

# FluxTransgenics: A Comprehensive Management System for Plant Transformation Facilities

C Botelho<sup>1</sup>, A Faria-Campos<sup>1</sup>, A Folgueras-Flatschart<sup>2</sup>, P Batista<sup>1</sup>,  
R Noda<sup>2</sup>, A Carneiro<sup>2</sup>, S Campos<sup>1</sup>

<sup>1</sup> Laboratório de Universalização de Acesso – DCC - UFMG  
<sup>2</sup> Núcleo de Biologia Aplicada – NBA - Embrapa Milho e Sorgo - MG

cbotelho@dcc.ufmg.br; alessa@dcc.ufmg.br; aureavff@cnpmc.embrapa.br; batista.phs@gmail.com;  
roberto.noda@cnpmc.embrapa.br; andreac@cnpmc.embrapa.br; scampos@dcc.ufmg.br

## Introduction

The production and commercial liberalization of the Genetically Modified Organisms (GMOs) are currently the focus of important discussions. In order to guarantee quality and reliability of their trials, products and services, companies and institutions that act in this area must adopt new approaches on management, organization and registering of the conditions at the laboratories where field studies are carried out. Computational systems for laboratory data storage and management known as Laboratory Information Management Systems (LIMS) are essential tools to help in this process. In this work, we describe the development of the FluxTransgenics LIMS, this system has been designed to manage data from the Núcleo de Biologia Aplicada Laboratory at Embrapa Milho e Sorgo-MG-Brazil. This facility works on the analysis and production of transgenic maize and sorghum plants. Two different workflows have been constructed for data management considering the two main methods used for maize and sorghum transformation: the use of the bacteria *Agrobacterium tumefaciens* and the Microparticle Bombardment.

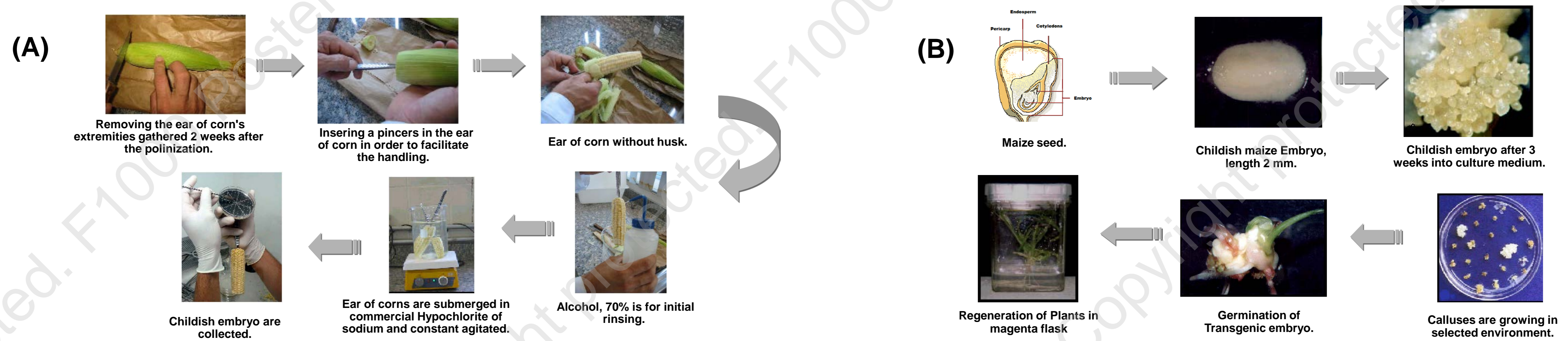


Figure 1. Activities of the Núcleo de Biologia Aplicada laboratory at EMBRAPA Milho e Sorgo - MG. (A) Activities of the harvesting of immature embryos. (B) Formation of calluses and maize plant regeneration in medium.

## Objectives

Development of a customized LIMS to store and manage data from the plant transformation process performed using *Agrobacterium tumefaciens* and microparticle bombardment.

## Methods

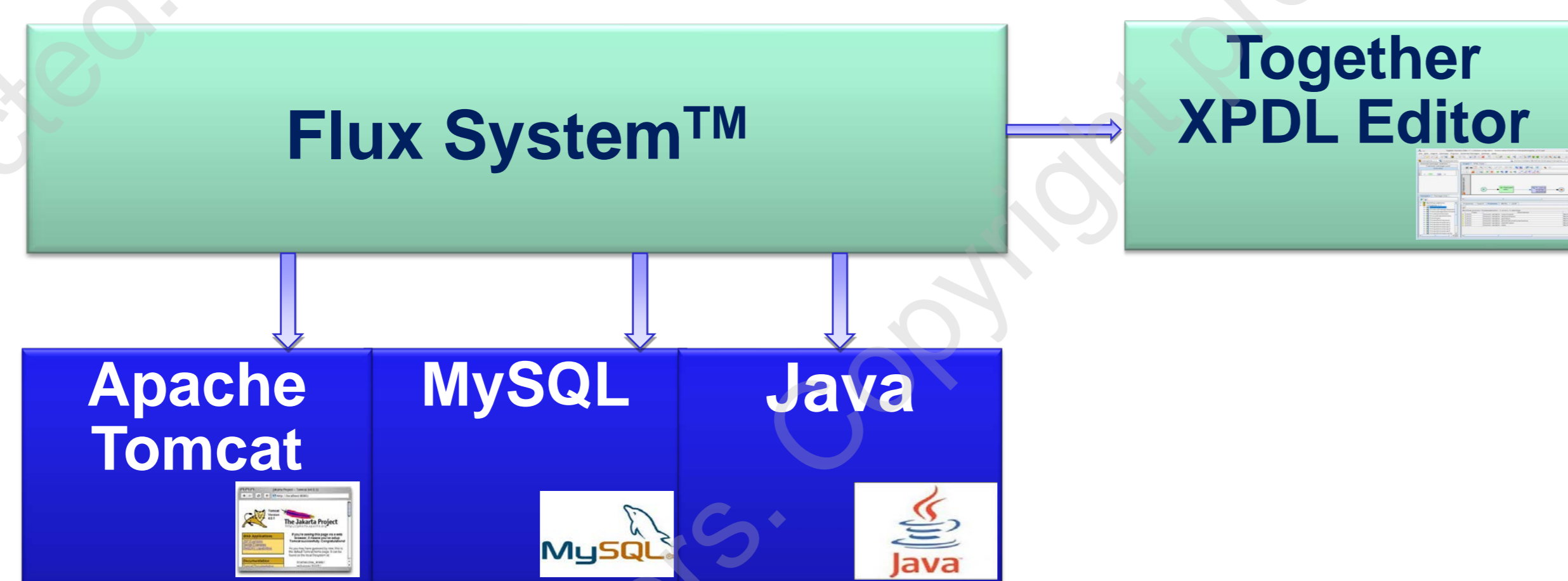


Figure 2. Architecture of the FluxTransgenic LIMS with the tools used to run the workflows for management of the processes and data from transformation Using *A. tumefaciens* and microparticle bombardment.

## Results

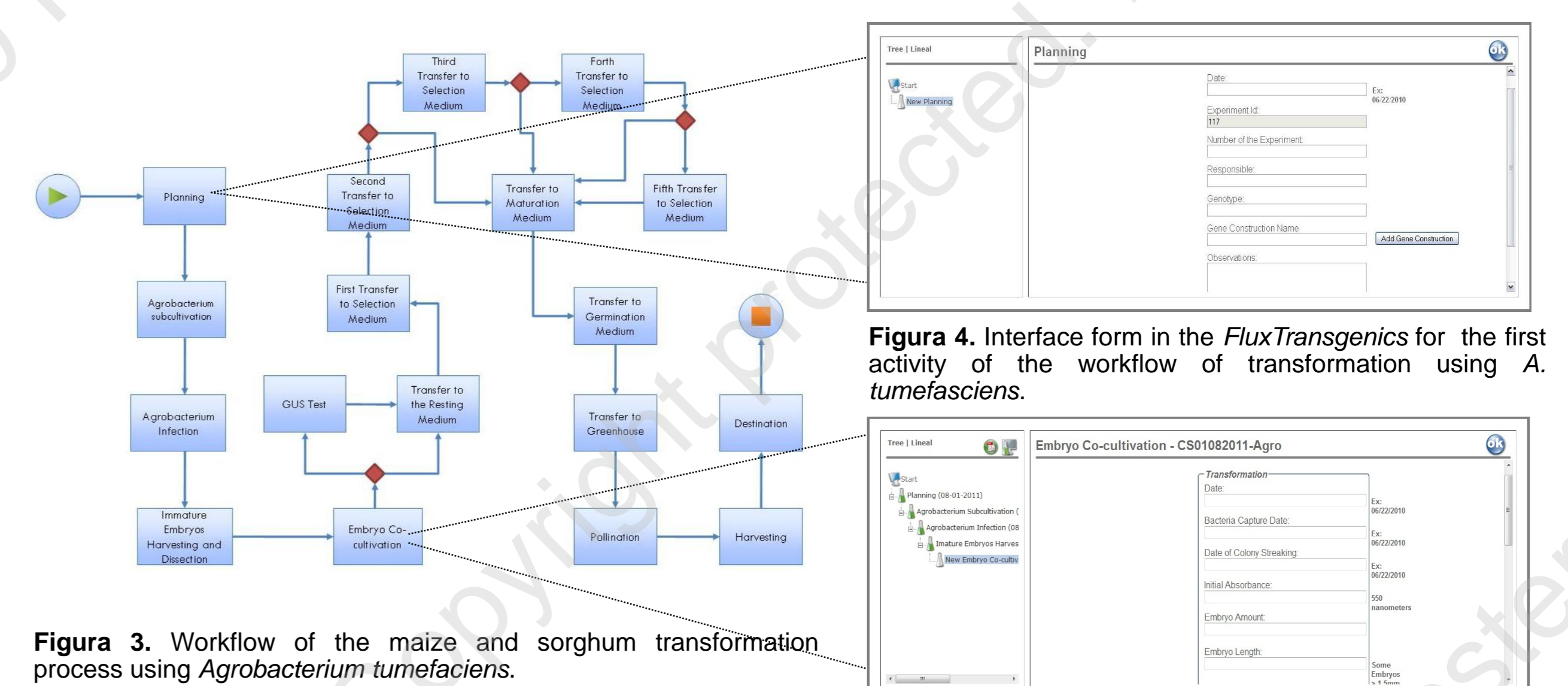


Figure 4. Interface form in the FluxTransgenics for the first activity of the workflow of transformation using *A. tumefaciens*.

Figure 5. Interface form in FluxTransgenics for the embryo co-cultivation activity on the workflow of transformation using *A. tumefaciens*.

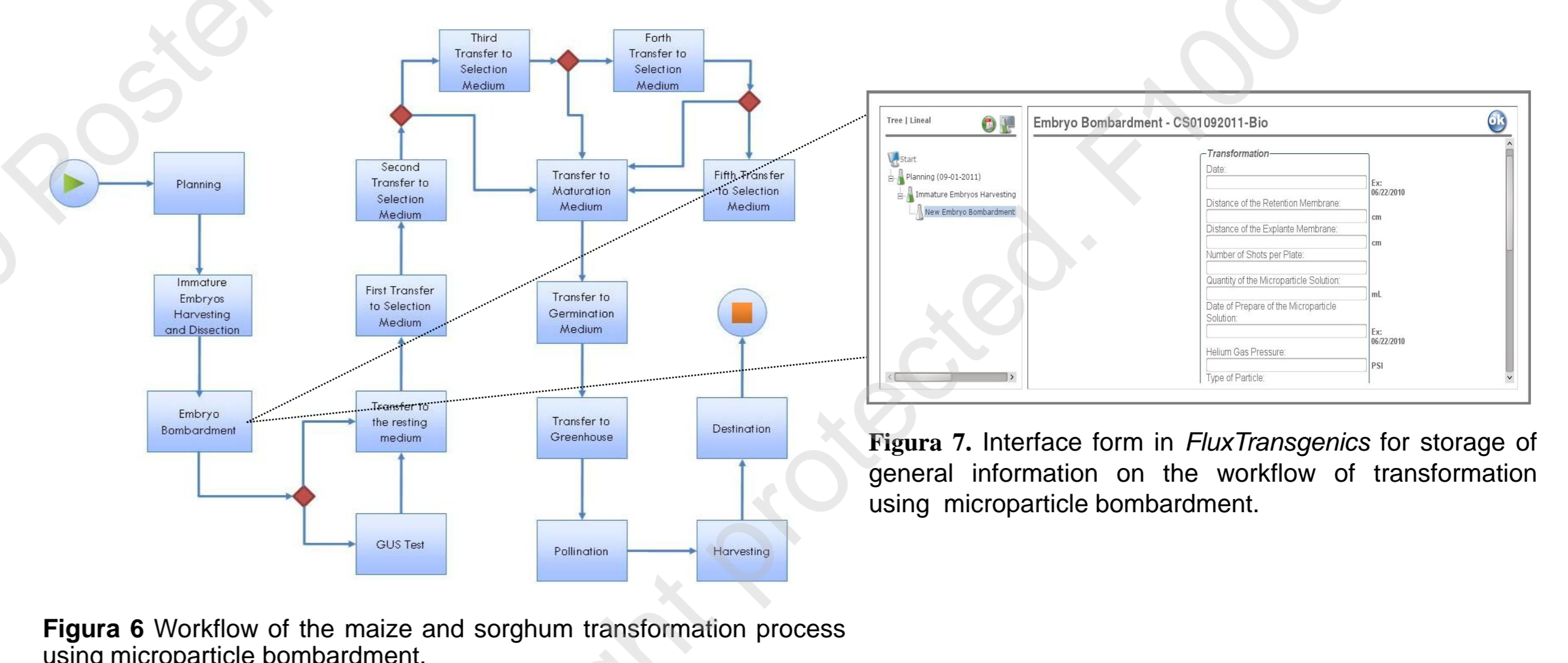


Figure 6 Workflow of the maize and sorghum transformation process using microparticle bombardment.

Figure 7. Interface form in FluxTransgenics for storage of general information on the workflow of transformation using microparticle bombardment.

## Discussion and Conclusion

The FluxTransgenics system has been successfully tested by the researchers at Embrapa Milho e Sorgo as a tool to track the plant transformation process. An improved version of the system is under development with additional features, including the design of new workflows to manage processes that are indirectly related to the processes of plant transformation. The system can manage the information and the correct sequence of the work with transgenic plants at the Núcleo de Biologia Aplicada Laboratory at Embrapa Milho e Sorgo (Brazil). It is possible to keep track of the data stored during the execution of each activity of the plant transformation. This ensures the quality required by Good Laboratory Practices.