



Scheda Proposta Progetto

CIP XFYKGZ

Dati proposta

Acronimo

RESI-STRESS (rev.1)

Titolo

Systems Biology of RESilience to Heat and Transition-Period STRESSors in Dairy Cattle: Shared Mechanisms, Intergenerational Signatures, and Breeding-Oriented Tools

Durata in mesi

36

Descrizione

Dairy cattle are increasingly exposed to environmental and metabolic challenges that compromise welfare, health, fertility and production efficiency. Among these, heat stress and transition-period stress are two of the most relevant stressors in modern dairy systems. Heat stress is becoming more frequent under climate change, particularly in Mediterranean environments, while the transition period around calving remains one of the most critical phases for metabolic imbalance, immune dysfunction and reproductive losses. Although both stressors have been widely studied, they have usually been investigated separately, often in different animals and with limited integration between exposure, phenotypes, detailed records and molecular data. Consequently, the biological architecture of resilience to these stressors, and the extent to which they share common mechanisms, remains poorly understood. RESI-STRESS will use an integrated systems-biology approach to study resilience to heat stress, transition-period stress and their interaction when calving occurs under heat load. The project will combine existing well-characterized cohorts and biological samples with targeted new sampling, maximizing available resources while filling specific gaps required for a coherent design. The objective is to identify stressor-specific and shared mechanisms of resilience, assess selected intergenerational signatures, and prioritize candidate biomarkers and scalable indicators for future use in management and breeding. The project is built on unique Holstein resources from northern Italy and will collect new validation samples under Southern Mediterranean conditions. Existing UNIPD resources include a transition-period cohort of 260 F0 Holstein cows with longitudinal blood and milk samples, production, fertility, health, β -hydroxybutyrate and precision livestock farming (PLF) records, together with daughters of dams showing divergent transition-period profiles and animals selected from the extremes of panting-score response under high THI. UCSC/CERZOO resources include Holstein cows sampled under heat-load and comfort conditions for blood, milk, faeces and rumen fluid, with extensive PLF, production and environmental data. Targeted sampling will complete the design with Holstein cows samples in Sicily for validation under Southern Mediterranean heat stress and Modicana cattle will serve as a genetically diverse locally breed adapted to chronic heat challenge. A major strength of RESI-STRESS is that the main animal cohorts are raised on farms equipped with advanced PLF systems. The UCSC/CERZOO dairy facility includes video cameras, collar sensors, rumen boluses, GreenFeed units for methane measurement, RIC systems for individual feed-intake recording and AfiMilk technology for in-line milk analysis. Several of these technologies are also available in the farm where the UNIPD experiments were conducted. The Sicilian Holstein farm will be selected among farms with the same or comparable equipment, supporting validation under severe heat load through robust digital phenotyping. The Modicana farm is expected have a less developed PLF infrastructure and comparison will mainly rely on omic data, environmental characterization and conventional records

Stato

ACCETTATA

Proponente

MARLETTA, DONATA

Struttura proponente

DI3A

Ambito

NAZIONALE

Ente finanziatore

Ministero della Università e della Ricerca

Bando di riferimento

PRIN: PROGETTI DI RICERCA DI RILEVANTE INTERESSE NAZIONALE
- Bando 2026

Capofila

Università Cattolica del Sacro Cuore, Piacenza campus



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Partner

Università degli studi di Padova
Università degli studi di Perugia
Università degli studi di Messina
Consiglio Nazionale delle Ricerche (CNR - IBBA) Lodi

Dati economici

Costo complessivo	€ 1.609.305
Finanziamento complessivo atteso	€ 1.199.372
Finanziamento previsto UNICT	€ 269.973
Cofinanziamento previsto UNICT	€ 64.995

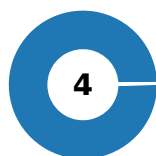
Componenti (4)

#	Nominativo	Ruolo	Carriera**	Struttura	ERC	Ore*
1	MARLETTA, DONATA	RESP_SCIENTIFICO	PO	DI3A	LS	400
2	BORDONARO, Salvatore	COMPONENTE	PA	DI3A	LS	313
3	CRISCIONE, ANDREA	COMPONENTE	PA	DI3A	LS	300
4	TUMINO, SERENA	COMPONENTE	RD	DI3A	LS	300

* ore stimate

** PO - Professore Ordinario; PA - Professore Associato; RD o RM - Ricercatore TD; RU - Ricercatore

Distribuzione componenti per struttura



■ DI3A: 4 (100%)