Breakout Session 5

Quality control in the pollen supply chain

Pollen collection optimization

Which stage of flowering?

- Collect pollen from flowers of the same stage and same position on the plant
  - Several stages (flower age) and positions need to be identified and tested (viability (Ampha Z32) and seed set (manual pollinations))
    - Size of pollen may have an effect on the pollen vigor (signal amplitude comparisons, early vs. late pollen)
  - Collection in batches, several replicates need to be tested
  - Pollen isolated from the anthers and used/tested immediately

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Pollen collection optimization

When to collect?

- Repeat previous experiment at different times and different days
  - Keep track of the temperature, relative humidity, light, water (irrigation)
  - Repeat this for a number of seasons, to gain experience on how and when to collect based on conditions in the field/greenhouse

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Pollen storage

How to isolate?

- Shaking/vibrating directly from flower
- Harvesting anthers
- Harvesting flowers

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Pollen storage

How to preserve?

- How long between harvest and preservation?
- Dehydration necessary?
  - Avoid cell bursting during freezing
- Freezing dynamics?
  - For instance, to avoid crystalline ice
    - Immediate storage in freezer (-20C, -80C)
    - Snap freezing in liquid N2
    - Snap freezing in EtOH+dry ice sludge
- Max temperature during process (a ‘do not exceed temperature’)
  - Depends on variety, i.e. pollen may lose activity at certain temperature

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Pollen storage

Dehydration

- Silica gel
  - Low rate of absorption
  - Does not dry the pollen to a large extend
- Zeolite (drying beads)
  - High rate of absorption
  - Dries to a large extend

  Goal: find the right level of dehydration
  - Standardize the amount of pollen
  - Monitor relative humidity
  - Measure the time needed

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Pollen storage

Pollen usage

- Thawing?
  - At which temperature?
- Rehydration necessary?
  - Time?
  - Relative humidity?
  - Pollen quantity?
- Pollen application
  - How much?
  - For how long after thawing/rehydration?
  - How to carry in the field?
    - Ambient temperature?
    - On ice?
  - During which (weather) conditions?
- Which viability is required for a full seed set?

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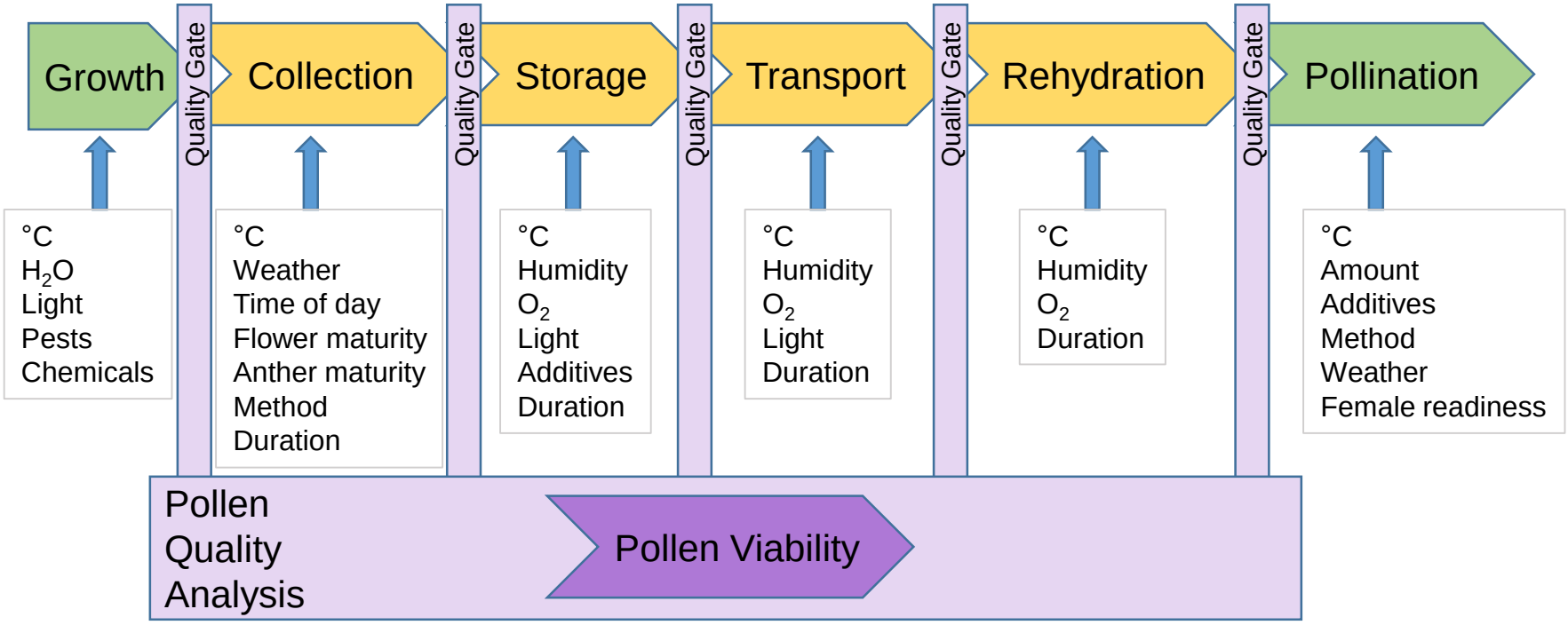
Pollen Supply Chain



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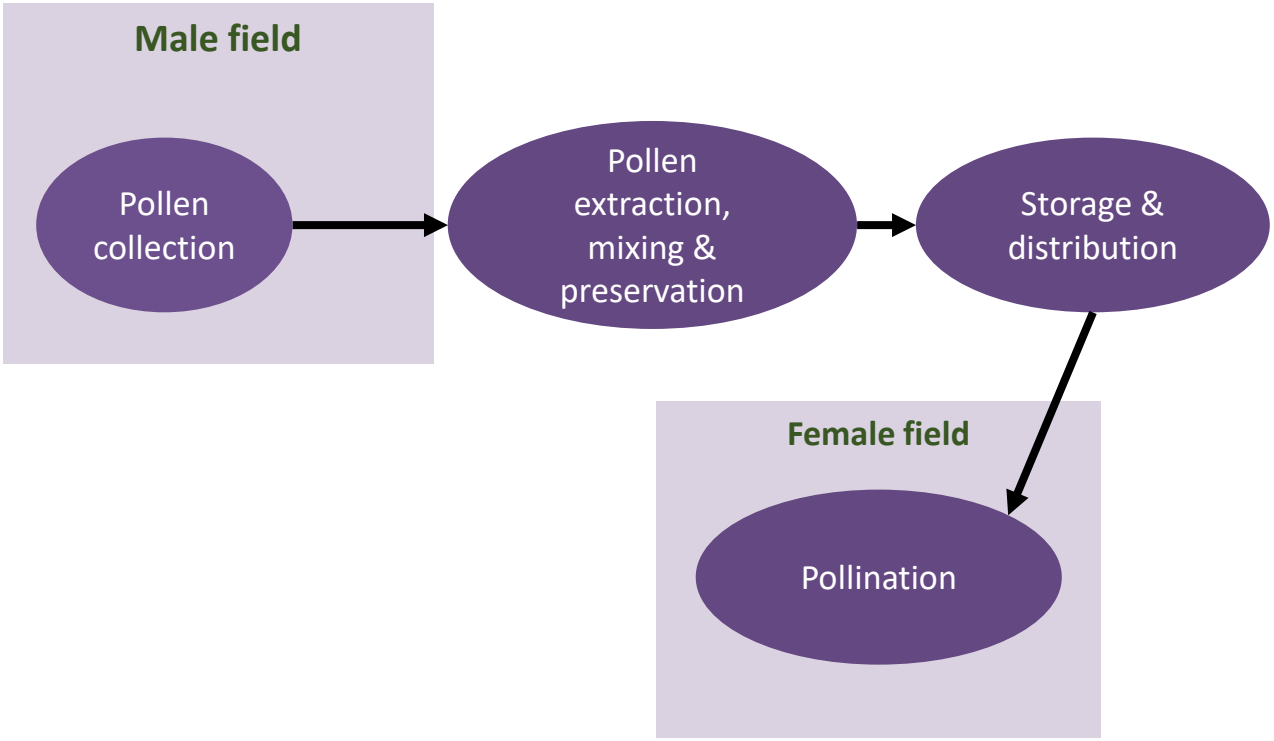
Implementation example



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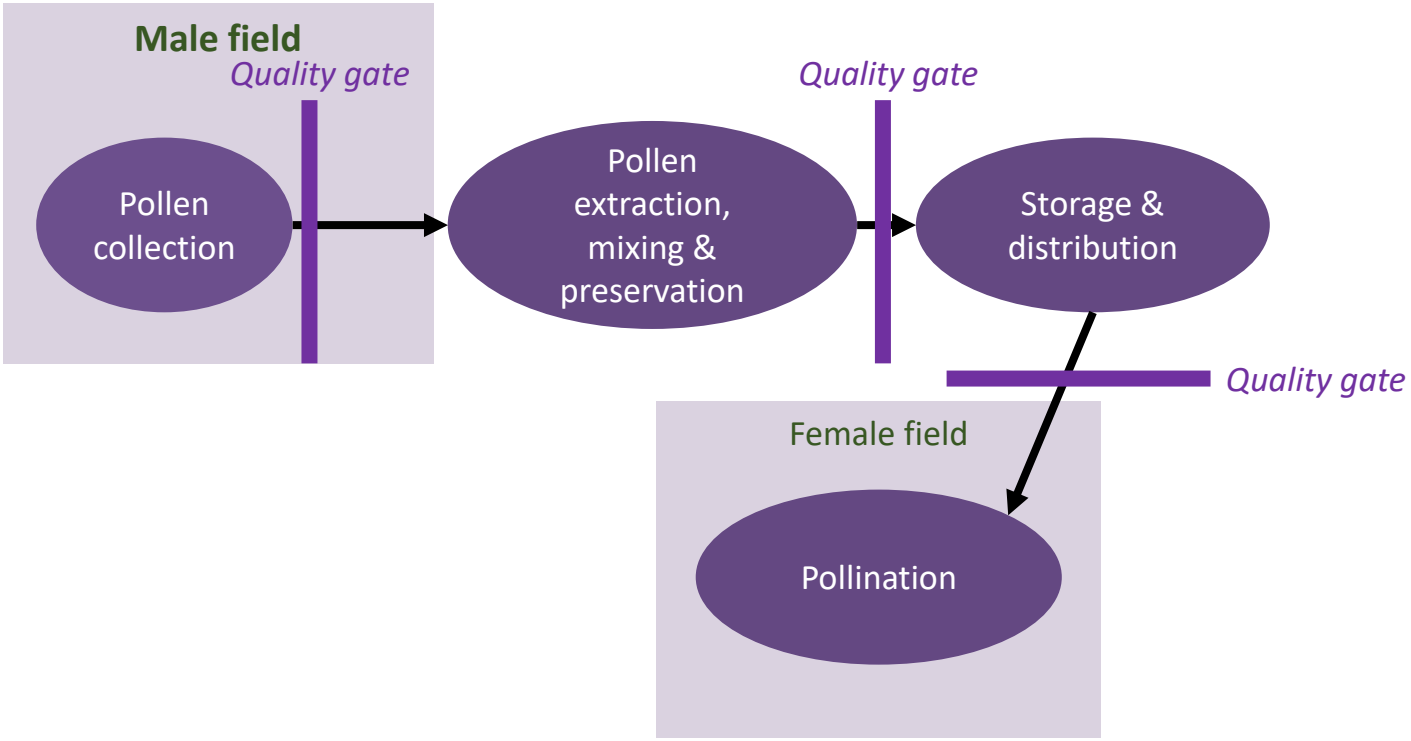
Implementation example



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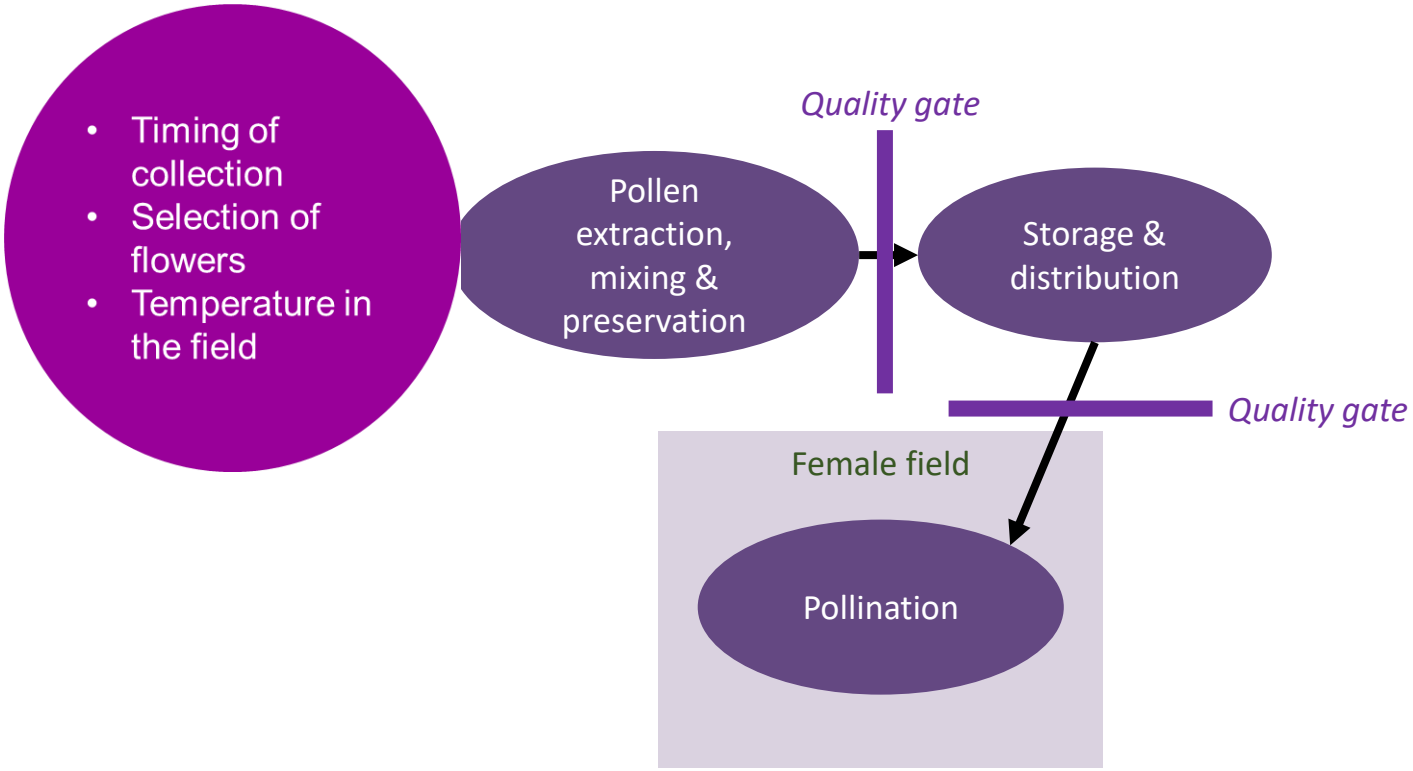
Implementation example



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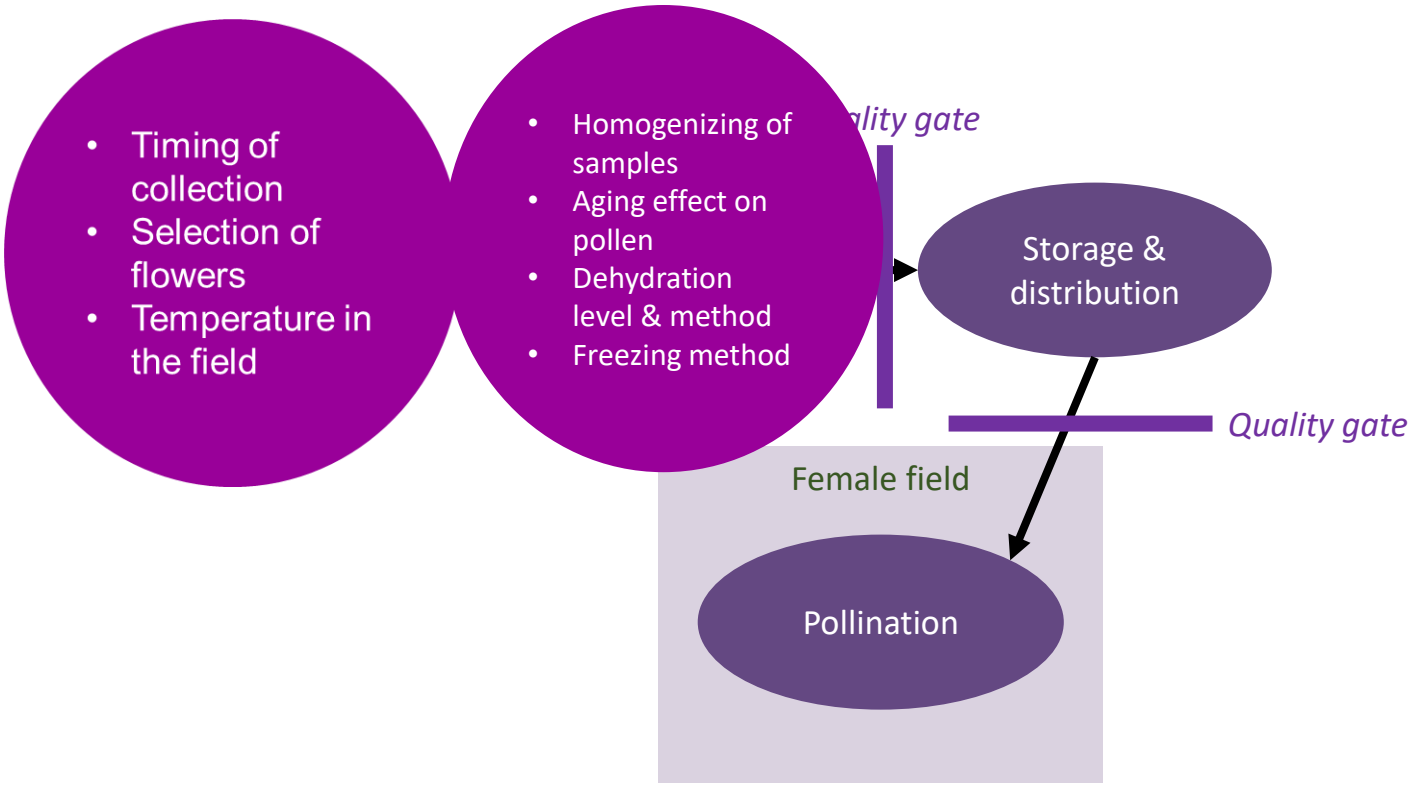

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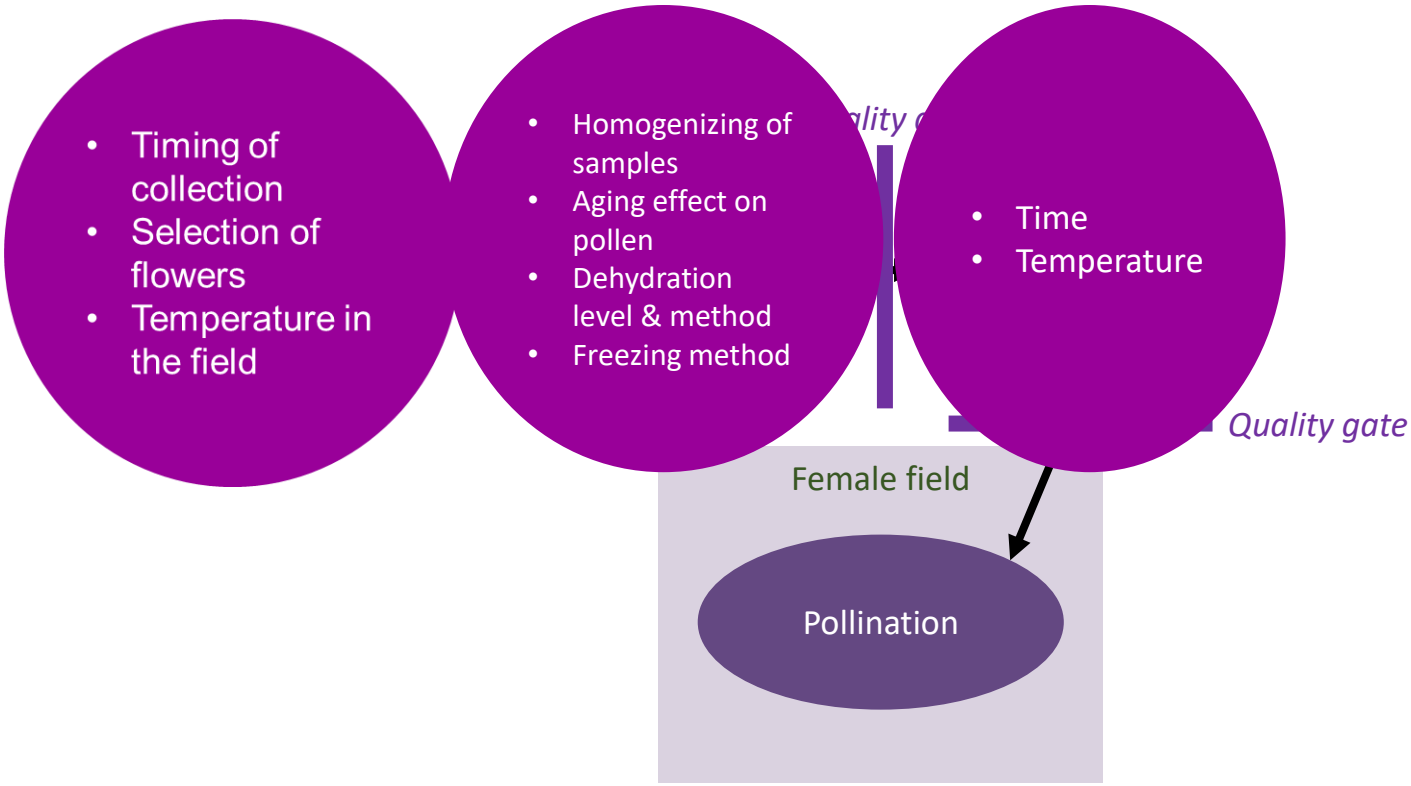

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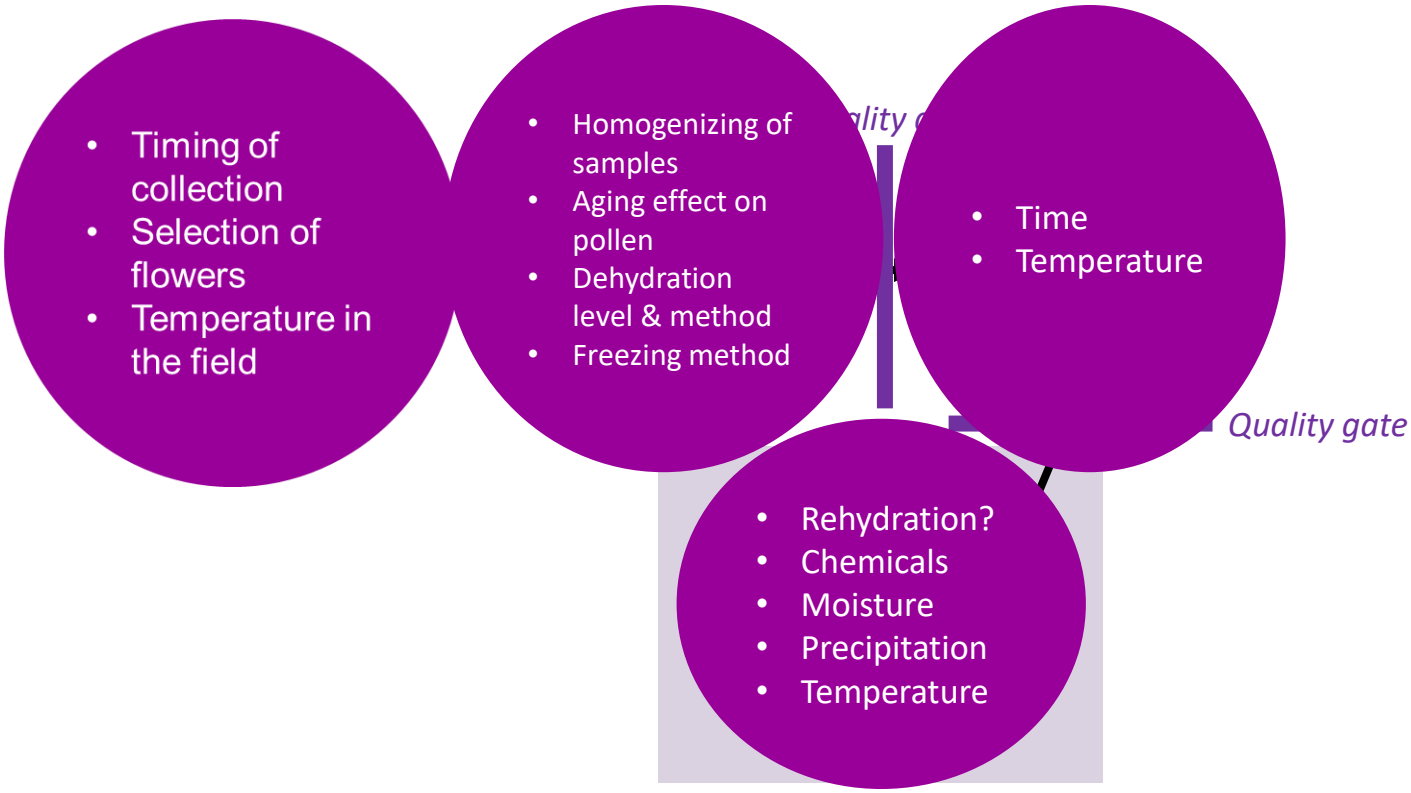

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