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Photoperiodism in voles

van Rosmalen, Laura

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PHOTOPERIODISM IN VOLES

A NEUROBIOLOGICAL PERSPECTIVE
ON SEASONAL ECOLOGY

LAURA VAN ROSMALEN

Photoperiodism in voles: A neurobiological perspective on seasonal ecology

The research presented in this thesis was carried out within the Chronobiology unit at the Groningen Institute for Evolutionary Life Sciences (GELIFES), University of Groningen, Groningen, the Netherlands.

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university of
groningen

Photoperiodism in voles

A neurobiological perspective on seasonal ecology

PhD thesis

to obtain the degree of PhD at the
University of Groningen
on the authority of the
Rector Magnificus Prof. C. Wijmenga
and in accordance with
the decision by the College of Deans.

This thesis will be defended in public on

Friday 10 September 2021 at 9:00 hours

by

Laura van Rosmalen

born on 6 July 1991
in Nieuwegein, the Netherlands

Promotores

Prof. R.A. Hut

Prof. D.G. Hazlerigg

Co-promotor

Dr. L. van de Zande

Assessment Committee

Prof. J.D.A. Olivier

Prof. A. Herwig

Prof. F.J.P. Ebling

Paranymphs

Dr. Renske Lok

Sjoerd van Hasselt, MSc

List of abbreviations

3V	third ventricle
α-GSU	glycoprotein hormone α -subunit
ARC	arcuate nucleus
BAT	brown adipose tissue
CPP	critical photoperiod
CTE	circadian thermo-energetics
Dio2	iodothyronine-deiodinase 2
Dio3	iodothyronine-deiodinase 3
DMH/VMH	dorso- and ventromedial hypothalamus
FAA	food-anticipatory activity
FEO	food-entrainable oscillator
FSH	follicle-stimulating hormone
GH	growth hormone
GnRH	gonadotropin-releasing hormone
GSI	gonadosomatic index
IP	intermediate photoperiod
KISS1	kisspeptin-1
Kp	kisspeptin
KNDy	kisspeptin, neurokininB, dynorphin
LEO	light-entrainable oscillator
LH	luteinizing hormone
LP	long photoperiod
LRR	leucine-rich repeats

MBH	mediobasal hypothalamus
MPP	maternal photoperiodic programming
Mtnr1a (Mt1)	melatonin receptor 1a
Rfrp (Npvf)	RFamide-related peptide (neuropeptide VF precursor)
POA	preoptic area
PNES	photoperiodic neuroendocrine system
PP	photoperiod
PT	pars tuberalis
PVN	paraventricular nucleus of the hypothalamus
PVT	paraventricular nucleus of the thalamus
PVZ	paraventricular zone
SCN	suprachiasmatic nucleus
SNP	single nucleotide polymorphism
SP	short photoperiod
T₃	triiodothyronine
T₄	thyroxine
T_a	ambient temperature
T_b	body temperature
TMD	transmembrane domain
TRF	time-restricted feeding
Tshβ	thyroid-stimulating hormone β -subunit
Tshr	thyroid-stimulating hormone receptor
WFF	work-for-food

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