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Swedish Board of AgriculturePlant and Control Department
[REDACTED]**Assessment of the legal status of cybrid plants**

The Swedish Board of Agriculture (SBA) is sending this letter to inform you of our recent assessment regarding the legal status of the cybrid plants described below. We have been contacted by researchers who wanted to know if they had to apply for a field trial permit, *i.e.* if their cybrid plants are considered as GMOs. We have decided that there is no need for them to send us an application since we do not regard their diploid cybrids as GMOs.

Cybrids can also be produced in other ways. We have only assessed the plants described by the researchers and we have pointed out that our assessment does not necessarily apply to other plants produced in similar ways.

The cybrids have, somewhat simplified, been produced as follows:

1. *Arabidopsis thaliana* has been treated with a substance that causes mutations. After the treatment, a plant with a non-functional *CENH3* gene has been obtained.
2. A DNA sequence has subsequently been inserted into the chromosomal DNA (in the cell nucleus) of the plant. The insertion of the DNA sequence results in a modified expression of the *CENH3* gene. In the inserted DNA, the gene sequence for GFP (green fluorescent protein) is also included.
3. The *A. thaliana* from step 2 is crossed with a nonmodified (wild type) *A. thaliana*. After fertilization, a progeny is obtained where all chromosomes derived from the modified plant have been eliminated due to the modification. When the plant from step 2 is used as the maternal plant in a cross with a wild type as the paternal plant, the offspring only obtains DNA present in mitochondria and chloroplasts from the genetically modified plant. The nuclear DNA (the chromosomes) is obtained from the nonmodified paternal plant. Thus, the resulting seed does not contain the DNA sequence that was inserted into the maternal plant in step 2 (neither in the embryo nor in the endosperm). The offspring, which is called a cybrid, contains only half the set of chromosomes.
4. The number of chromosomes in the cybrid is doubled to obtain a fertile plant with two of each chromosome (diploid). The chromosome doubling can happen either spontaneously or be obtained through chemical treatment.

The seeds obtained after an additional generation will be used in the field trial.

It is the opinion of the SBA that it is the plants that are going to be used in the field trial, *i.e.*, in this case, the diploid cybrids, that should be assessed.

Among the steps listed above, the plant in step 2 is the only plant that is a GMO and that is not exempt from regulation according to Directive 2001/18/EC (Annex I A, part 1). The seed resulting from the fertilization in step 3 gives rise to a plant that does not contain the DNA inserted in the parent plant in step 2. The chromosome doubling (polyploidy induction) in step 4 is, according to Annex I A, part 2 in the same directive, not considered to result in genetic modification if it does not involve the use of recombinant nucleic acid molecules or GMOs. Since the chromosome doubling has not included any such use, the resulting plant is not a GMO according to our assessment. It is reasonable not to take previous generations into account when the previously inserted DNA is absent in the end product.

The steps described above do not involve any “new” methods of mutagenesis. The ruling of the European Court of Justice (case C-528/16) is therefore not relevant in this case.

All in all, our assessment leads to the conclusion that the diploid cybrids have been developed using a method that does not lead to a GMO.