**Introduction**

Fruit flies (Diptera: Tephritidae) are pests of economic importance in many crops including mango, *Mangifera indica* L. Flies lay eggs into fruit where the subsequent larvae feed and develop, causing both quantitative and qualitative losses. Fruit maturity is known as a major factor of fruit fly infestation. Our aim is to better characterize and model the relationship between fruit maturity and mango infestation by fruit flies.

**Material and Methods**

The study was conducted in Reunion Island and Senegal on four mango cultivars (‘Kent’, ‘Irwin’, ‘Cogshall’ and ‘José’) and consisted in monitoring artificial infestations in the laboratory (no-choice tests in cages) with two *Bactrocera* species (*B. zonata* in Reunion Island and *B. dorsalis* (syn. *B. invadens*) in Senegal) and natural infestations in the orchard.

- **Fruit infestation recording**
- **Fruit maturity description**
  - qualitative indicator: visual phenological stages (Green, Turning and Ripe)
  - quantitative indicator: chlorophyll fluorescence (Fig. 1)

**Results**

- In the orchards, mangoes were mainly infested by *B. dorsalis* in Senegal and *B. zonata* in Reunion Island.
- In Reunion Island, infestation rates of turning/ripe mangoes observed in orchards without pesticide applications were 8%, 12% and 37% (2014) and 15%, 8% and 19% (2015) for cv. ‘Cogshall’, ‘José’ and ‘Kent’, respectively.
- Fruit flies displayed an egg-laying preference for mature mangoes but the maturity level at which the fruit elicits an egg-laying behavior of flies varied by fly species, mango cultivars (Tables 1, 2) and conditions of choice (in orchards) vs. no-choice (in cages) (Table 2).
- Infestation probability of mangoes (cv. ‘Cogshall’) significantly increased with the decrease in fruit variable chlorophyll fluorescence (Fig. 2).
- The relationship was modeled using a GLM with a binomial distribution and incorporated into a mango crop model predicting fruit yield and quality development (Fig. 3; see Grechi et al. in this conference).

**Discussion and conclusion**

- A further step is to improve the model by incorporating the effect of fly abundance (i.e., fly to mango ratio).
- From an applied point of view, the mango crop-pest model should be used to optimize harvest stage of mangoes for a compromise between fruit quality and risk of production losses, and design of management solutions for a sustainable mango production.