

COFFEE BOURBON POINTU OF REUNION ISLAND :

the post-harvest process, one of the keys to achieve the best sensory quality

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Producing coffee in a European country is a challenge according to the cost of labour. Farmers of the Reunion Island, the French island in the Indian Ocean (Figure 1), decided to grow coffee helped by a development project (“Café Bourbon pointu de la Réunion”). This coffee, caffeine low, is well known for its fruity taste since the 19th century (Gold medal winner in 1869 and 1897). Coffee cultivation is abandoned in 1940 because of the production cost. It is now boosted for a high value niche market.

Results of agronomic experiments crossed with sensory evaluation led to produce a “gourmet” coffee.

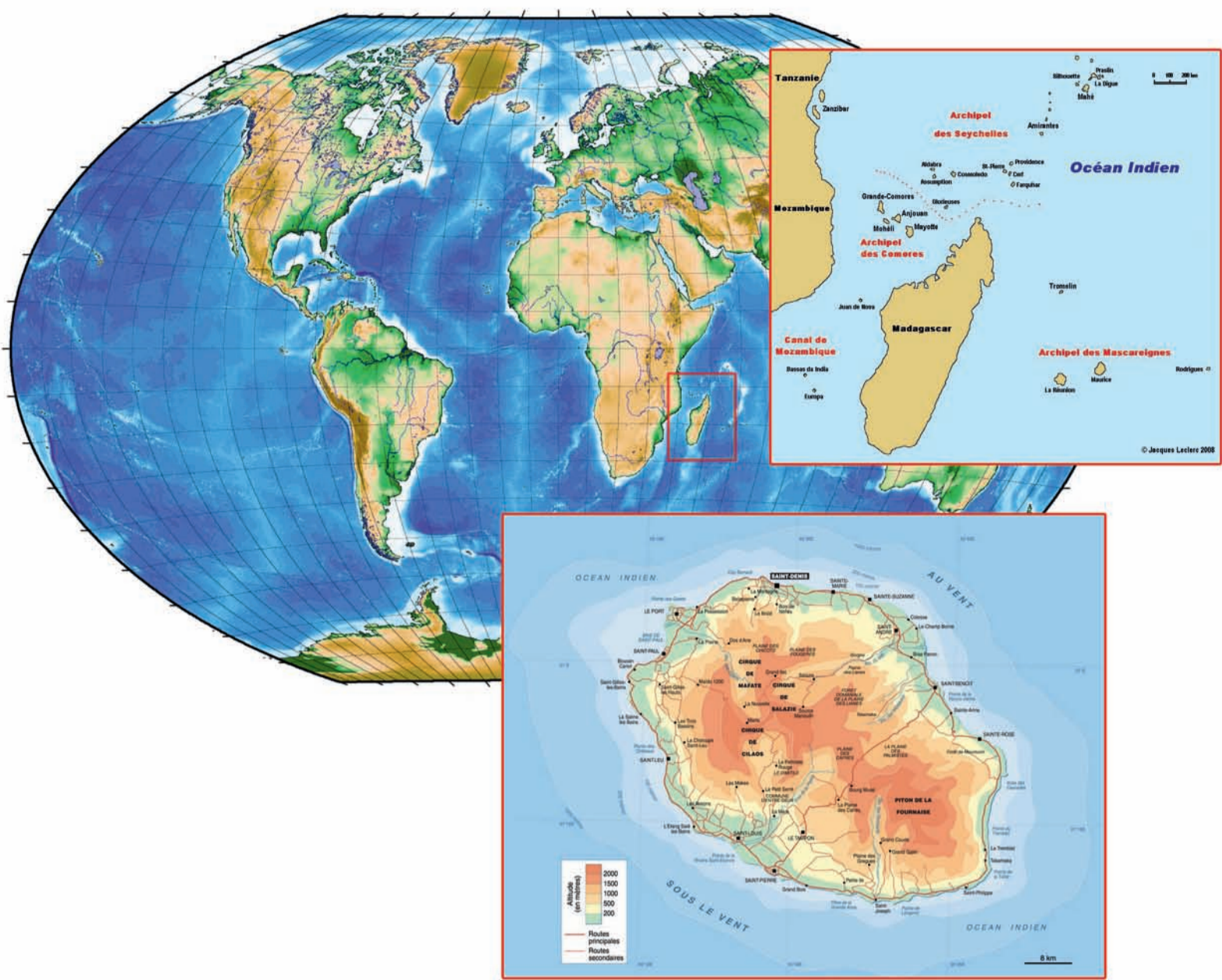


Figure 1: Geographic location of the Reunion Island

Materials and Methods

In 2003, more than 100 plots are planted all around the island with selected Bourbon coffee plants. Coffee berries are collected by the project and processed in the project workshop. Seven post-harvest processes are tested (Table 1).



Figure 2 : Coffee is dried in the sun

Process	fermentation (hours)	Maceration (hours)	Steeping (hours)	Process length (hours)
A	24	24	0	48
B	24	12	12	48
C	24	24	12	60
D	24	12	0	36
E	12	12	12	36
F	12	12	0	24
G	24	0	0	24

Table 1: Seven post-harvest processes are tested

After processing, the coffee is washed and spread to be dried in the sun during 9 to 11 days to reduce the water content to 8-9%. The dry coffee is bagged and stored in an air-conditioned room.

After processing and roasting, all the lots are evaluated by a panel of 12 coffee experts. The statistical analyses are carried out with XLSTAT® software. Principal Component Analysis (PCA) and ANalysis Of VAriance (ANOVA) with comparison Fisher tests are used. The data base involves the data from the favourable “terroir” defined in 2008 (high altitude zones in the West and South). Analyses are carried out on 299 samples in 2006, 584 in 2007 and 503 in 2008.

Results and discussion

On 2006 data, a PCA is carried out (Figure 3). Post-harvest processes D, E and F tend to the quality sensory attributes (Fruity, Aroma quality and Preference). The other processes take the opposite direction and are closed to Sour, Fermented, Woody and Grassy. The ANOVA shows that processes D, E and F give the best results for Fruity and Aroma quality (Table 2).

Process	Aroma quality (means)	Groups
F	3.47	A
E	3.41	A
D	3.37	A
B	3.20	B
A	3.17	B
C	3.15	B
G	3.10	B

Process	Fruity (means)	Groupes
F	1.56	A
D	1.33	A
E	1.31	A
G	0.96	B
B	0.96	B
A	0.88	B
C	0.82	B

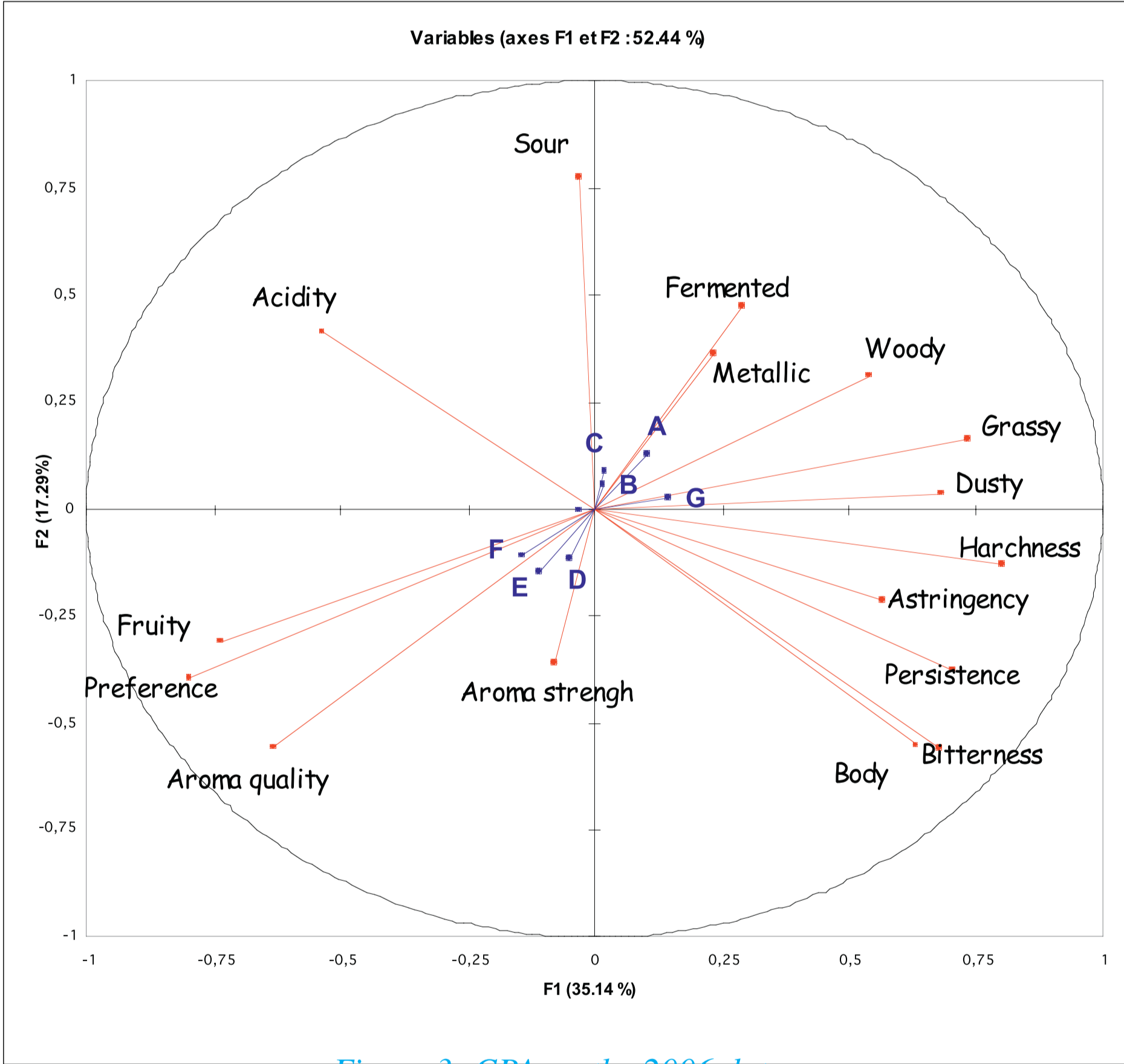


Figure 3: CPA on the 2006 data

On 2007 data, an ANOVA is carried out. The post-harvest process D gives better results than the processes E and F for the most important sensory attributes (Aroma quality : 3.38, Acidity : 2.63, Fruity : 1.78 and Preference : 3.20). The process D (24 hours of dry fermentation, 12 hours of maceration, no steeping) is chosen to process the berries of the 2008 harvest.

Variables	D	E	F	significativity
Aroma quality	3.38 A	3.32	3.28 B	Yes
Body	2.41	2.42	2.44	No
Acidity	2.63 A	2.58	2.51 B	Yes
Bitterness	2.01	2.04	2.06	No
Fruity	1.78	1.71	1.64	No
Preference	3.20 A	3.11	3.06 B	Yes

Table 3 : Results of ANOVA (Fisher tests) on 2007 data

Conclusion

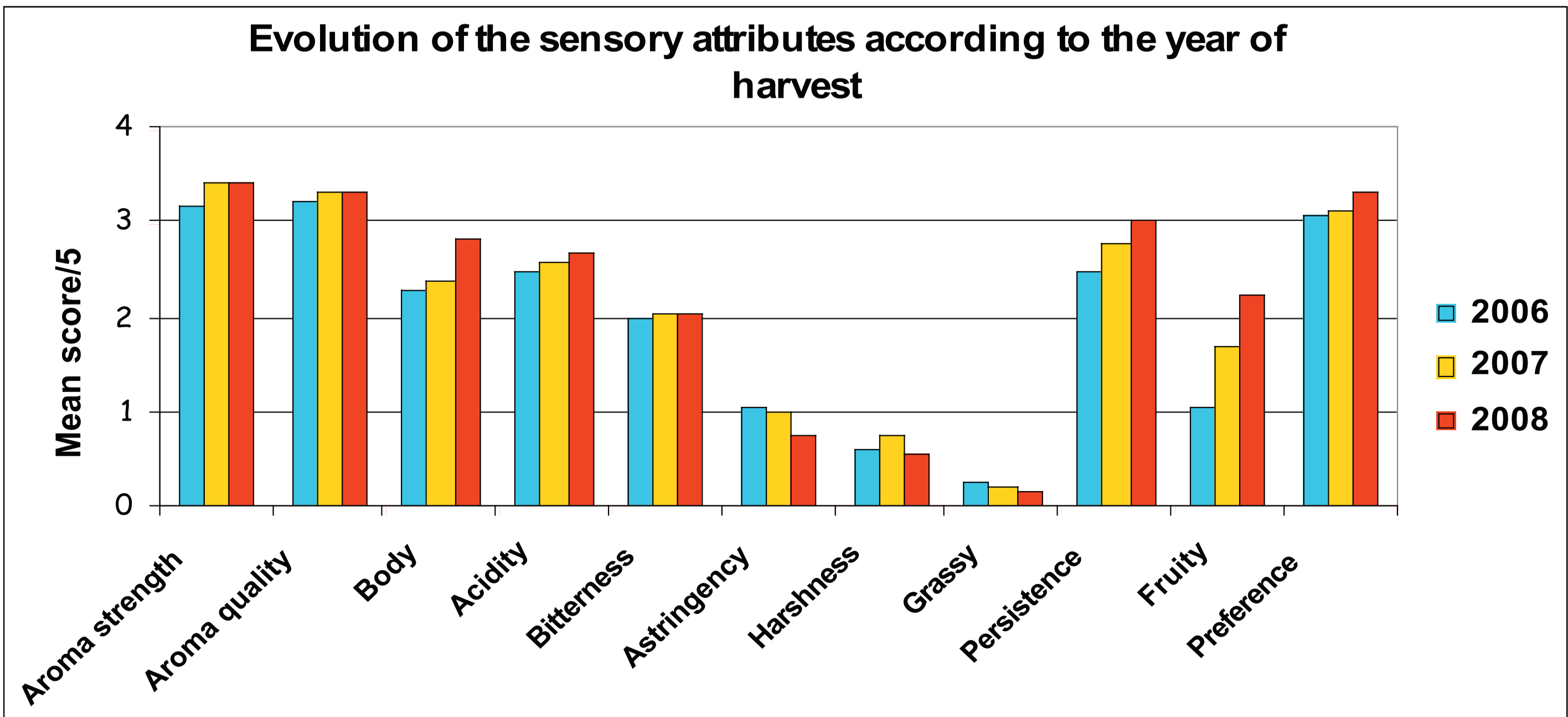


Figure 4 : Evolution of the sensory attributes according to the year of harvest

The histogram (Figure 4) of the evolution of variables shows the progress made in only 3 years, especially for the Fruity taste.

In 2006, 7 post-harvest processes are compared and 3 of them are chosen according to their good results.

In 2007, the 3 processes are compared and 1 (process D) gives the best results.

In 2008, the post-harvest process D is the only process to be used. To get the best coffee « Bourbon pointu de la Réunion », besides good pedoclimatic conditions, the more efficient post-harvest process is a two phases process with 24 hours dry fermentation followed by 12 hours maceration. Steeping is banned. Sun drying is imperative.