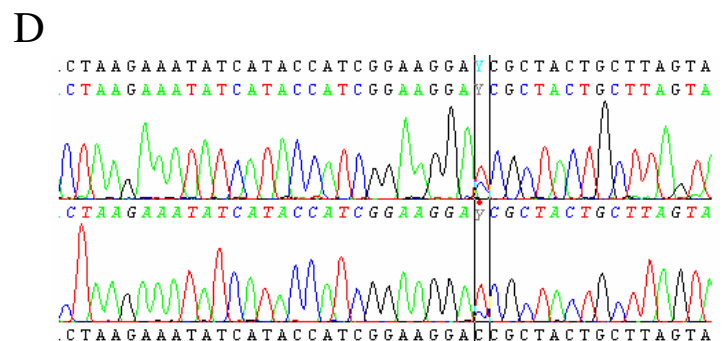
**Summary:** Biogemma has created a new collection of 2,000 and 5,000 plant populations from two varieties from Limagrain Verneuil Holding (LVH) respectively Arche, a spring type, and Apache a winter type, both adapted to European Agronomic conditions.

Wheat seeds have been treated with EMS at different doses (from 0.6 to 1.2%) and grown to maturity. Plants have been propagated and DNA sampled in order to set up molecular screens for candidate genes. Early steps of characterization are ongoing. This work has been performed in the frame of "Semences de Demain", a project funded by the Ministry of Industry of France.



**Figure 1: General scheme to raise the wheat populations (A) and EMS sensitivity (B).**

**A)** EMS treatment was applied on seeds from two LVH varieties (ARCHE -spring wheat- and APACHE -winter wheat- at different doses (from 0.6 to 1.2%). The main spike was harvested on M0 plants and 10 M1 seeds selected for the next generation. DNA was collected as a pool of 10 segregating M1 plants and M2 seeds stored for further uses. The whole collection is of about 7,000 plants. **B)** Solid lines indicate the percentage of lethality, and the dashed lines indicate the percentage of sterility in respect of the EMS dose applied. APACHE (in blue) was less sensitive to EMS than ARCHE (in red) according to the reduced lethality.



**Figure 2: Mutation discovery.**

**A)** Phenotypic alterations were scored during propagation of M1 seeds. Dwarf, sterile or late flowering plants were observed at low frequency and especially for higher EMS dose (1.2%). **B)** Mutations were scored by direct Sanger sequencing on both DNA strands for a set of candidate genes. The rate of mutagenesis was calculated according to the following formula: [(amplicon size in kb \* number of plants) / Number of mutations]; it is of 1 mutation / 63kb of sequence for ARCHE population.

**Conclusion:** Biogemma has created two new populations of mutagenesis of 7,000 plants with two LVH varieties ARCHE and APACHE (hexaploid wheat). The rate of mutagenesis is about 1 mutation every 63 kb. This is somehow less than the rate of mutagenesis reported by Slade et al., 2005 which was of 1 mutation every 26kb. EMS sensitivity (91% of lethality at 1.2%EMS for ARCHE) did not allow us to increase the dose of EMS. The rate of mutagenesis may be explained by the fact that the different varieties have a different sensitivity, as shown in this work.

These populations will constitute an efficient resource to identify new alleles in genes of interest and their evaluation in breeding