## Project Update: August 2019

After my last update, the crops of tomatoes were prepared, grown to be planted, as planned with the farmers (Fig. 1). And since I had problems with my last three attempts, this time we tried a different kind of experiment. A comparative development of tomato crops in and outside of a greenhouse. At first it would be done at a semi protected area, but the farmer responsible for the crop chose to build a greenhouse.



Fig 1. Tomatoes to be planted. Fig 2. Greenhouse being raised.



Fig 3. & Fig 4. Greenhouse being raised.

In May 2019 the crops were transfered to the field, before the greenhouse were built. Shortly after the transplanting of the crops at the end of May, the greenhouse started to be raised (Fig. 2, 3 and 4) and was finished in the middle of July (Fig. 5). In the meantime, on July 6<sup>th</sup> 2019, three hives of *Milipona quadrifasciata* were introduced into the area (Fig. 6 and 7) and then, translocated inside the greenhouse on July 18th when the experiment began (Fig. 8).



Fig 5. Greenhouse finished. Fig 6. Hives of Melipona quadrifasciata introduced in the study area.



Fig 7. & Fig 8. Hives of Melipona quadrifasciata introduced in the study area.

The experiment was going very well, but the farmer had some problem adjusting the crop management, which caused some problems in its development, although the tomatoes are growing and being harvested. This experiment will try to compare two things:

1) The pollination of flowers by the wind, called here by auto-pollination, and the pollination by floral visitors, where outside of the greenhouse will be considered as any natural pollinator and inside will be consider as *Melipona quadrifasciata* (Fig. 9)

2) The efficiency of the two kind of pollinators (any natural pollination x Melipona quadrifasciata)

For that, a total of 40 flowers of each treatment were marked and their development to fruit was observed until harvest time. To make sure the flower marked received the same investment of the plant, just one of the bunches was left to develop a fruit (Fig. 10). After harvest, the fruits will be weighed, measured and had it seeds count and prepare to the germination experiment.



Fig 9. Melipona quadrifasciata pollinating the flower of tomatoes. Fig 10. Flower of tomatoes marked (just one left of the bunches to develop a fruit).

To complement the data already collected data for bee diversity and survey, an experiment with pan traps were done with a total of 7.464 ha of survey from March to August 2019. This experiment (Fig. 11) consists of 750 ml cups of three colours (white, phosphorescent blue and phosphorescent yellow), filled with soapy water and distributed on the crop in groups of three (one of each colour), 3 m apart from each other and 10 m apart from each group pf cups. They stay on the field for 24 hours and the bees trap are collected daily.

The identification of material collected with pan traps are being done with the aid of a systematic of the Federal University of Minas Gerais on Belo Horizonte. Until today, more than 20 species were already identifieded (Fig. 12).



Fig 11. Pan trap experiment. Fig 12. Identification of material collected with pan traps.

Since only three hives were introduced, the hives kept at the meliponary had the same management (feed with a supplement of honey, water and sugar every 15 days and have any necessary actions for the management of the hives carried out). The three hives introduced were firstly feed weekly with the same supplement every week and daily with fresh water (Fig. 13 and 14). After been perceived that the amount of supplement was being offer more than necessary, the supplement was offer monthly until the end of the experiment.

In March 2019, the second communication action was made at the Federal Institute (IFMG-Ibirité Campus). Inaugurated in November 2018, the unit is focused on high technology areas, as the courses offered: technicians in industrial automation, mechatronics and renewable energy systems and superior in control and automation engineering. The campus is located near the study area and the same action was made in three different classes of students of 14-16 years old. A total of approximately 120 students participated of this action (Figs 15, 16 and 17).



Fig 13. Supplement of food and fresh water. Fig 14. Supplement of food given for the bees.



Fig 15, Fig 16. & Fig 17. Communication action made on the IFMG-Ibirité Campus.