THE NETHERLANDS

PEDO-CLIMATIC CONDITIONS:

Maritime climate, with moderate winters and summers, and rainfall spread throughout the year.

Picture 1: Field inspection, monitoring the differences between varieties

CROP: Quinoa

Quinoa is a plant of the Amaranthaceae family, which also includes the 'weed' plants Chenopodiaceae. Controlling these weed plants is important and challenging, since they are hard to distinguish from quinoa.

The table below shows the yields obtained (kg/ha) at the Lelystad location, without chemical control and at 86% dry-matter content.

	2020	2021	Mean*
TITICACA (early cultivar)	1660	1442	1551
VIKINGA	1293		1246
EQUINOM 1001	1685		1637
EQUINOM 1002 (late cultivar)	2656	2422	2539
EQUINOM 1010 (late cultivar)	2094	1404	1749
EQUINOM 1014	1937		1890
EQUINOM 1021	2081		2034
PUNO (early cultivar)	1590	1884	1737
ZENO (early cultivar)	1380	1755	1568

BEST AGRICULTURAL PRACTICES:

- **Organic regenerative practices applied:**
  - Use of organic manure.
  - Mechanical weed control. Starting early, before crop emergence, with a harrow, in order to control already-germinating weeds and make sure that the field is free of weeds when the crop emerges. After emergence, a combination of harrowing and hoeing for weed control took place.
  - Choice of varieties that need very little nitrogen. There are differences between varieties.

- **Best practices for sowing :**
  - Best period for drill seeding is mid-March through to mid-April, at a soil temperature of 10°C.
  - Seed quantity of 10 kg/ha or 100 germinating seeds/m2 and a depth of about 1 cm, with row spacing of 50 cm.
  - Due to the small size of the seeds, the seed bed should be composed of small particles.

Picture 2: Quinoa, shortly after crop emergence

- **Best practices for managing the chosen crops:**
  - Row spacing at an appropriate distance that allows for mechanical weed control.
  - Choice of organic manure with a good combination of nitrogen, phosphorus, and potassium content.
  - Select fields with little infestation of the fast-growing weed Chenopodium album, since it is hard to distinguish from quinoa. Because its presence requires manual weed control, it's better to avoid such fields.
  - Quinoa seeds are very small, which means that a good seedbed is crucial for optimal crop emergence. It is important that the seeds are in contact with the soil and can profit from capillary rise in dry periods after sowing.
  - Choose varieties that are resistant to leaf disease. Peronospora quinoae (downy mildew) is the main threat and can cause severe damage to the crop. There are significant differences between varieties in terms of their resistance.

Picture 4: Quinoa variety that is heavily infested with downy mildew, which causes yield damage

- **Best practices for harvesting the crops chosen:**
  - The length of the growing season depends on the cultivar, with ripening strongly determined by day length. Under normal conditions, the crop can be combine-harvested in the second half of August, when the first seeds are shattering (i.e. the natural shedding of seeds as they ripen).

Picture 3: Quinoa, at the start of flowering

CONTACT

Harm Brinks, Project Manager at Delphy

h.brinks@delphy.nl