QUALITÄT

aus Deutschland

HL HAMBURGER LEISTUNGSFUTTER GMBH

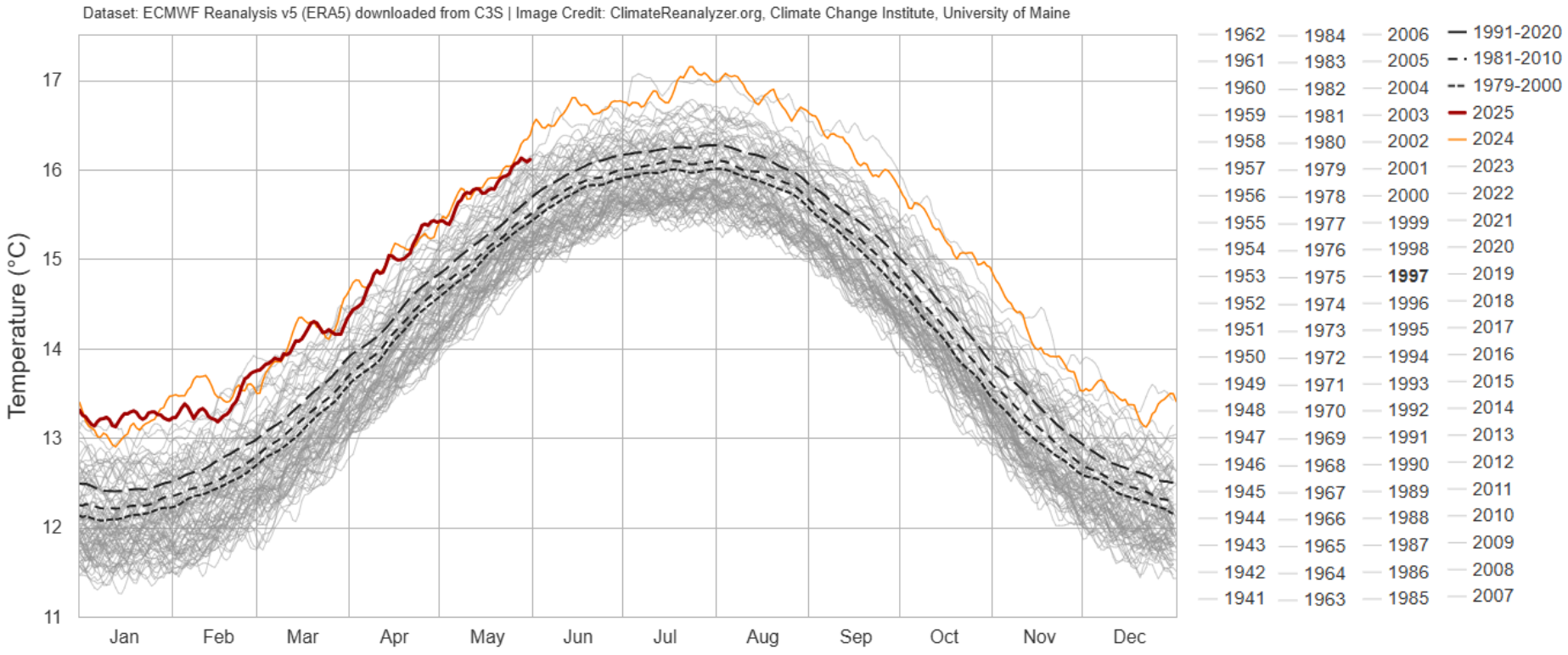
IBEKA PANTO

Dr. Elmir Sedic
Direktor izvoza

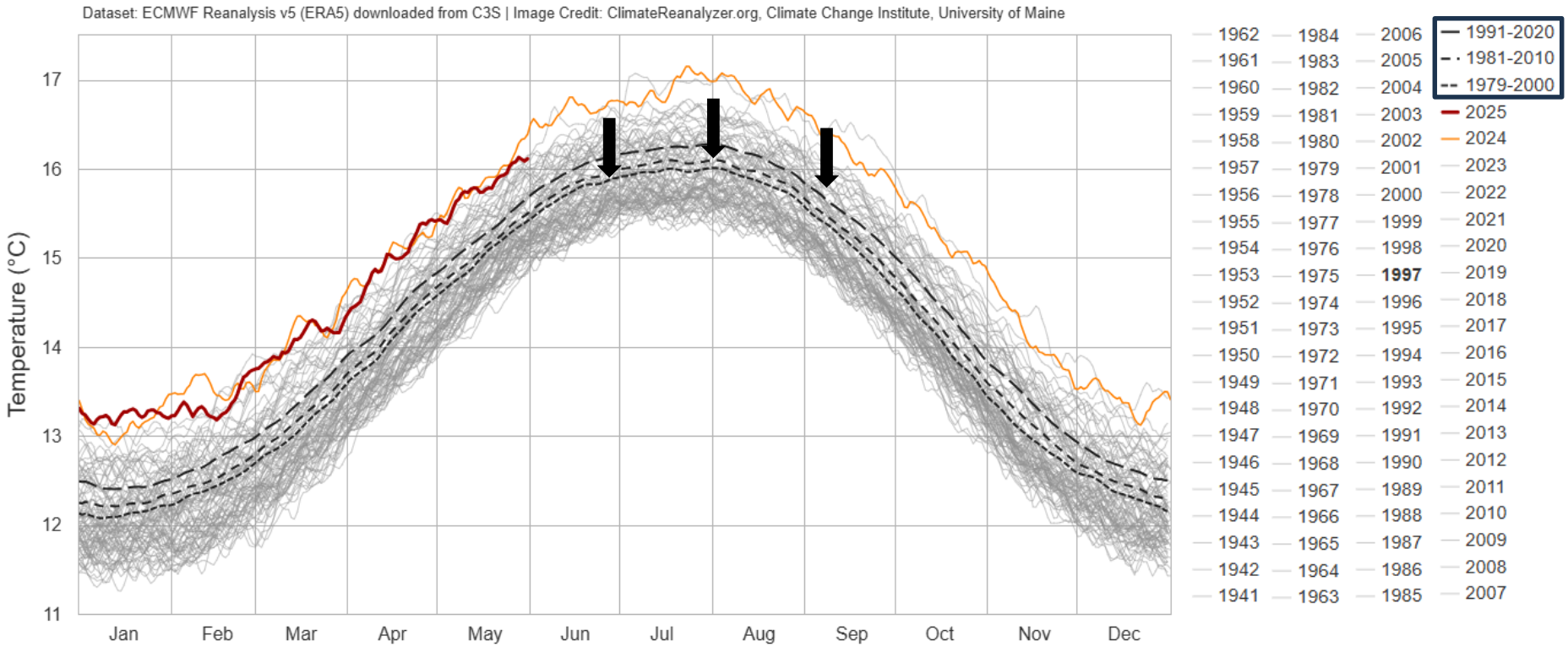
MOGUĆNOSTI UNAPREĐENJA MLJEČNOSTI U FAZAMA TOPLOTNOG STRESA PREKO ISHRANE

Globalno zagrijavanje ⟷ **toplotni stres**

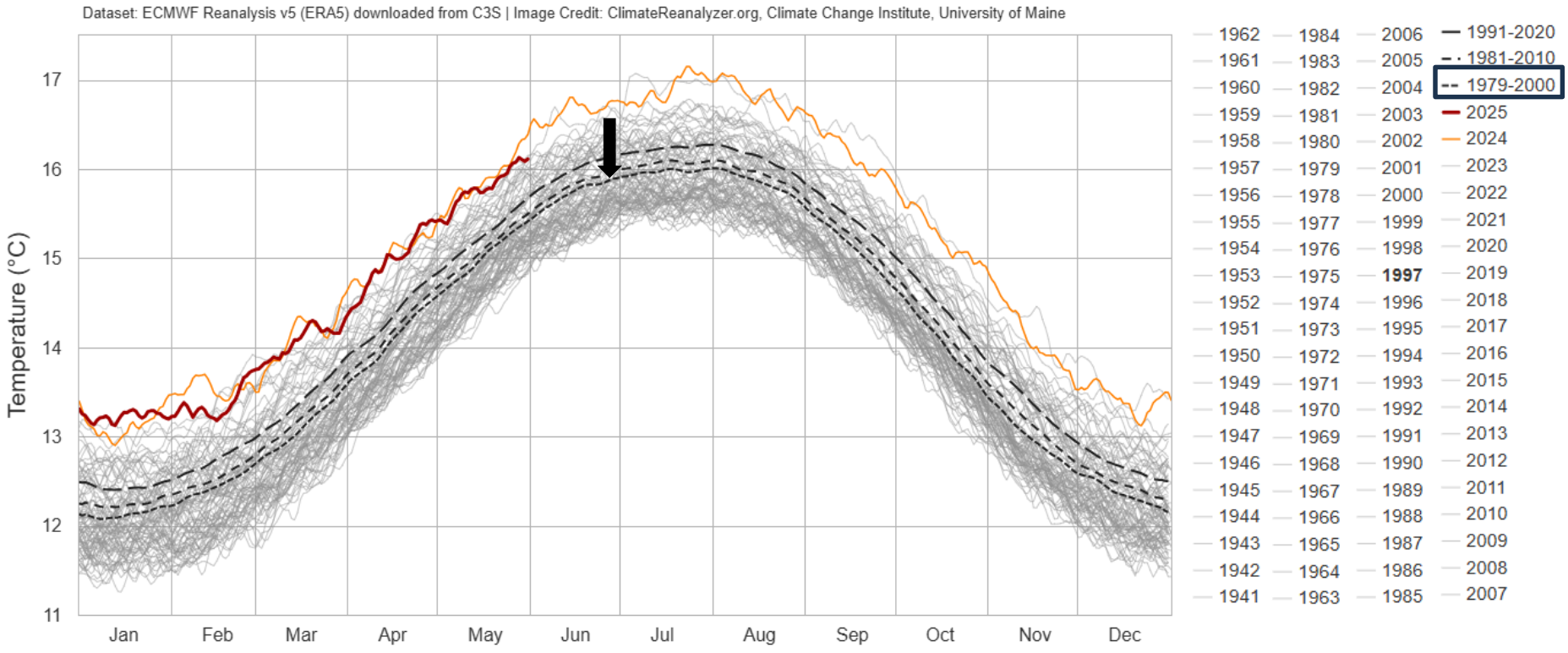
Prosječne dnevne temperature, Worldwide



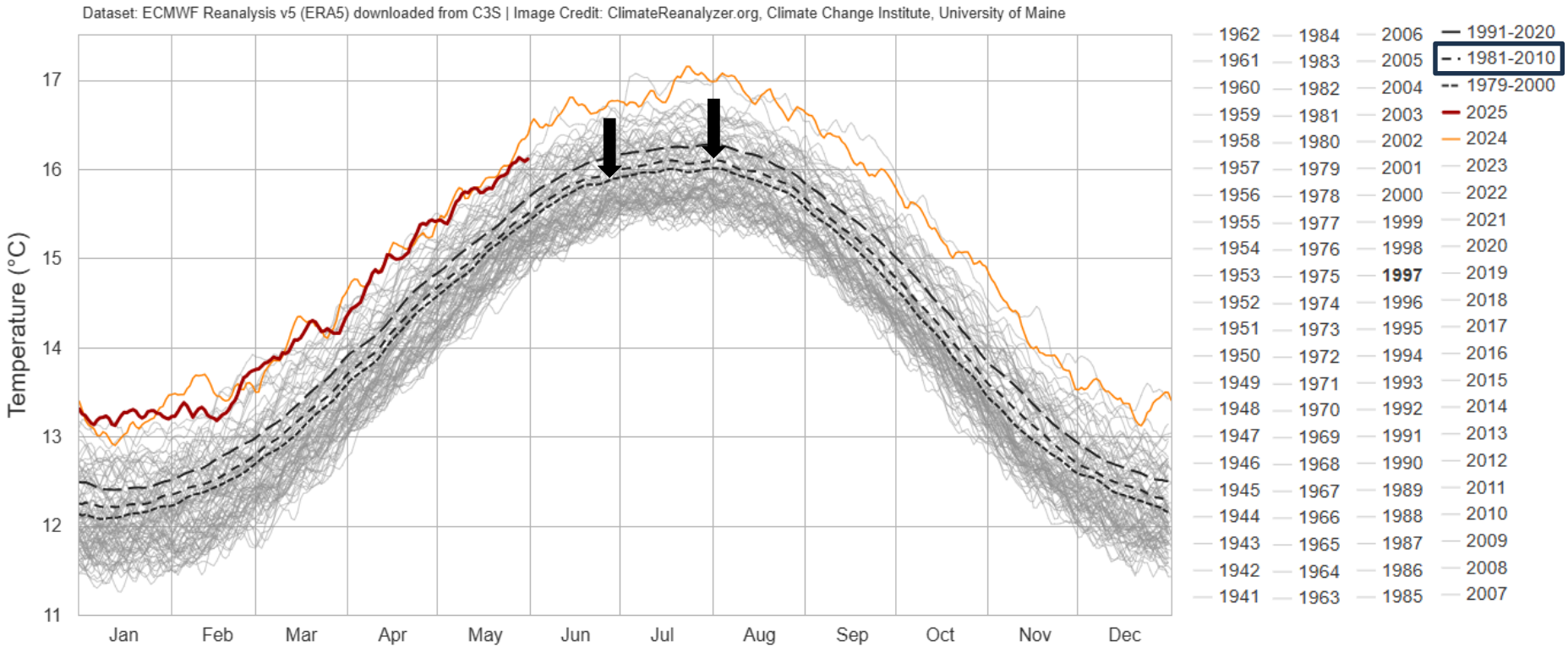
Prosječne dnevne temperature, Worldwide



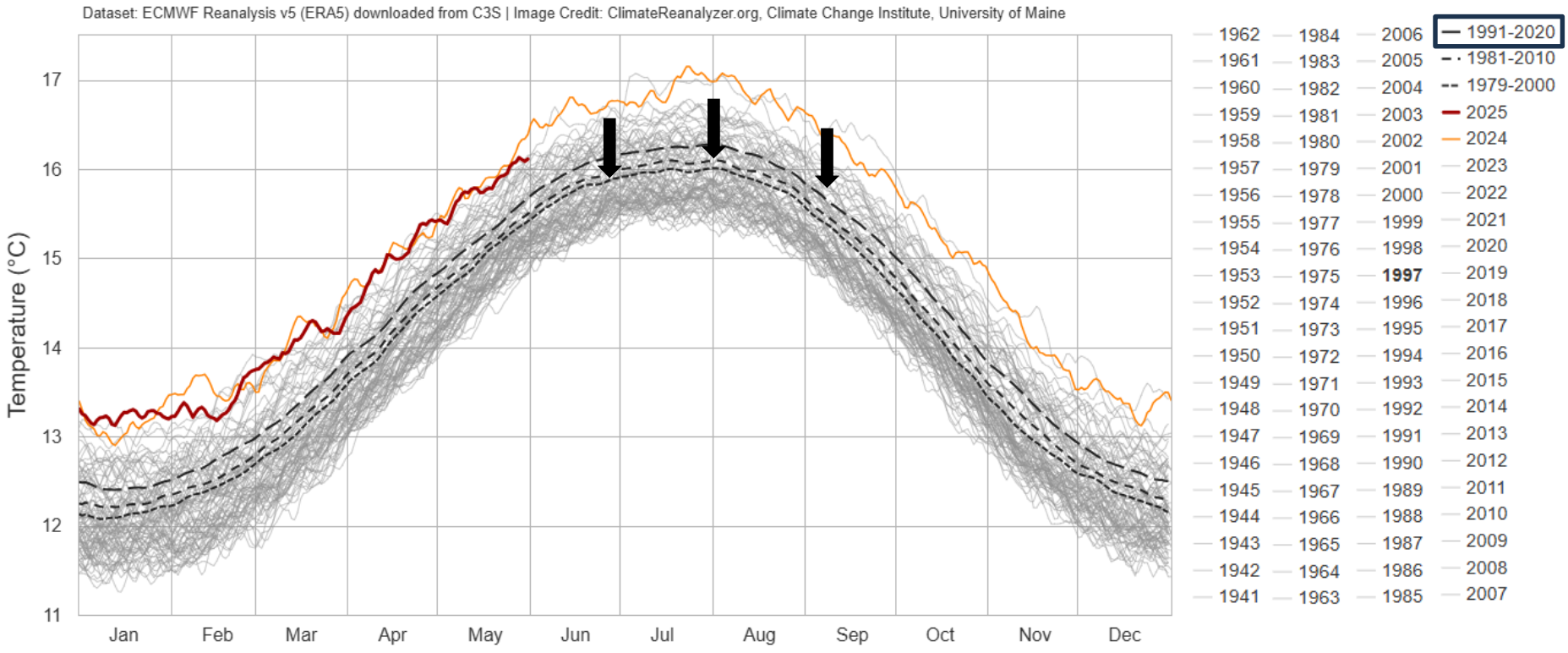
Prosječne dnevne temperature, Worldwide



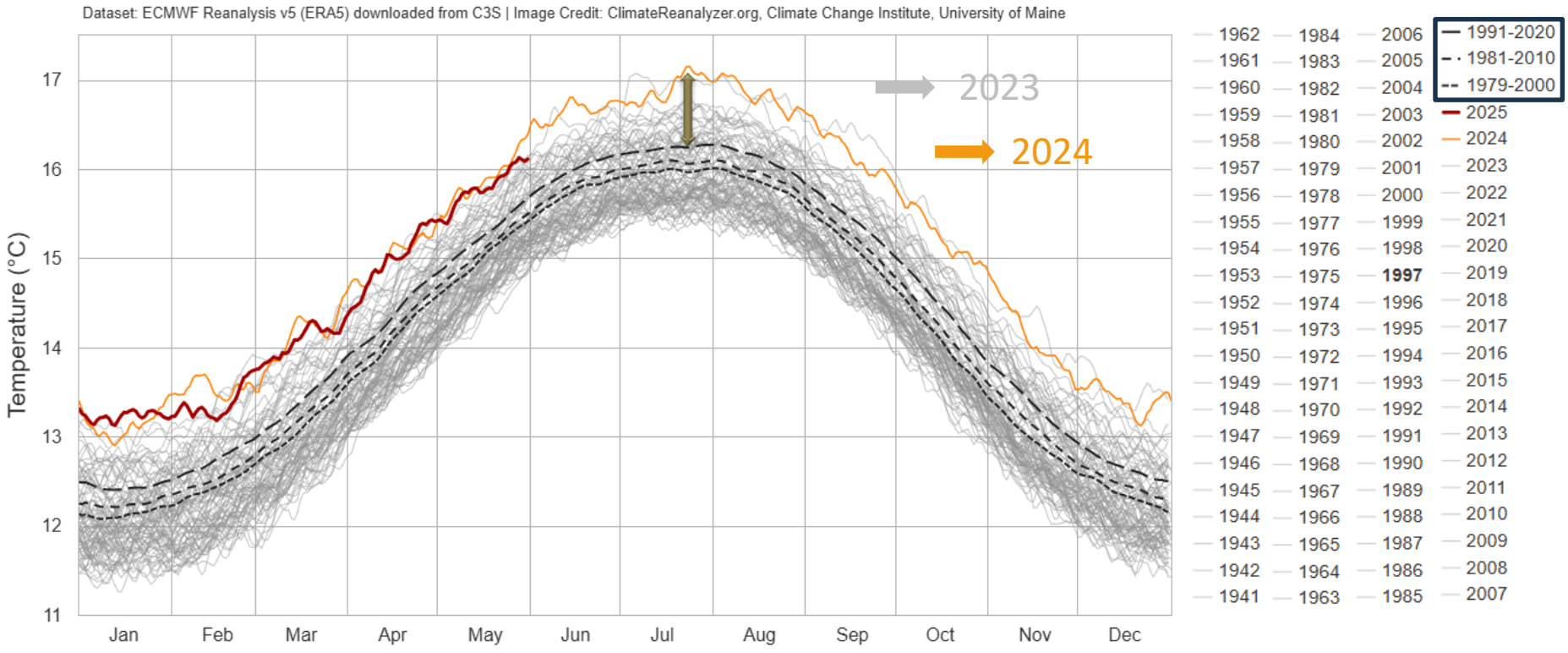
Prosječne dnevne temperature, Worldwide



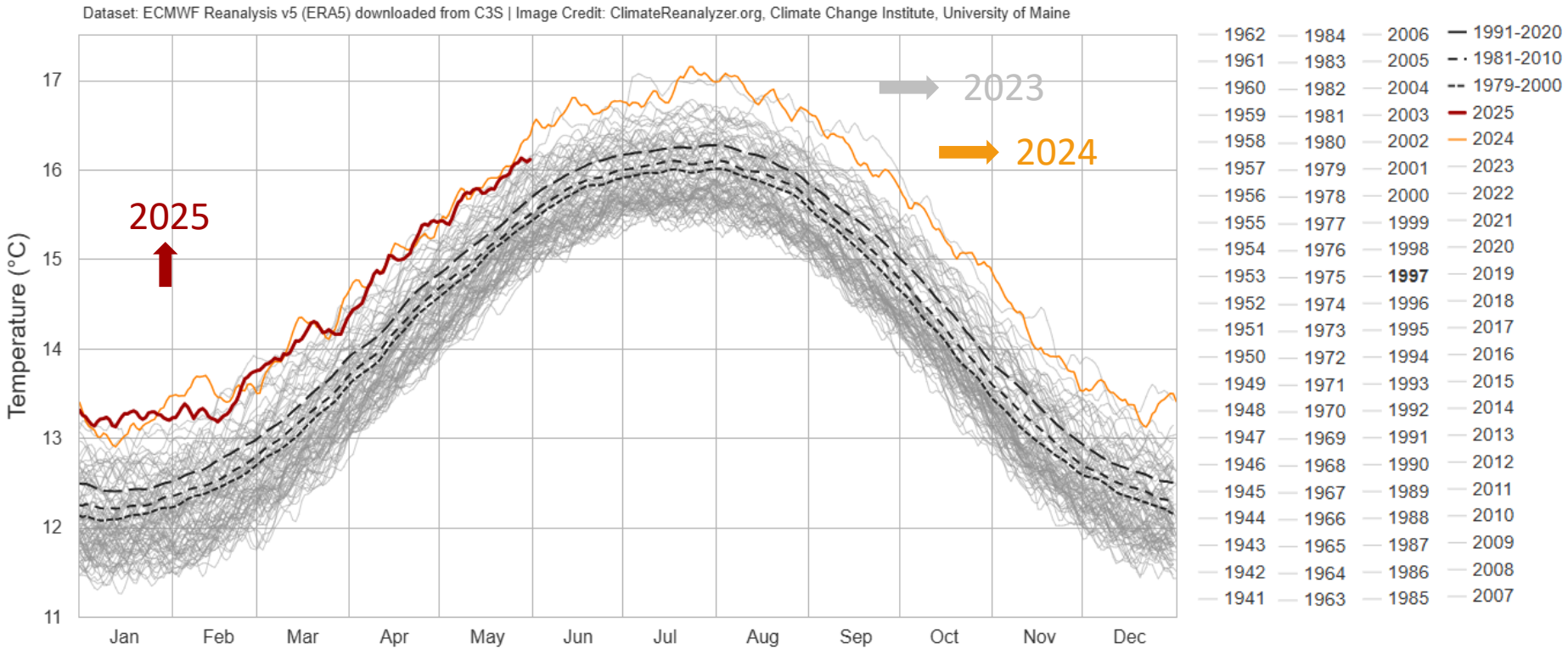
Prosječne dnevne temperature, Worldwide



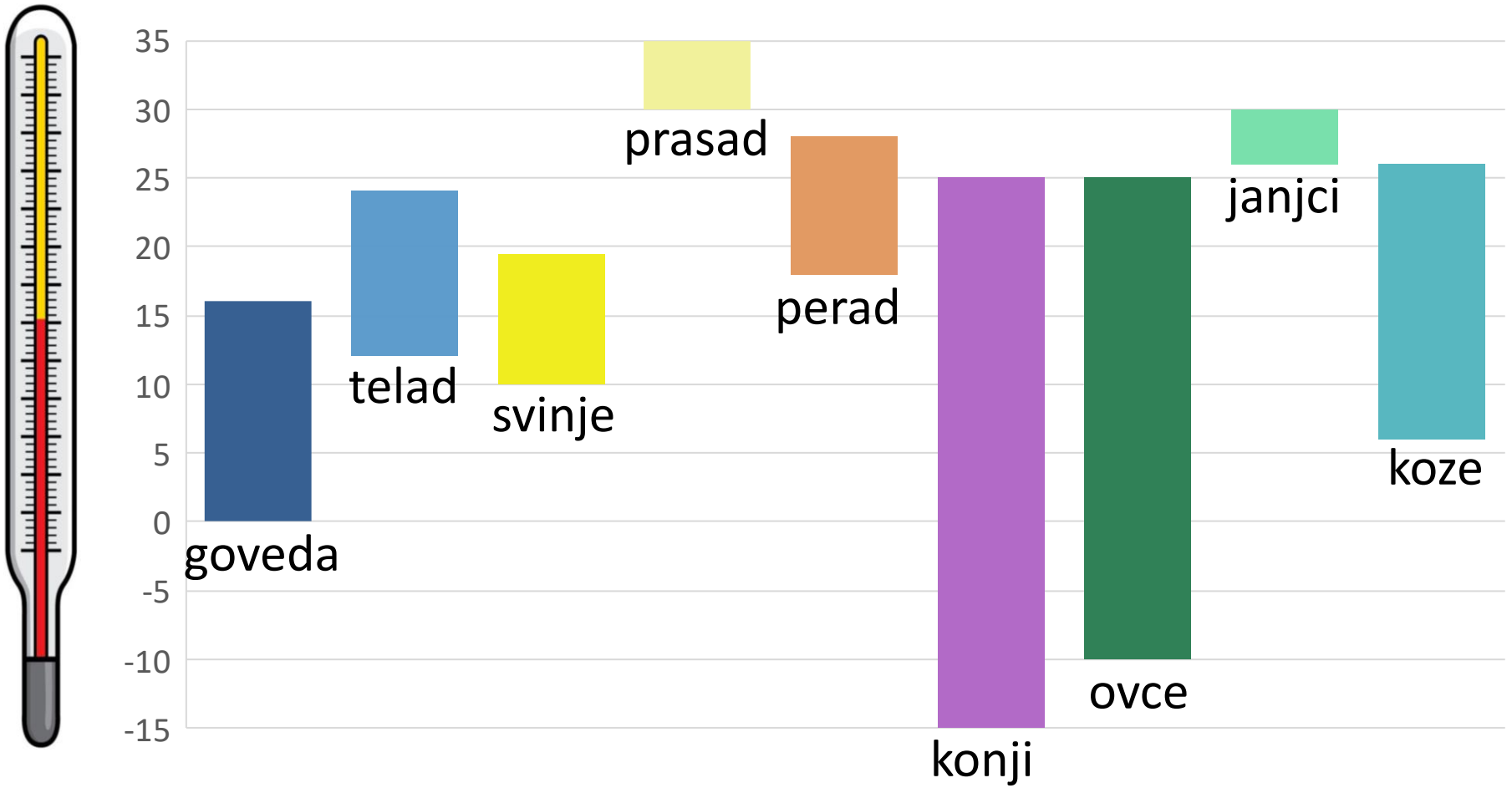
Prosječne dnevne temperature, Worldwide



Prosječne dnevne temperature, Worldwide

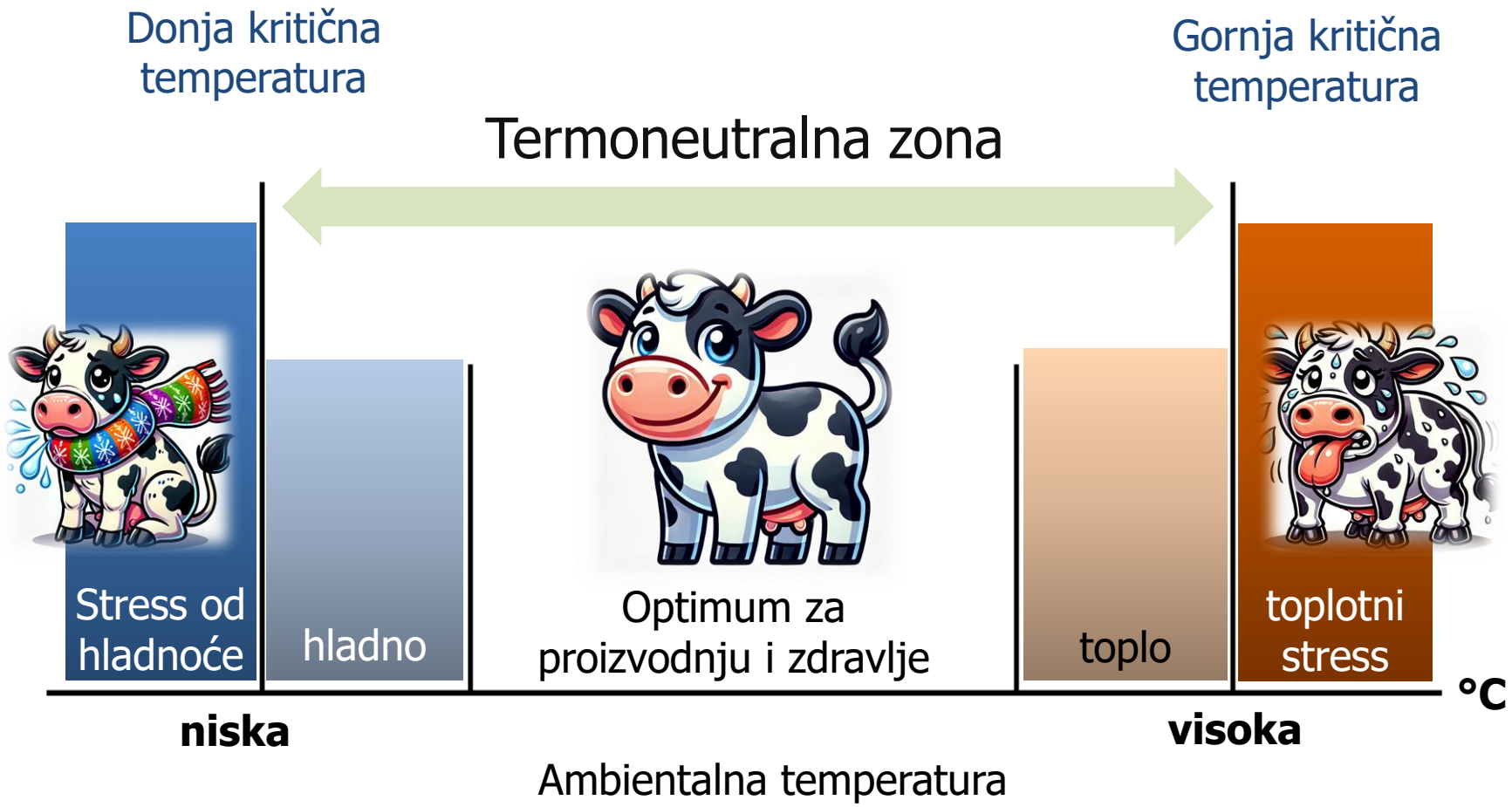


Termoneutralne zone



Data source: FiBl (2016)

Termoneutralne zone



Indeks temperature i relativne vlažnosti vazduha (THI)

Temp	Relative Humidity (%)																			
°C	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
15	58	58	58	58	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59
16	59	59	59	59	60	60	60	60	60	60	60	60	60	60	60	60	60	61	61	61	61
17	60	60	60	60	61	61	61	61	61	61	61	61	62	62	62	62	62	62	62	62	63
18	61	61	61	61	62	62	62	62	62	62	63	63	63	63	63	64	64	64	64	64	64
19	62	62	62	62	63	63	63	63	63	64	64	64	64	65	65	65	65	66	66	66	66
20	62	63	63	63	64	64	64	64	65	65	65	65	66	66	66	67	67	67	67	68	68
21	63	64	64	64	65	65	65	66	66	66	67	67	67	67	68	68	68	69	69	69	70
22	64	64	65	65	66	66	66	67	67	67	68	68	69	69	69	70	70	70	71	71	72
23	65	65	66	66	67	67	67	68	68	69	69	70	70	70	71	71	72	72	73	73	73
24	66	66	67	67	68	68	68	69	69	70	70	71	71	72	72	73	73	74	74	75	75
25	66	67	67	68	69	69	70	70	71	71	72	72	73	73	74	74	75	75	76	76	77
26	67	68	68	69	70	70	71	71	72	72	73	74	74	75	75	76	76	77	78	78	79
27	68	69	69	70	71	71	72	72	73	74	74	75	76	76	77	77	78	79	79	80	81
28	69	69	70	71	72	72	73	74	74	75	76	76	77	78	78	79	80	80	81	82	82
29	70	70	71	72	73	73	74	75	75	76	77	78	78	79	80	81	81	82	83	83	84
30	70	71	72	73	74	74	75	76	77	77	78	79	80	81	81	82	83	84	84	85	86
31	71	72	73	74	75	75	76	77	78	79	80	80	81	82	83	84	84	85	86	87	88
32	72	73	74	75	76	76	77	78	79	80	81	82	83	83	84	85	86	87	88	89	90
33	73	74	75	76	77	77	78	79	80	81	82	83	84	85	86	87	88	89	90	90	91
34	74	75	76	77	78	79	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93
35	74	75	76	77	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
36	75	76	77	78	80	81	82	83	84	85	86	87	88	89	90	91	92	94	95	96	97
37	76	77	78	79	81	82	83	84	85	86	87	88	90	91	92	93	94	95	96	97	99
38	77	78	79	80	82	83	84	85	86	87	89	90	91	92	93	95	96	97	98	99	100
39	78	79	80	81	83	84	85	86	87	89	90	91	92	94	95	96	97	99	100	101	102
40	78	80	81	82	84	85	86	87	89	90	91	92	94	95	96	98	99	100	101	103	104

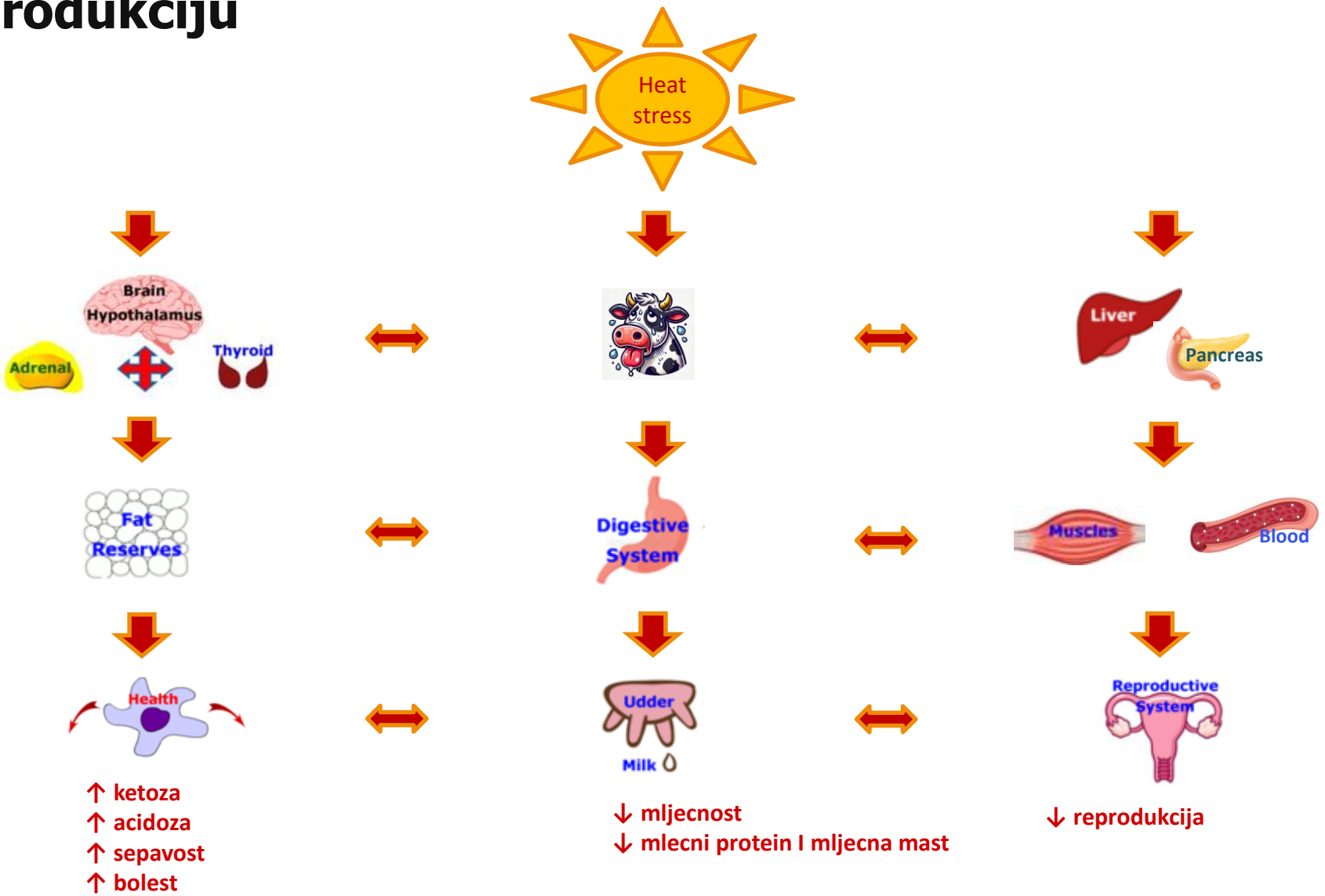
- **<68** Bez toplotnog stresa
- **68-75** Blagi toplotni stres
- **76-84** Umjereni toplotni stres
- **85-95** Izražen toplotni stres
- **>95** Teški toplotni stres / smrt

Data source: Van Laer et al. (2015)

Indeks temperature i relativne vlažnosti vazduha (THI)

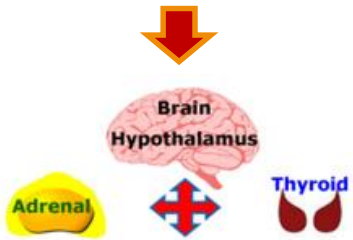
<68	Bez toplotnog stresa	• Optimalna mljecnost i reproduktivna sposobnost
68-75	Blagi toplotni stres	• Zivotinje traze hlad i vodu • ↑ frekvancija disanja • Prvi znaci smanjenja mljecnosti primjetni
76-84	Umjereni toplotni stres	• Ubrzano disanje i lucenje pljuvacke • ↓ konzumacija hrane • ↑ temperature tjela I konzumacija vode • ↓ reproduktivna sposobnost I mljecnost
85-95	Izražen toplotni stres	• Jako ubrzano disanje • Intenzivno lucenje pljuvacke • ↓↓ reproduktivna sposobnost I mljecnost
>95	Teški toplotni stres / smrt	• Uginuce

Uticaj toplotnog stresa na fiziološke funkcije i produkciju

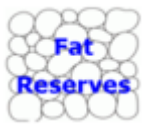


Source: Wang et al. (2020); Takahashi (2011)

Uticaj toplotnog stresa na fiziološke funkcije i produkciju



↑ Stress & gluconeogeni hormoni
↓ stitna zlijezda & hormoni rasta



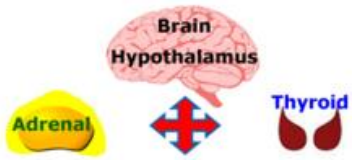
↓ mobilizacija slobodnih masnih kiselina (**NEFA**)

↑ reakcija na upalne procese u tjelu
↓ imunitet

↑ ketoza
↑ acidoza
↑ sepavost
↑ bolest

Source: Wang et al. (2020); Takahashi (2011)

Uticaj toplotnog stresa na fiziološke funkcije i produkciju



↑ tjelesna temperatura, ubrzano disanje i gubitak tecnosti
↓ konzumacija hrane, apetit I energetski bilans

↓ absorpcija pljuvacke + HCO_3 + SCFA
↓ pH buraga (acidoza)
Disbalans (Na^+, K^+) elektrolita
↑ oksidativni stres

↓ snadbjevanje vimena hranjivima
↓ funkcija epitelnog tkiva u vimenu

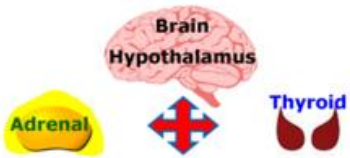
↑ ketoza
↑ acidoza
↑ sepavost
↑ bolest

↓ mljecnost
↓ mlecni protein I mljecna mast

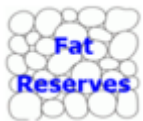
*SCFA = short chain fatty acid

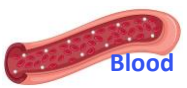
Source: Wang et al. (2020); Takahashi (2011)

Uticaj toplotnog stresa na fiziološke funkcije i produkciju



↑ oksidativni stres
↑ zamascenje
↓ glukoneogeneza





↑ katabolizam
gubitak tjelesne mase

↓ glukoza
↓ LH hormoni

↓ rast folikula
↓ kvalitet jajnih celija
↑ izostatak estrusa
↓ razvoj embriona

↑ ketoza
↑ acidoza
↑ sepavost
↑ bolest

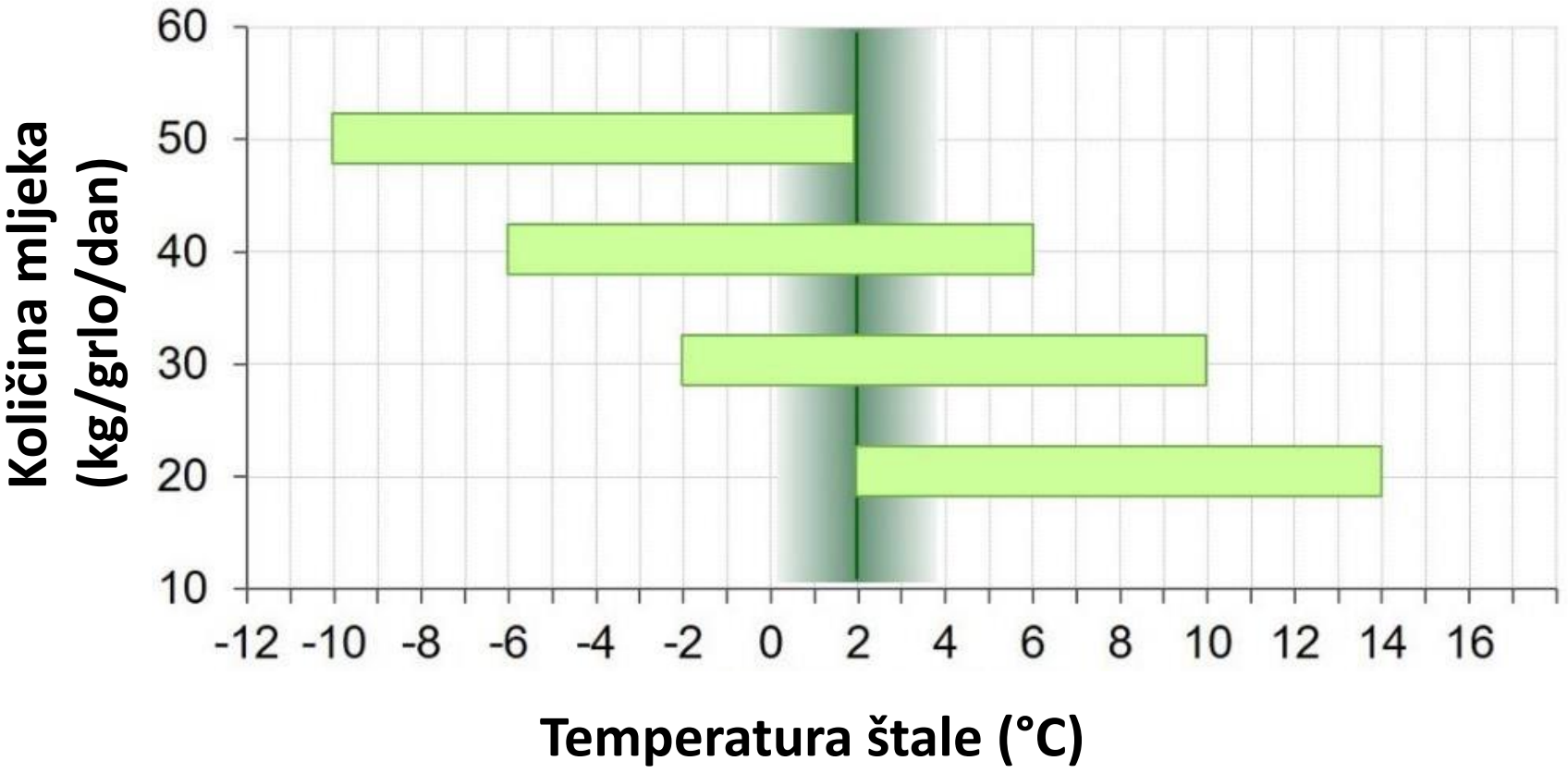
↓ mljecnost
↓ mlecni protein I mljecna mast

↓ reprodukcija

*LH = luteinizing hormone

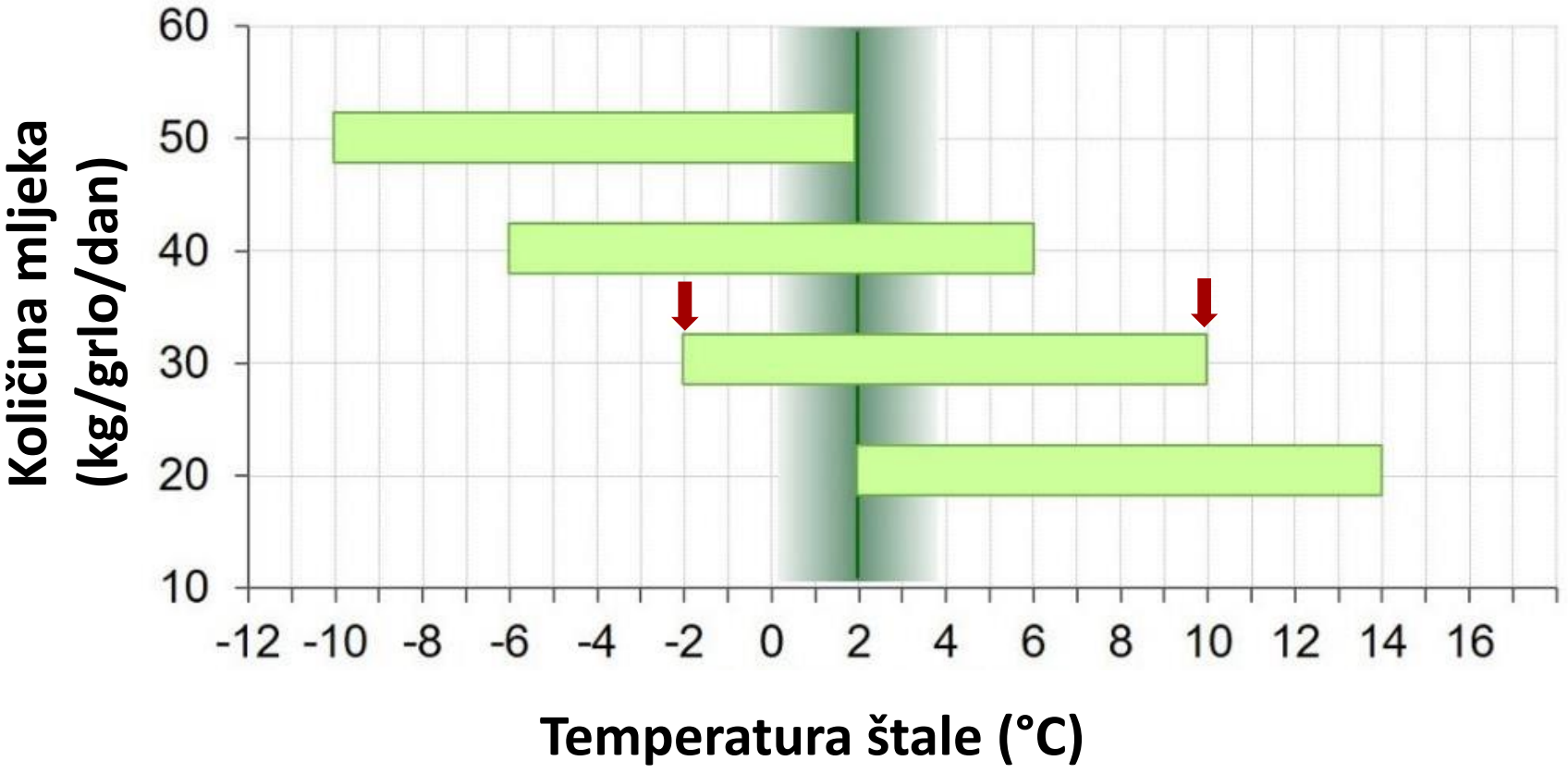
Source: Wang et al. (2020); Takahashi (2011)

Optimalna ambientalana temperature i proizvodnja



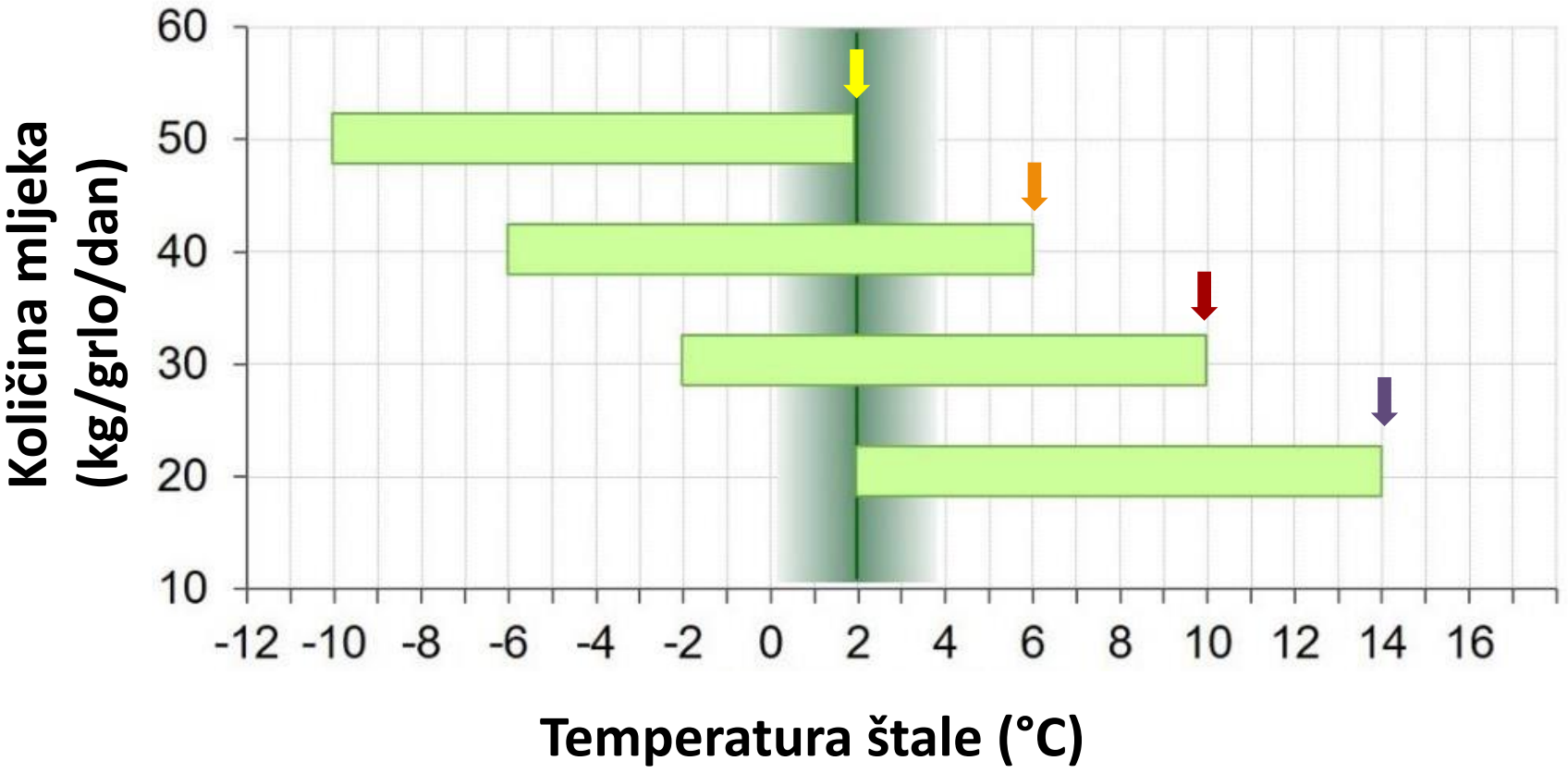
Source: Articles on the topic of stable climate in animal husbandry 2020, Dummerstorf

Optimalna ambientalana temperature i proizvodnja



Source: Articles on the topic of stable climate in animal husbandry 2020, Dummerstorf

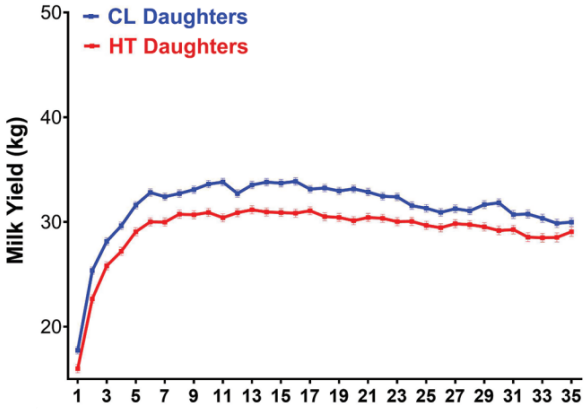
Optimalna ambientalana temperature i proizvodnja



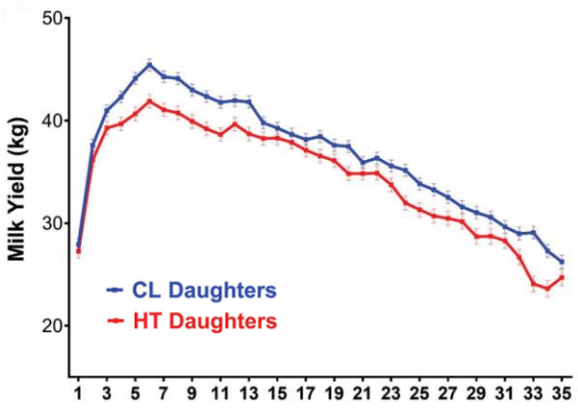
Source: Articles on the topic of stable climate in animal husbandry 2020, Dummerstorf

Toplotni stres smanjuje produktivnost buduće generacije krava

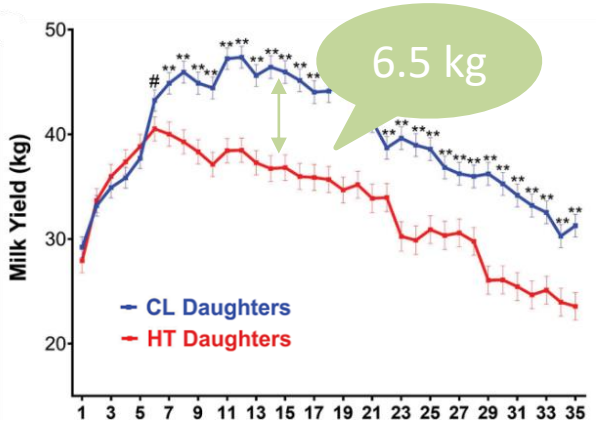
1. laktacija



2. laktacija



3.laktacija



Sedmice nakon telenja

*CL = aktivno klimatizirane
HT = izložene toplotnom stresu

Source: Laporta et al. (2020)

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Šta mi možemo učiniti?

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

voda

Minerali & vitamini

↑ koncentracija energije

Zdravlje buraga

↑ By-pass protein

↑ probavljivost vlakana

↓ zagrijavanje hrane

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa

preko ishrane

voda

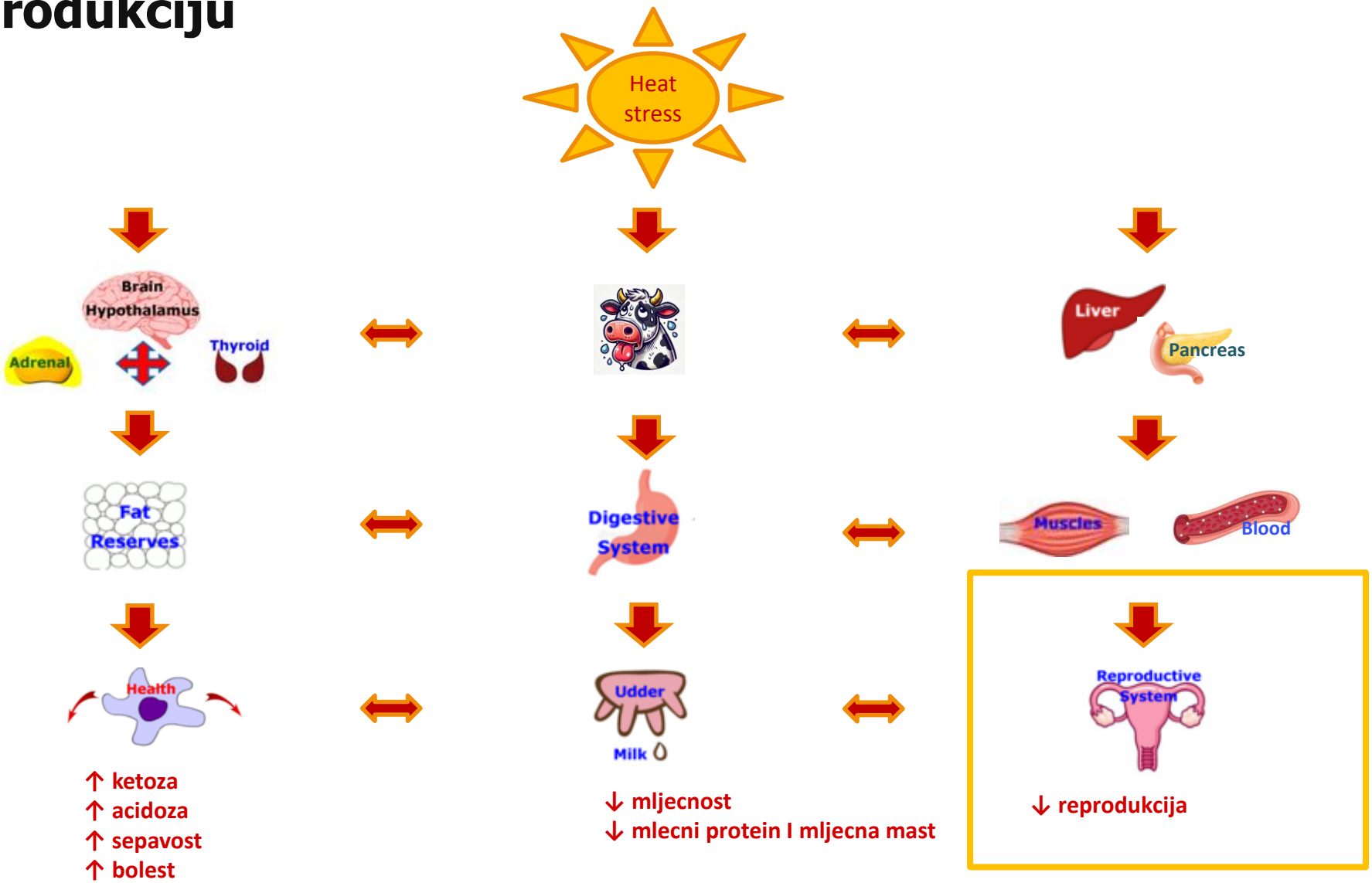
Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

voda

Minerali & vitamini

		R 61	KR 60
Minerals			
Ca	%	12,3	20
P	%	3	4
Na	%	8	8
Mg	%	7	7
S	%	1	
Vitamins			
Vit. A	IU	300000	800000
Vit. D3	IU	100000	100000
Vit. E	Mg	6000	2000
Vit. B		√	
Trace Elements		Organski vezani	
Cu	mg	800	1000
Zn	mg	4000	8000
Mn	mg	4000	5000
I	mg	60	60
Co	mg	33,3	40
Se	mg	16,67	50

Uticaj toplotnog stresa na fizioloske funkcije i produkciju



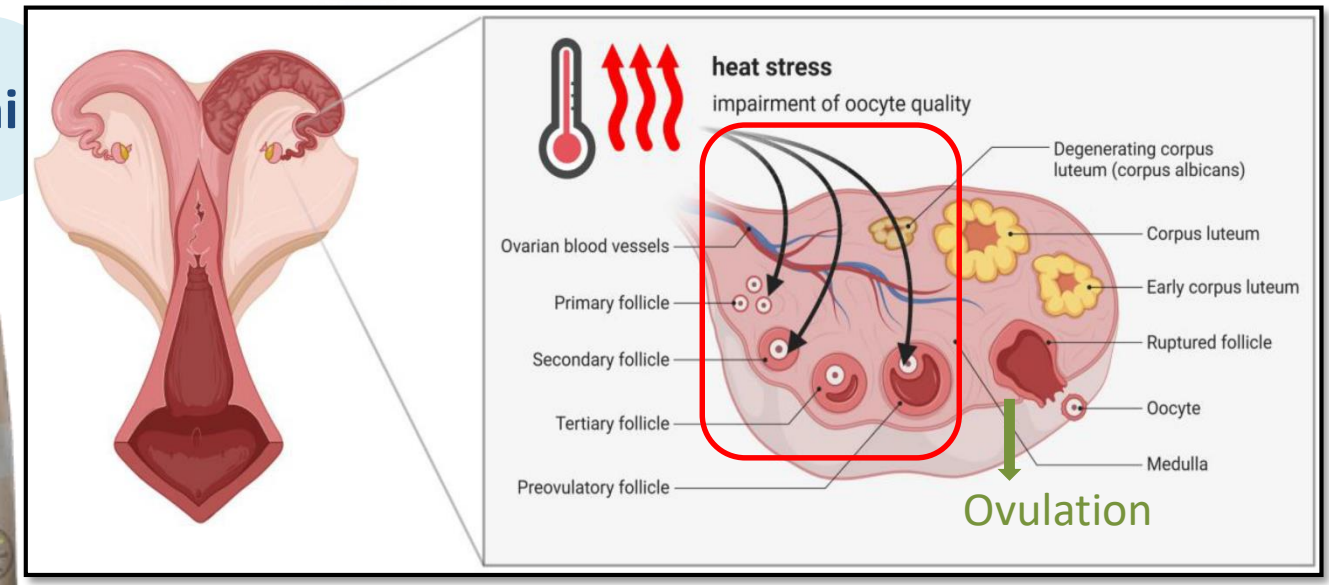
Source: Wang et al. (2020); Takahashi (2011)

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

voda

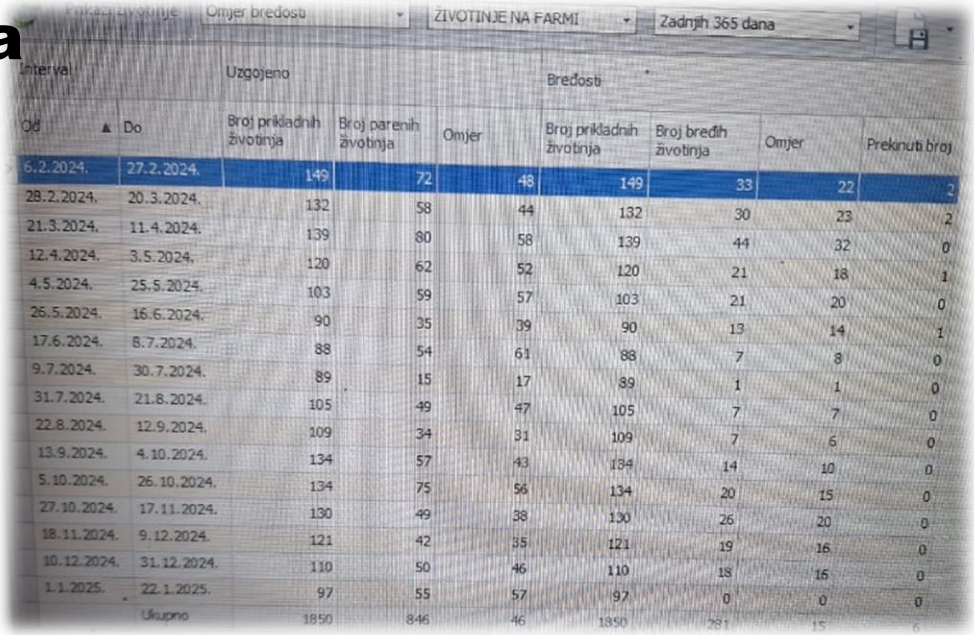
Minerali & vitamini

Vitamin A



Picture source: Miętkiewska et al. (2022)

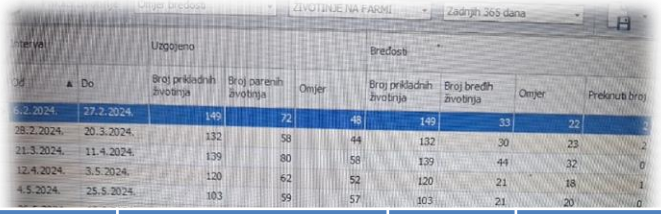
Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane



Omjer bređosti | ŽIVOTINJE NA FARMI | Zadnjih 365 dana

Interval		Uzgojeno			Bređosti			
Od ▲	Do	Broj prikladnih životinja	Broj parenih životinja	Omjer	Broj prikladnih životinja	Broj bređih životinja	Omjer	Preknuti broj
6.2.2024.	27.2.2024.	149	72	48	149	33	22	2
28.2.2024.	20.3.2024.	132	58	44	132	30	23	2
21.3.2024.	11.4.2024.	139	80	58	139	44	32	0
12.4.2024.	3.5.2024.	120	62	52	120	21	18	1
4.5.2024.	25.5.2024.	103	59	57	103	21	20	0
26.5.2024.	16.6.2024.	90	35	39	90	13	14	1
17.6.2024.	8.7.2024.	88	54	61	88	7	8	0
9.7.2024.	30.7.2024.	89	15	17	89	1	1	0
31.7.2024.	21.8.2024.	105	49	47	105	7	7	0
22.8.2024.	12.9.2024.	109	34	31	109	7	6	0
13.9.2024.	4.10.2024.	134	57	43	134	14	10	0
5.10.2024.	26.10.2024.	134	75	56	134	20	15	0
27.10.2024.	17.11.2024.	130	49	38	130	26	20	0
18.11.2024.	9.12.2024.	121	42	35	121	19	16	0
10.12.2024.	31.12.2024.	110	50	46	110	18	16	0
1.1.2025.	22.1.2025.	97	55	57	97	0	0	0
	Ukupno	1850	846	46	1850	281	15	6

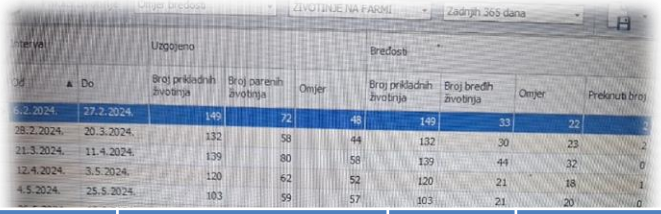
Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane



21 d

Od	do	Broj prikladnih zivotinja	Broj osjemenjenih	Omjer %	Broj prikladnih zivotinja	Broj gravidnih zivotinja	Odnos %	Omjer %
6.2.24	27.2.24	149	72	48	149	33	22	46
28.2.24	20.3.24	132	58	44	132	30	23	52
21.3.24	11.4.24	139	80	58	139	44	32	55
12.4.24	3.5.24	120	62	52	120	21	20	34
4.5.24	25.5.24	103	59	57	103	21	20	36
26.5.24	16.6.24	90	35	39	90	13	14	37
17.6.24	8.7.24	88	54	61	88	7	8	13
9.7.24	30.7.24	89	15	17	89	1	1	6.7
31.7.24	21.8.24	105	49	47	105	7	7	14
22.8.24	12.9.24	109	34	31	109	7	6	21
13.9.24	4.10.24	134	57	43	134	14	10	25
5.10.24	26.10.24	134	75	56	134	20	15	27
27.10.24	17.11.24	130	49	38	130	26	20	54
18.11.24	9.12.24	121	42	35	121	19	16	45
10.12.24	31.12.24	110	50	46	110	18	16	36

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane



Udio osjemenjenih krava

Od	do	Broj prikladnih zivotinja	Broj osjemenjenih	Omjer %	Broj prikladnih zivotinja	Broj gravidnih zivotinja	Odnos %	Omjer %
6.2.24	27.2.24	149	72	48	149	33	22	46
28.2.24	20.3.24	132	58	44	132	30	23	52
21.3.24	11.4.24	139	80	58	139	44	32	55
12.4.24	3.5.24	120	62	52	120	21	20	34
4.5.24	25.5.24	103	59	57	103	21	20	36
26.5.24	16.6.24	90	35	39	90	13	14	37
17.6.24	8.7.24	88	54	61	88	7	8	13
9.7.24	30.7.24	89	15	17	89	1	1	6.7
31.7.24	21.8.24	105	49	47	105	7	7	14
22.8.24	12.9.24	109	34	31	109	7	6	21
13.9.24	4.10.24	134	57	43	134	14	10	25
5.10.24	26.10.24	134	75	56	134	20	15	27
27.10.24	17.11.24	130	49	38	130	26	20	54
18.11.24	9.12.24	121	42	35	121	19	16	45
10.12.24	31.12.24	110	50	46	110	18	16	36

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Od	do	Broj prikladnih zivotinja	Broj osjemenjenih	Omjer %	Broj prikladnih zivotinja	Broj gravidnih zivotinja	Odnos %	Omjer %
6.2.24	27.2.24	149	72	48	149	33	22	46
28.2.24	20.3.24	132	58	44	132	30	23	52
21.3.24	11.4.24	139	80	58	139	44	32	55
12.4.24	3.5.24	120	62	52	120	21	20	34
4.5.24	25.5.24	103	59	57	103	21	20	36
26.5.24	16.6.24	90	35	39	90	13	14	37
17.6.24	8.7.24	88	54	61	88	7	8	13
9.7.24	30.7.24	89	15	17	89	1	1	6.7
31.7.24	21.8.24	105	49	47	105	7	7	14
22.8.24	12.9.24	109	34	31	109	7	6	21
13.9.24	4.10.24	134	57	43	134	14	10	25
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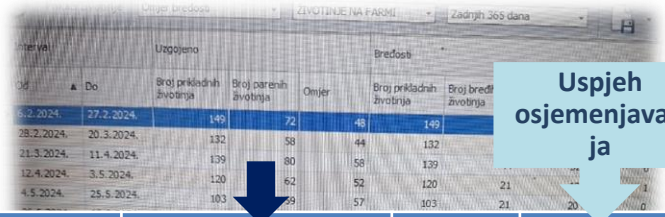
Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane



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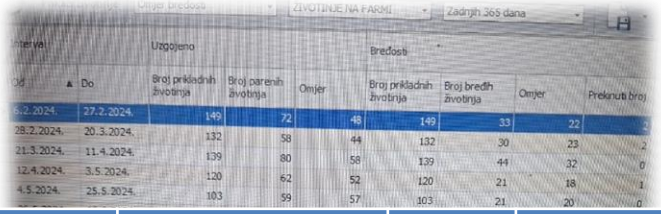

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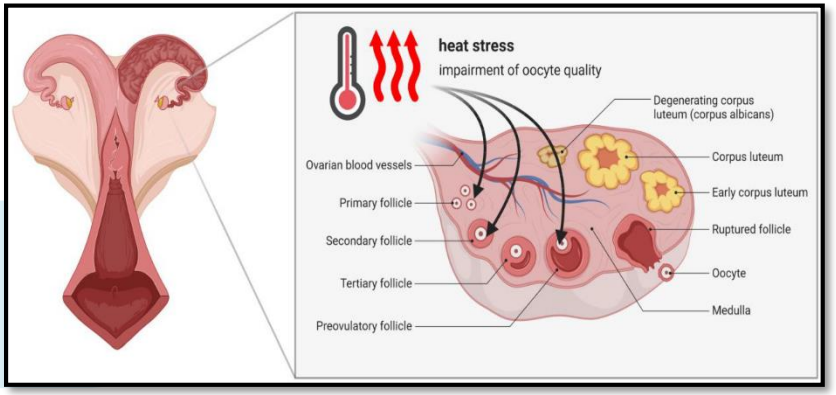
Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Voda



Minerali & vitamini

Vitamin A

		Carotin	Fertil
ß-karotin	mg	2000	4000
Vitamin E	mg	1000	2000
Mikro-elementi			Povecana probaljivost
Cu hidroksid	mg	-	1250 mg
Zn hidroksid	mg	-	1500 mg
Mn kelat	mg	-	500 mg
Se protektovan	mg	-	15 mg

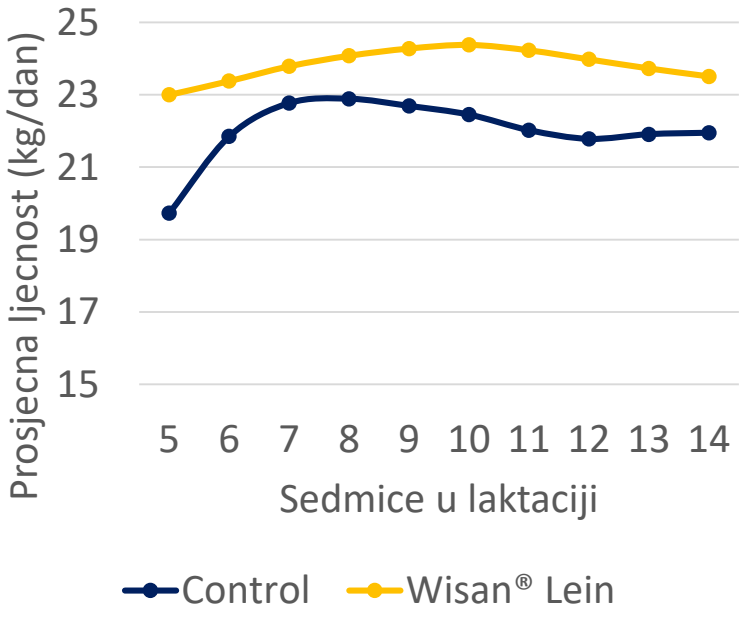
Picture source: Miętkiewska et al. (2022)

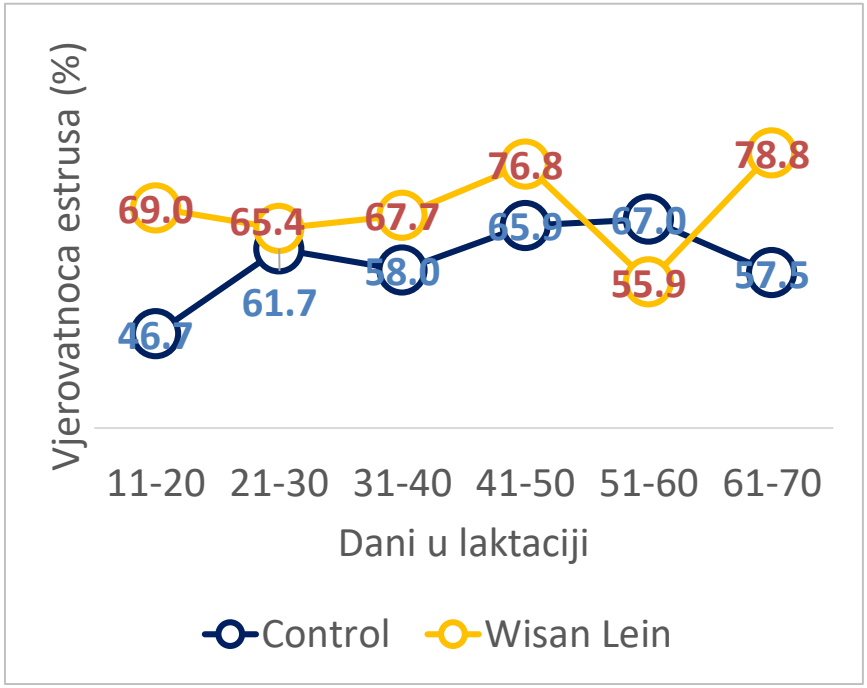
Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Ogled: Wisan®Lein i plodnost

Lokacija: Mecklenburg Vorpommern, Njemačka

Veličina ogleda: 96 muznih krava





Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Ogled: Wisan®Lein i plodnost

Lokacija: Mecklenburg Vorpommern, Njemačka

Veličina ogleda: 96 muznih krava

Uspjeh osjemenjavanja iz prvog pokusaja 57% ogled vs 49% u kontroli

Gravidnost nakon dva osjemenjavanja 95% ogled vs 73% u kontroli

Indeks osjemenjavanja 1.8 ogled vs 2.0 u kontroli

Servis period 81 dan u gledu vs 99 dana u kontroli

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Voda

Minerali & vitamini

Zdravlje buraga

Posljedice acidoze buraga:
-upala resica
-stjenka burga postaje propusna
-toksicne tvari prodiru u krvotok

Puferne supstance & zive celije kvasaca

Moallem et al. (2010); Niles et al. (1980)

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Ogled: poređenje sode sa ADDIFERM®MultiPuffer u obrocima krava sa visokom proizvodnjom mlijeka

Lokacija: Wendland, Njemačka

Veličina ogleda: 65 muznih krava

Mlječnost: 35.4 L mlijeka/dan, sa 4.1% masti & 3.6% proteina

Ogled

kontrola 1	150 g MultiPuffer	200 g soda bikarbona	kontrola 2	150 g MultiPuffer
10 dana	10 dana	10 dana	10 dana	10 dana

Rumen-bolus smaXtec

→ pH-mjerenja svakih 5 minuta

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Ogled: poređenje sode sa ADDIFERM®MultiPuffer u obrocima krava sa visokom proizvodnjom mlijeka

Vrijeme buražnog pH ispod 6.1 (dnevno)→ mjereno svakih 5 min

Period	Tretman	Vrijeme niskog buražnog pH (min)
1	kontrola 1	503[a]
2	150 g MultiPuffer	199[b]
3	200 g soda bikarbona	204[b]
4	Kontrola 2	408[a]
5	150 g MultiPuffer	244[b]

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

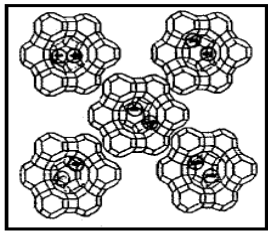
Samo 150-250 g/grlo/dan
Kalkulacija obroka nije potrebna

Dobra alternativa za sodu bikarbonu protiv acidoze

Prednosti Addiferm® Multipuffer u odnosu na sodu:

- ✓ Može biti korištena u svim obrocima u stadu (čak i u suhostaju)

  *soda povećava rizik pojave mlječne groznice i njenih posljedica
- ✓ Nema posljedica u slučaju predoziranja
- ✓ Ima umjeren kapacitet vezivanja toxina



Zeolit = selektivno vezivanje

1. Neutralizuje mikotoksine
2. Ne vezuje aminokiseline i vitamine
3. Ne inhibira djelovanje medikamenata

ADDIFERM® MultiPuffer
- za smanjenje toplotnog stresa i acidoze

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Voda

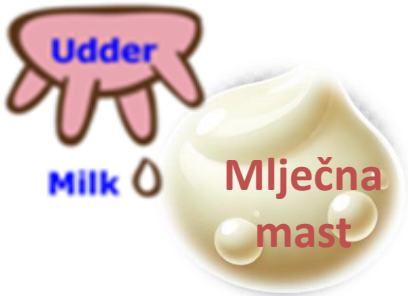
Minerali & vitamini

Zdravlje buraga

↑ probavljivost vlakana

Acetat

Butirat



Korde et al. (2007); Zebeli et al. (2008)

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Voda

Minerali & vitamini

↑ koncentracija energije

lan & protektovane masne kiseline

Zdravlje buraga

↑ probavljivost vlakana

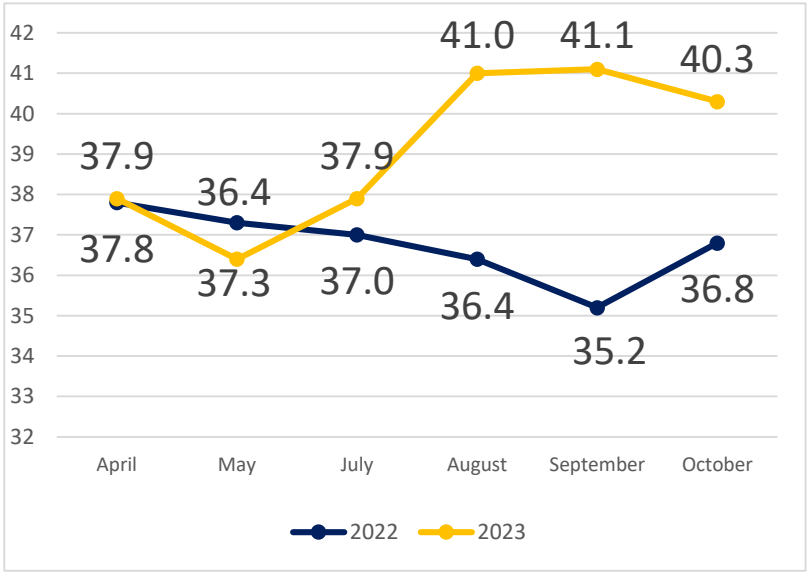
West (1999); Beede and Collier (1986)

Heat Stress & Prevention
through feeding management

Power Mix - feeding trial :
Replacing fat supplements in dairy cow ration with Power Mix

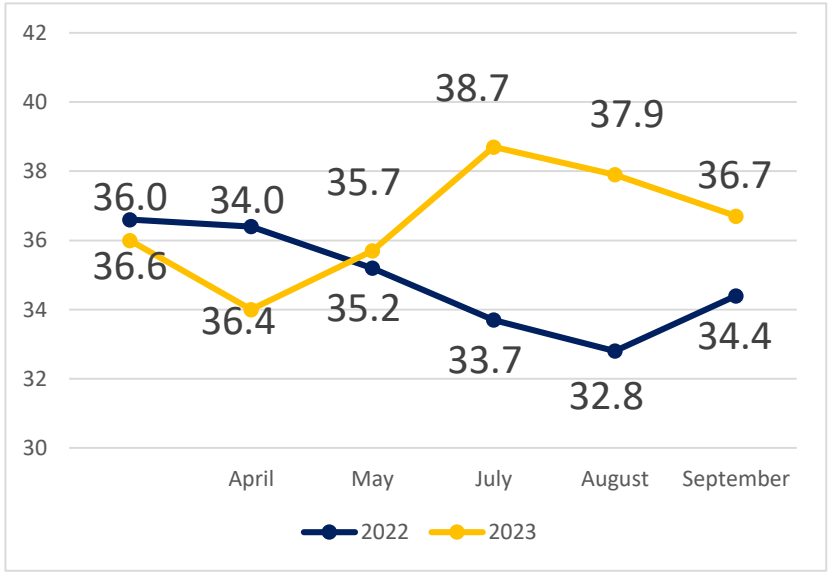
ECM milk yield (kg/d)

Early lactation



Average: + 2.9 kg

Mid lactation



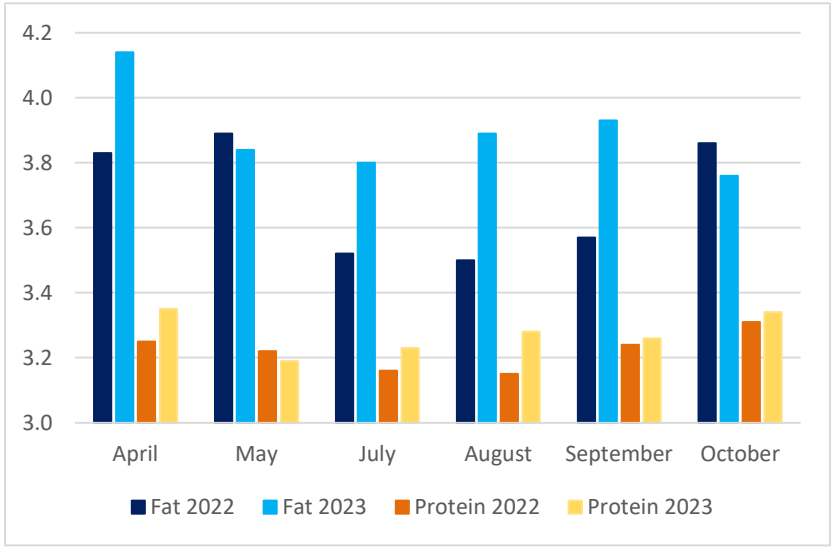
Average: + 2.3 kg

Heat Stress & Prevention
through feeding management

Power Mix - feeding trial :
Replacing fat supplements in dairy cow ration with Power Mix

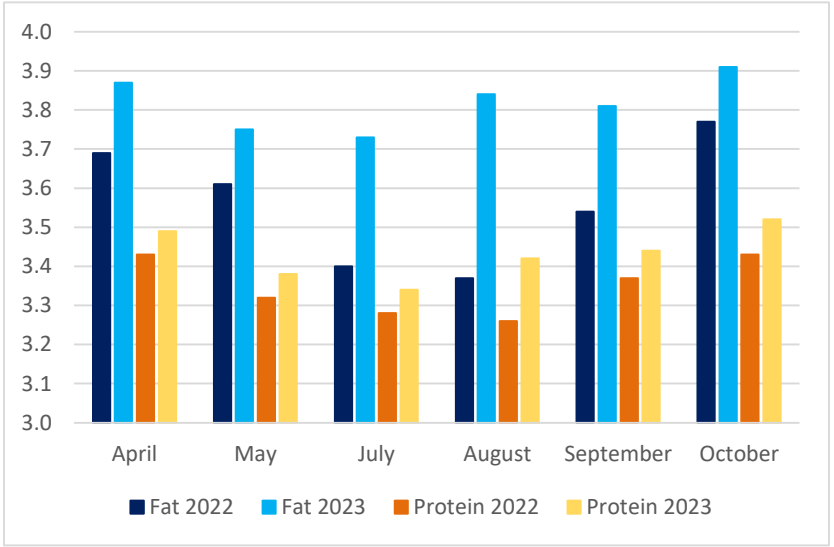
Milk fat & protein content (%)

Early lactation



Average:
+ 0.2 % milk fat
+ 0.05 % milk protein

Mid lactation



Average:
+ 0.3 % milk fat
+ 0.08 % milk protein

Mogucnosti unapredjenja mljecnosti u fazama toplotnog stresa preko ishrane

Voda

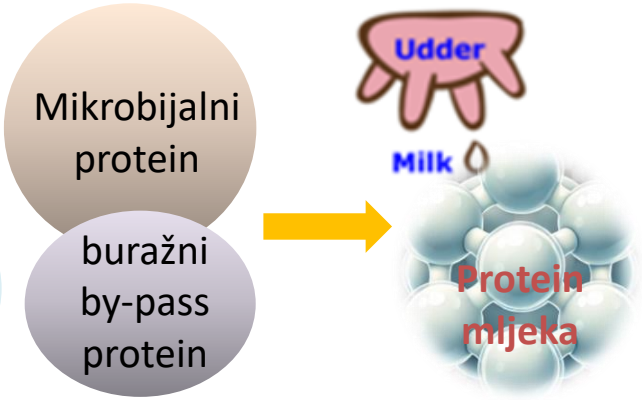
Minerali & vitamini

Zdravlje buraga

↑ probavljivost vlakana

↑ koncentracija energije

↑ **By-pass protein**



Sarkar et al. (2022)

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Wisan® Raps vs. Komercijalne varijate sačmi soje

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Wisan® Raps – tretirana sačma repice

Wisan® Raps	
UDP_5 (%)	50
UDP_8 (%)	61

Sačma soje Uzorci:	1	2	3	4	5	6	7	8	9	10	prosjek
UDP_5 (%)	15	21	16	13	17	16	15	25	35	31	20
UDP_8 (%)	22	29	23	19	23	22	21	34	45	41	28

Izvor: doktorska disertacija (Chi, 2023)

UDP = buražni by-pass protein

$UDP_{5/8}$ = količina by-pass proteina pri specifičnoj rati pasaže (5 sati kod tovne junadi/8 sati kod mlječnih krava)

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Wisan® Raps – specially treated rapeseed

Wisan® Raps	
UDP_5 (%)	50
UDP_8 (%)	61

Sačma repice Uzorci:	1	2	3	4	5	6	7	8	9	10	Mean
UDP_5 (%)	45	36	28	30	37	33	37	41	33	39	35.9
UDP_8 (%)	55	46	37	39	47	42	47	51	43	49	45.6

Data sources: Steingass et al. (2013)

UDP = buražni by-pass protein

$UDP_{5/8}$ = količina by-pass proteina pri specifičnoj rati pasaže (5 sati kod tovne junadi/8 sati kod mlječnih krava)

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Voda

Minerali & vitamini

↑ koncentracija energije

Zdravlje buraga

↑ By-pass protein

↑ probavljivost vlakana

↓ zagrijavanje hrane

Stabil

Mogućnosti unapređenja mlječnosti u fazama toplotnog stresa preko ishrane

Šta je to zagrijavanje hrane na hranidbenom stolu?

silaže:

- Temperatura jezgra silosa sa okončanim siliranem je oko 15 °C
- Odstupanje od + 10°C se smatra zagrijavanjem

obroci:

- + 2 °C u odnosu na temperaturu okruženjase smatra zagrijavanjem! (izazivaju ga gljivice i plijesni)

posljedice:

- Rast temperature hrane za 10 °C je jednako
  - Gubitku energije od 0,1 MJ NEL / kg DM hrane (2 MJ / dan ≈ 0,7 kg manje mlijeka)
  - I smanjenoj konzumaciji suhe tvari od 1 kg (6-7 MJ / dan ≈ 2 kg manje mlijeka)


42.4°C

bez ADDIFERM® Stabil

Sa ADDIFERM® Stabil

Mikrobiologischer Befund	(UM)	Einheit	Wert	KZS	Bewertung	OW	Wert	KZS	Bewertung	OW
Schwärzepilze	(111)	KbE/g								
Ustilago sp.	(111)	KbE/g								
Verticillium sp.	(111)	KbE/g	< 500				< 500			
produkttypische Schimmel- und Schwärzepilze (KG4)		**KbE/g**	**< 500**	**1**	**normal**	**<=50.000**	**< 500**	**1**	**normal**	**<=50.000**
Penicilium sp.	(111)	KbE/g	< 500				< 500			
Geotrichum sp.	(111)	KbE/g	< 500				< 500			
Aspergillus sp.	(111)	KbE/g	< 500				< 500			
Monascus sp.	(111)	KbE/g	< 500				< 500			
Scopulariopsis sp.	(111)	KbE/g	< 500				< 500			
Wallemia sp.	(111)	KbE/g	< 500				< 500			
verderbanzeigende Schimmelpilze (KG5)		**KbE/g**	**< 500**	**1**	**normal**		**< 500**	**1**	**normal**	
Mucorales sp.	(111)	KbE/g	< 500				< 500			
Rhizopus sp.	(111)	KbE/g	< 500				< 500			
verderbanzeigende Mucorales (KG6)		**KbE/g**	**< 500**	**1**	**normal**	**<=5.000**	**< 500**	**1**	**normal**	**<=5.000**
Hefen (Candida spp.)	(111)	KbE/g	64.000.000				3.000.000			
Saccharomyces cerevisiae	(147)	KbE/g	< 500							
Hefen (KG7)		**KbE/g**	**64.000.000**	**4**	**überhöht**	**<=1.000.000**	**3.000.000**	**2**	**leicht erhöht**	**<=1.000.000**
Qualitätsstufe				4	verdorben			2	mäßig herabgesetzt	

Alkohol u analiziranim obrocima

TMR **bez** ADDIFERM® Stabil

Ethanol	(38)	g	4,99	13,95	<5
1,2-Propandiol	(38)	g	< 0,09	< 0,25	
Propanol	(38)	g	0,87	2,44	

TMR **sa** ADDIFERM® Stabil

Ethanol	(38)	g	0,92	2,58	<5
1,2-Propandiol	(38)	g	0,64	1,80	
Propanol	(38)	g	< 0,36	< 1,00	

ADDIFERM® Stabil – izvještaji od farmera koji ga koriste

Mjesto:	Lüneburger Heide, niža saxonija (Njemačka)
Životinje:	180 muznih krava, holštajn
Proizvodnja:	30 kg mljeka, 4,1 % mast, 3,4 % protein
Izazov:	zagrijavanje travne silaže i TMR
Nakon upotrebe (1kg/t TMR):	somatske ćelije <200.000; odsutno zagijavanje, +0,7 kg mljeka na dan, povećana konzumacija suhe tvari

ADDIFERM® Stabil
- za svježu i ukusnu hranu tokom ljeta

QUALITÄT

aus Deutschland

HL HAMBURGER LEISTUNGSFUTTER GMBH

IBEKA PANTO PANTO® ADDIFERM Wisan®

Heat Stress & Prevention

ADDIFERM® MultiPuffer

Heat Stress & Prevention

ADDIFERM® MultiPuffer - introduction

- **Alternatives to sodium bicarbonate in terms of rumen acidosis**

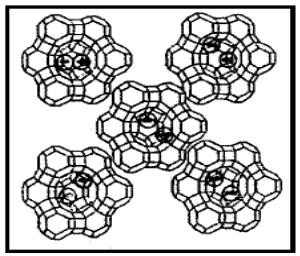
  Advantages against sodium bicarbonate

  ✓ Can be used in a variety of ways for young cattle, bull fattening, dairy cows AND dry cows

  (sodium bicarbonate increases the risk of milk fever and its complications)

  ✓ No metabolically active effect (no negative effects of overdosing)

  ✓ Toxin-binding properties



Zeolite = selective binding

1. Neutralize mykotoxins
2. Do not bind animo acids and vitamins
3. Do not interact with medications

HL HAMBURGER LEISTUNGSFUTTER GMBH

ADDIFERM® Stabil

Ingredient composition

Minerals
Bentonite
Diatomaceous earth
Acid combination (sorbic acids)
Functional flavors

Crude ash	**58 %**
Crude fat	**2.9 %**
Sodium	**13 %**

Traits & functions of ADDIFERM® Stabil

- Improves the stability of TMR
- Inhibits the growth of pathogenic bacteria, fungi and yeasts
- ↓ Rewarming of feed on the feeding table and nutrient losses from feed
- Promotes dry matter intake
- Supports the immune system by toxin-binding capacity

Usage of ADDIFERM® Stabil

- Mix 1 kg of ADDIFERM® Stabil to 1 mt of TMR (fresh mass), or 50 g/animal/day (=> approximately 50 kg of fresh feed intake)
- For dry cow mixtures (> 50% dry matter): can also blend with water in liquid form and mix in the feed mixing wagon

HL HAMBURGER LEISTUNGSFUTTER GMBH

ADDIFERM® MultiPuffer

Ingredient composition

Active buffering substances
Magnesium oxide
Yeast
Citrus extract
Rapeseed oil

Crude ash	89 %
Crude protein	2.0 %
Sodium	2.2 %
Magnesium	10.5 %
DCAB	576 meq

Traits & functions of ADDIFERM® MultiPuffer

- Various buffering substances exert their effect at different time in the rumen
  - constant buffering effect
- ↓ Risk of clinical and subclinical metabolic disorders such as acidosis and ketosis
- Clinoptilolite selectively binds pollutants due to the crystalline structure
- Yeasts provide high-quality nutrients for the growth of rumen bacteria
- Citrus extract increases the palatability and positively influences the feed intake

Usage of ADDIFERM® MultiPuffer

- 150 – 250 g mixed into the TMR (no need for new calculation)
- fed in addition to a mineral feed

ADDIFERM® Carotin/Fertil

Ingredient composition

ß-Carotene

high available trace elements (Fertil)

	Carotin	Fertil
ß-Carotene	2000 mg	4000 mg
Vitamin E	1000 mg	2000 mg
Cu Hydroxyl	-	1250 mg
Zn Hydroxyl	-	1500 mg
Mn Chelate	-	500 mg
Se Protected	-	15 mg

Traits & functions of ADDIFERM® Carotin/Fertil

- Is combined with vitamin E to stabilize ß-carotene in metabolism
- Boosts fertility of female animals
  - ↓ delayed ovulation, indistinct heat signs, ovarian cysts, early abortion, etc
- Is a good supplementation of ß-Carotene for:
  - rations with high contents of corn silage or whole plant silage
  - rations with bad silage quality
- Fertil has prophylactic dosage of highly available trace elements for the higher reproductive performance

Usage of ADDIFERM® Carotin/Fertil

- 100 (in the transition period) – 200 g (after calving) ADDIFERM® Carotin ↔ 50 – 100 g ADDIFERM® Fertil until the verification of a new pregnancy

Heat Stress & Prevention
through feeding management

Power Mix - feeding trial :
Replacing fat supplements in dairy cow ration with Power Mix

Location	North Germany (Mecklenburg-Vorpommern)
Animals	250 lactating cows (1~200 days of lactation)
Diet design	Replacing 300 grams of Ca-salt in the diet with 600 grams of PANTO® Power Mix
Time	July to October 2023 (compared with the results in 2022 when Power Mix was not used)

Composition of dairy cow ration (kg)

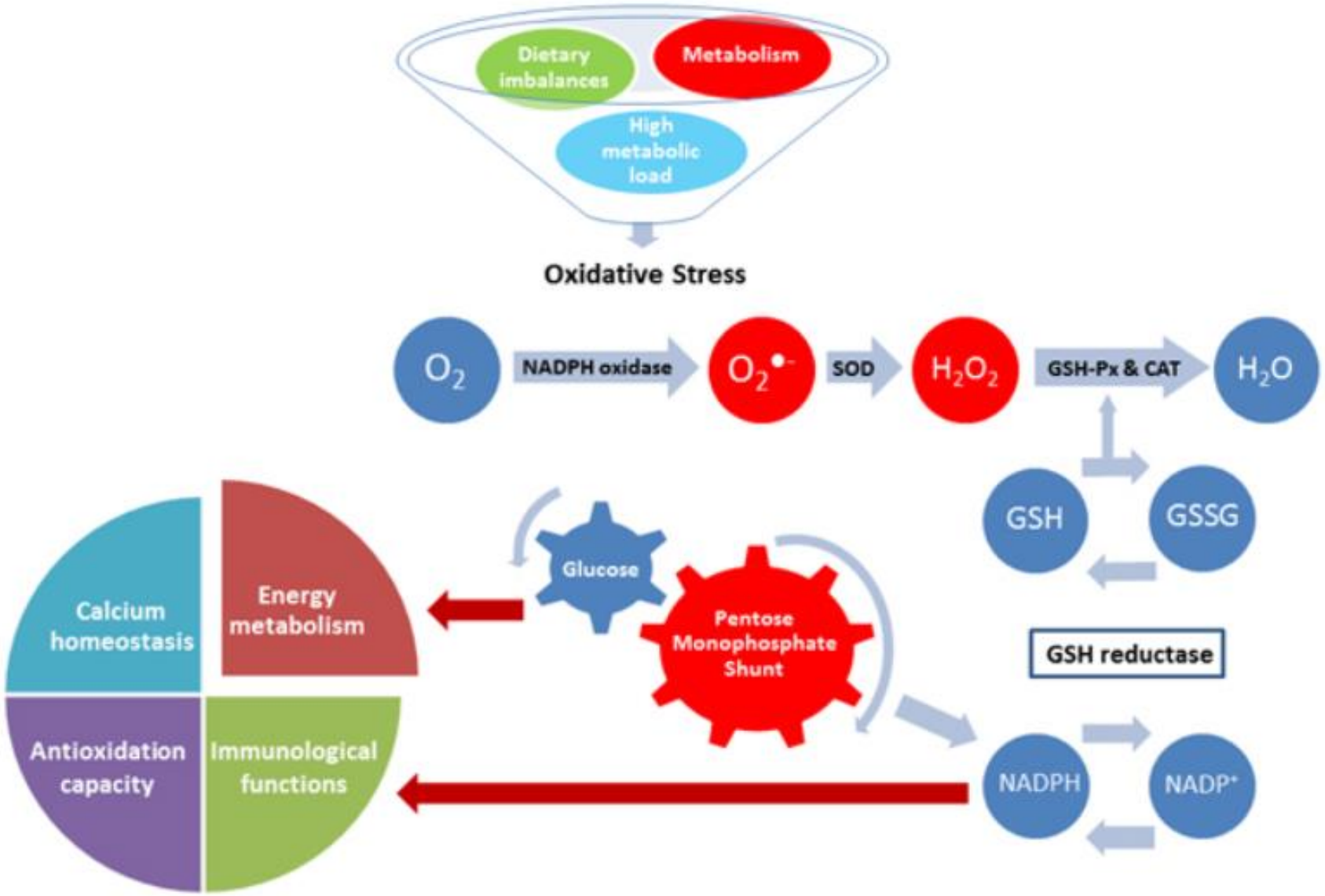
Ingredients	Early lactation	Mid lactation
Grass silage	10	13
Corn silage	24	24
Dried distillers grains	6	7
Rapeseed meal	3.5	5.5
Corn	2	2
Straw	1	0.3
Sugar beet pulp	1	2.5
Mineral feed	0.6	0.6
PANTO® Power Mix	0.6	0.6

Heat Stress & Prevention
through feeding management

Power Mix - feeding trial :
Replacing fat supplements in dairy cow ration with Power Mix

Also:

- **↓ numbers of cows that were too thin or lost too much weight in the early and mid lactation (> 30 %)**
- **↓ risk of ketosis in the same herd**


Dietary imbalances
Metabolism
High metabolic load
Oxidative Stress
O_2
NADPH oxidase
$O_2^{\bullet-}$
SOD
H_2O_2
GSH-Px & CAT
H_2O
GSH
GSSG
Glucose
Pentose Monophosphate Shunt
GSH reductase
NADPH
NADP+
Calcium homeostasis
Energy metabolism
Antioxidation capacity
Immunological functions