Applicativo UNIBO x assegni

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**CN Agritech**

**Scheda attività Ente\_ UniBO**

**Spoke\_\_\_1\_\_\_**

**WP\_1.2\_(*Dissecting morpho-physiological and molecular mechanisms of adaptation)***

**Task[[1]](#footnote-1):1.2.3 \_** *Biochemical mechanisms contributing to improved adaptation, production and quality traits* **(M1-M36)**

1. **Contact person (e-mails): stefano.delduca@unibo.it**
2. **Title of the activity : *Biochemical factors involved in plant response to climate change: The pollen-pistil interaction and the molecular factors involved in the adaptation of apple plants to abiotic stresses (thermal and water)***
3. **Durata (M 10-M 22)**
4. **Species and/or species classes**

 Rosacee

**5**. **Objectives**

Identification of the main molecular actors that support the adaptation of the organism to abiotic stresses and/or contribute to the maintenance of qualitative-quantitative production traits. The biochemical mechanisms underlying the action of molecules essential for stress resilience will be defined. Since plant reproduction is influenced by climate changes that cause morphophysiological and molecular alterations of reproductive organs, the pollen-pistil interaction and the molecular factors involved in the adaptation of apple plants to abiotic (thermal and water) stress will be studied, including allergenic proteins to decipher the effects of global warming on the qualitative and quantitative characteristics of productivity.

1. **Research activity**

Identification of the main molecular actors that support the organism’s adaptation to abiotic stresses and / or contribute to the preservation of qualitative-quantitative production traits(\*). The pollen-pistil interaction and the molecular factors involved in the adaptation of apple plants to abiotic stresses (thermal and water) will be investigated, as will allergenic proteins. The stress response studied will allow to identify factors involved, as well as the effects of global warming on the qualitative and quantitative productivity characteristics. An integrated morpho- cyto-logical (CSLM microscopy, TEM, ESEM), biochemical, and molecular approach will be applied to observe the structural alterations in the development of anthers, pollen and pistil. Immunohistochemical and biochemical assays will be performed to unravel the effects of abiotic stress on the development of the reproductive organs and on the pollen / pistil interaction. Metabolomics and enzymatic tests for oxidative stress, stress indicator proteins, allergens, pollen function parameters and polyamines as stress response factors will be investigated.

1. **Key material or collections**

Germplasm collection of apple

**7. (\*)Traits:**

* Drought tolerance
* Heat stress
* Photosynthesis
* Phenology
* Fertility
* Yield
* Seed proteins
* Seed quality
* Biotic resistance
* Reproductive systems

**8. Enabling technologies that you will use and that you would like to highlight:**

* Field trials – challenges
* Microscopy (CSLM, TEM, ESEM)
* Metabolomics
* Immunochemical and biochemical analyses

**9.** **Key collaboration within SPOKE and/or AGRITECH**

UNIBO **Task: 1.1.1, Task:1.1.3, Task: 1.3.1.**

**10. Expected results**

The results will provide information on: (1) the threshold temperatures causing alterations during the reproductive process (M4). (2) On the detailed analysis of the effects of stress on pollen which could be used as a biological indicator of global warming (M7). (3) On the comparison of the effects in male and female gametophytes to evaluate how sterility or abnormal seed production is induced by abiotic stress and what is the effect on productivity of different genotypes (M10). (4) On the effect of abiotic stress on agronomic traits (yield and quality) (M12). The acquired data will constitute a fundamental database that will provide the criteria for the selection of temperature resistant varieties for breeding purposes.

1. [↑](#footnote-ref-1)