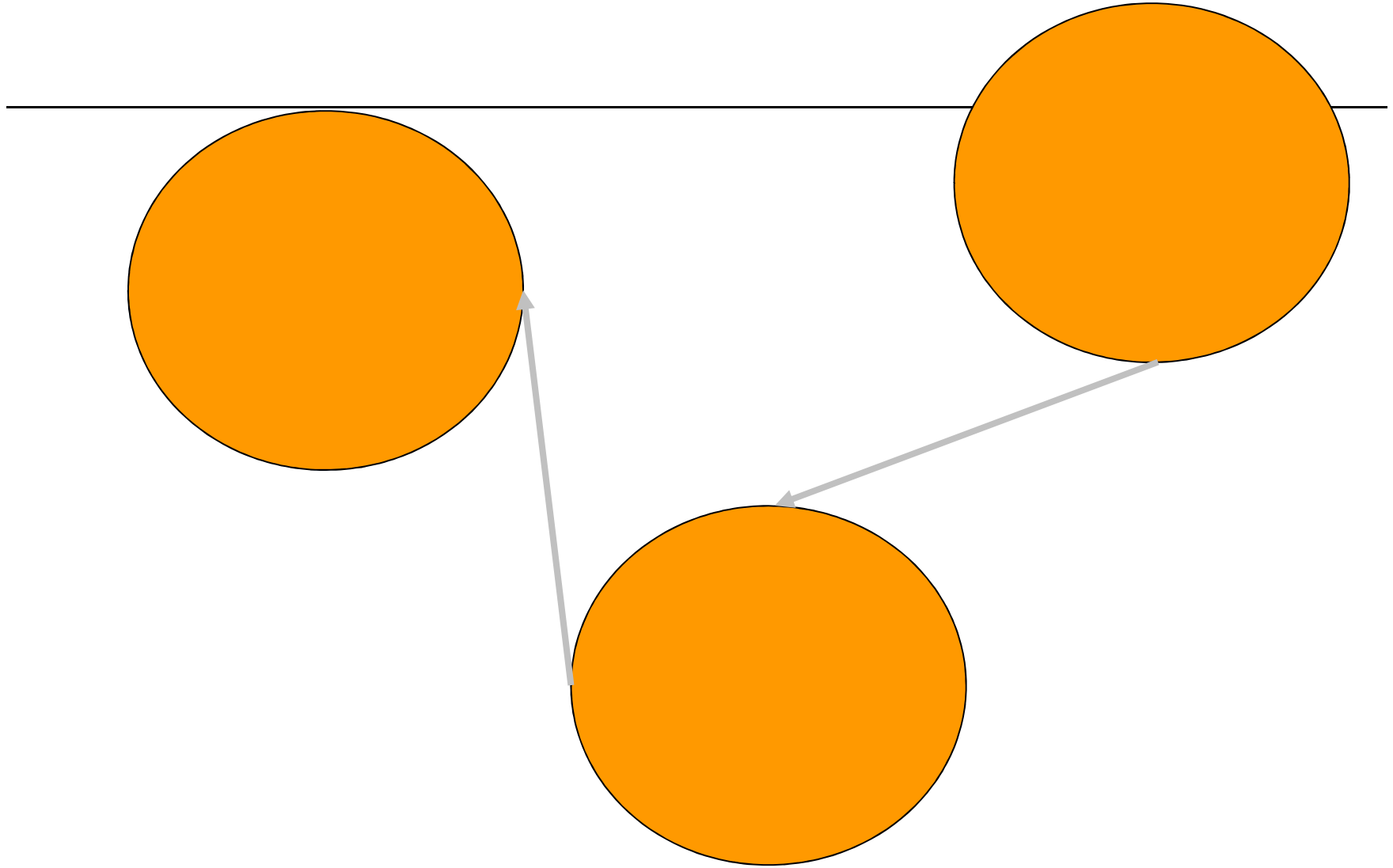


μ

kellis@phed.auth.gr

spiros@metrisislab.gr





()

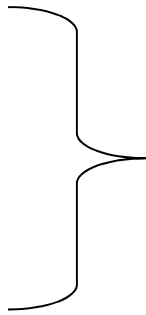
(. . μ ,) μ

μ

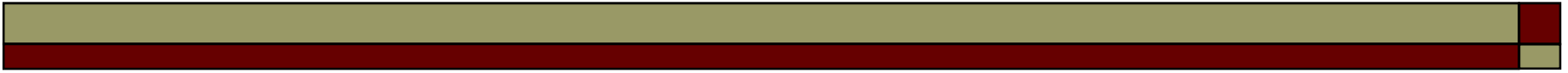
:



μ

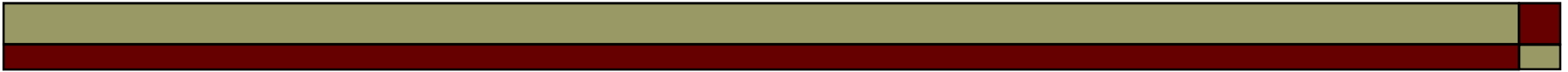


μ



μ

(μ -)



□

- μ . μ

□

- μ , μ
- μ μ
(μ μ) .

□

μ μ μ μ - μ .

□

μ μ μ μ .





$\mu \quad \mu$



μ

μ

μ

:

□

(μ)

□

μ



μ

μ

μ

,

.

μ .



μ

.



μ

.



μ

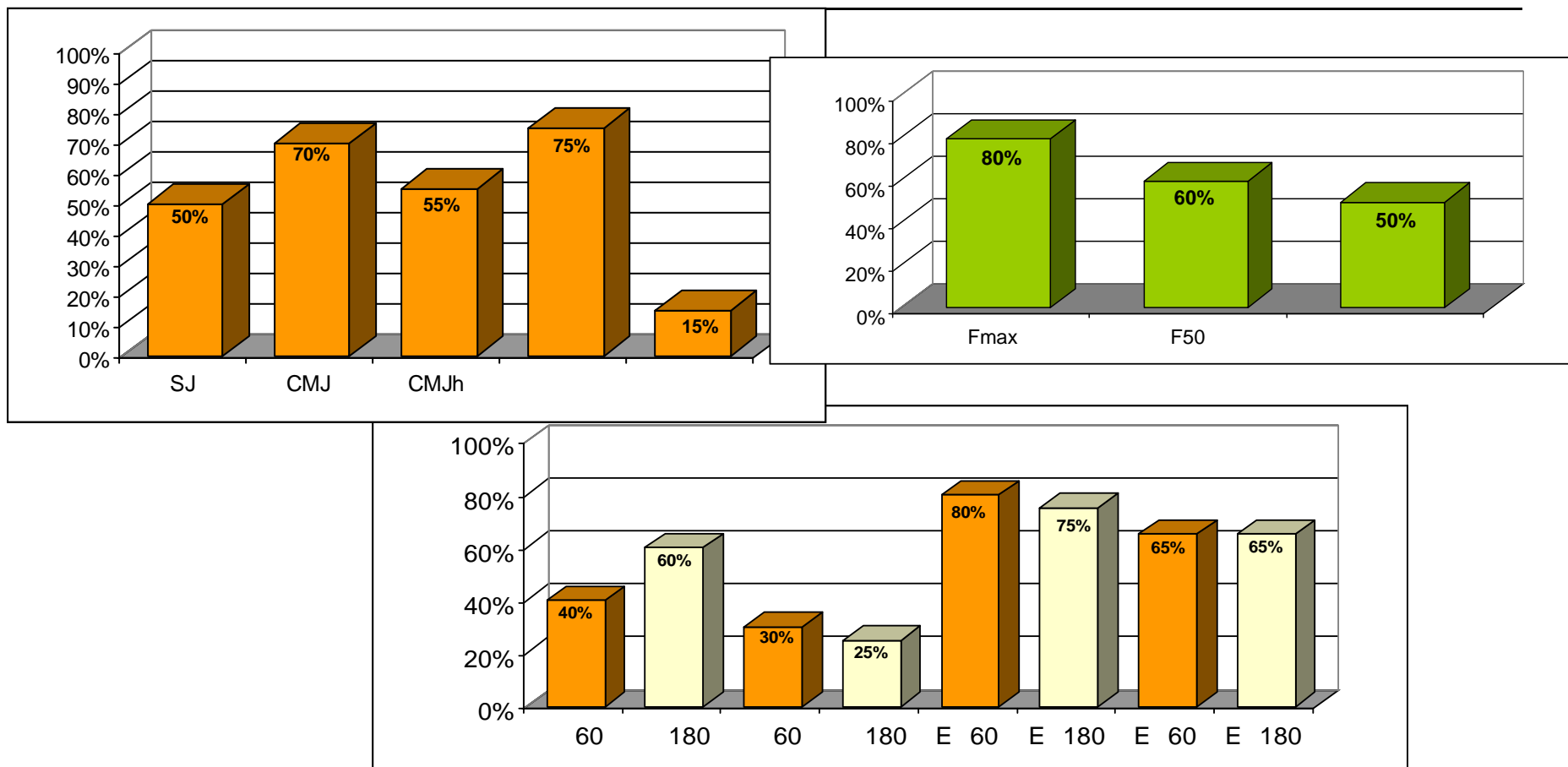
μ

.

μ

μ

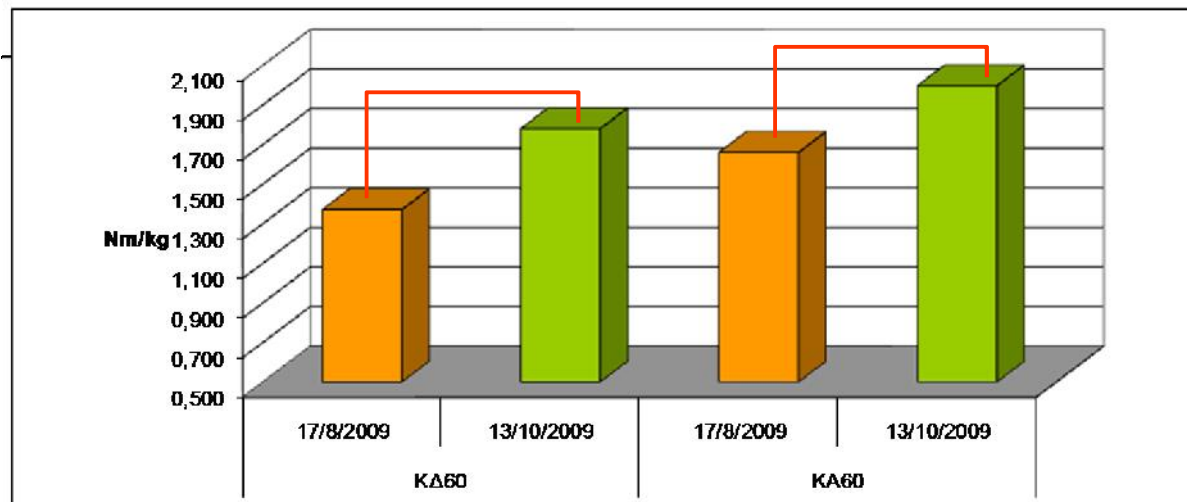
μ



μ

μ

μ

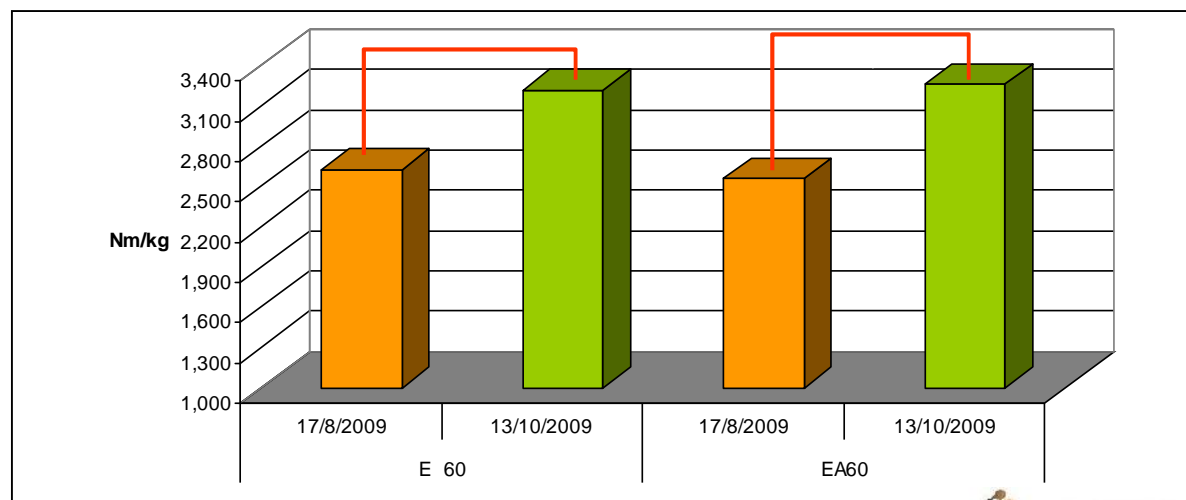


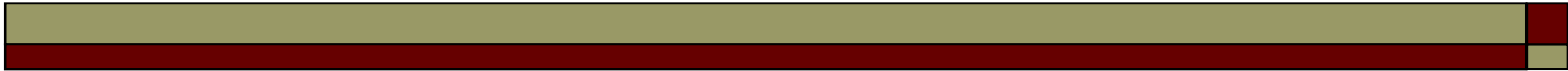
μ μ μ

60 /s

μ μ

60 /s

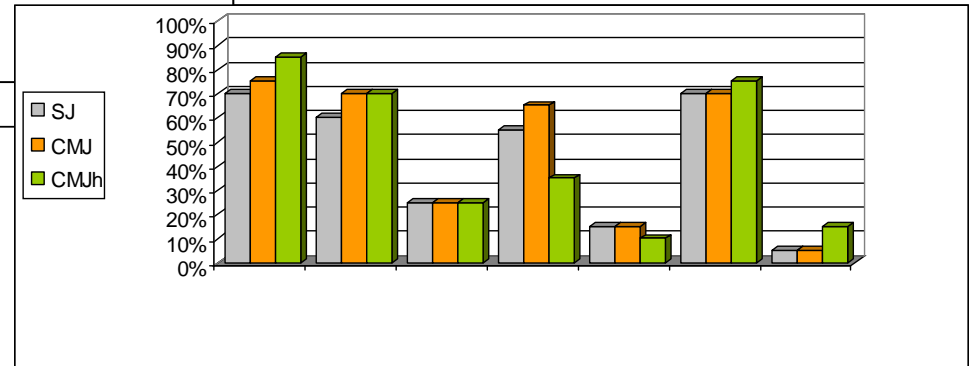
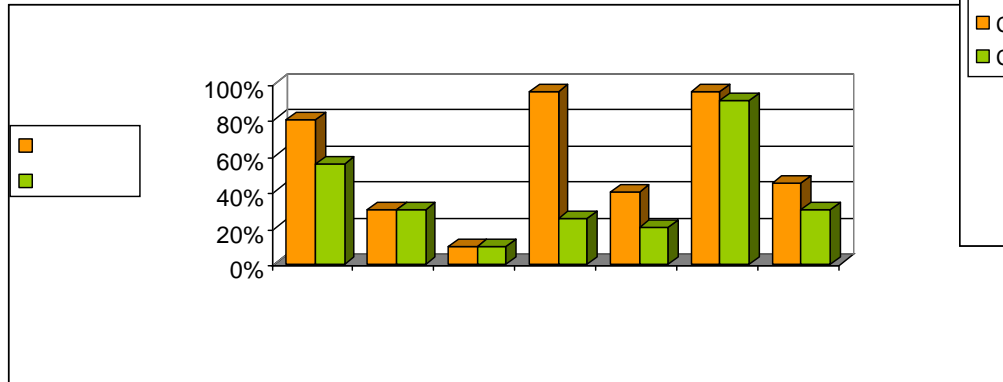
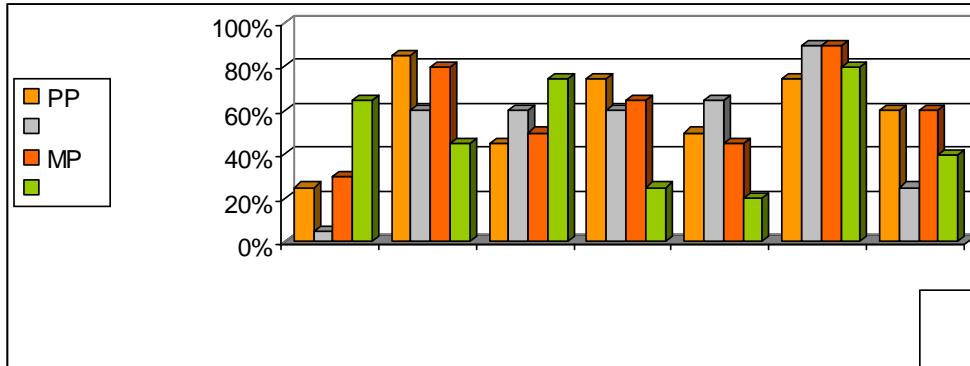




μ

μ

μ



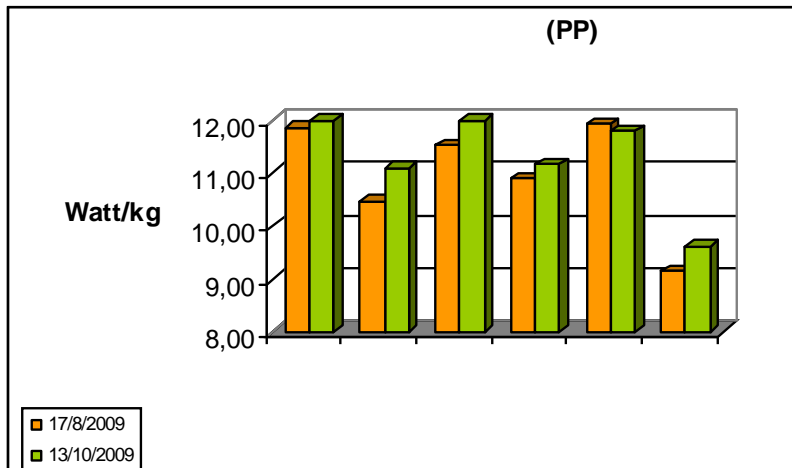
μ

μ

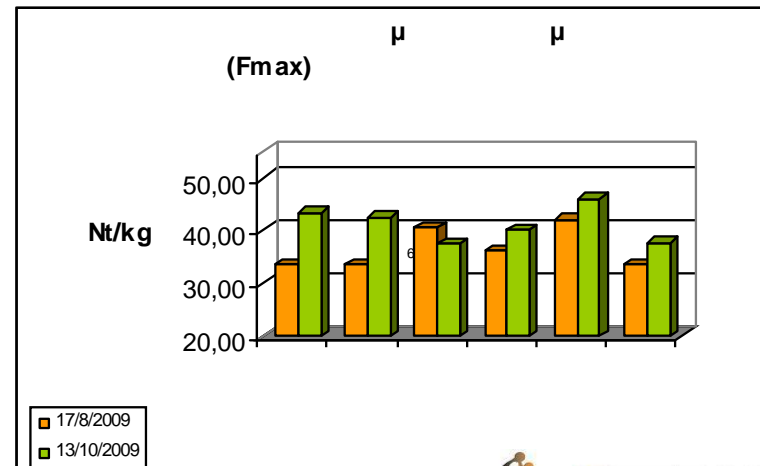
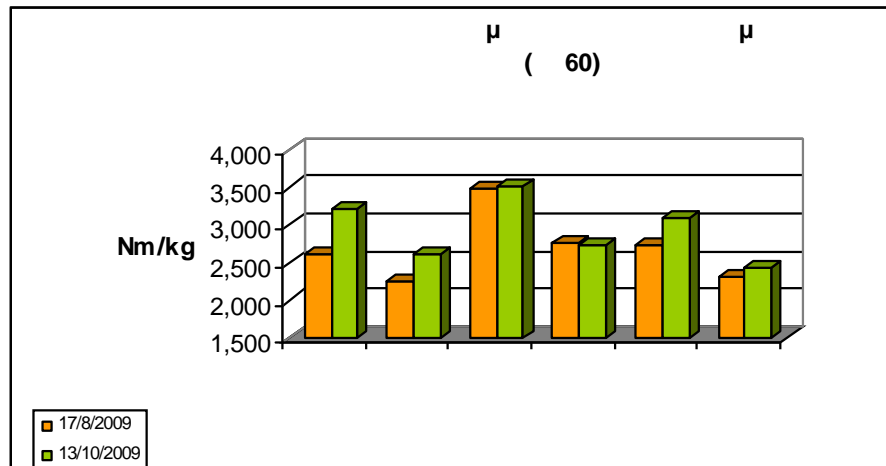
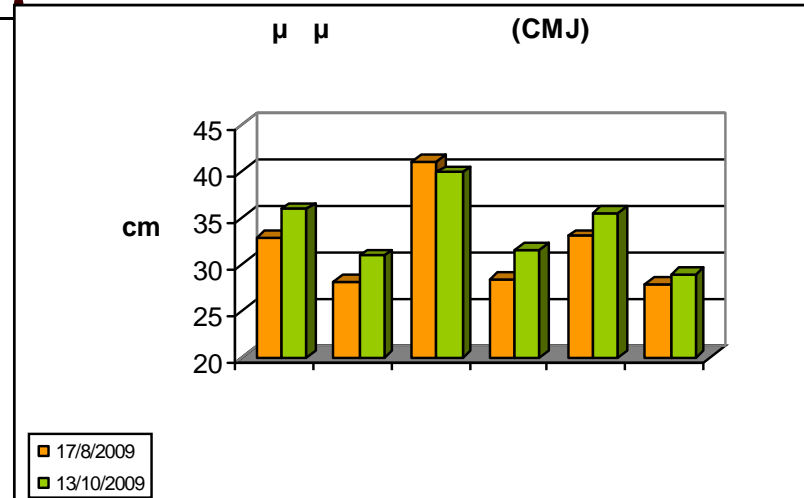
μ

μ

μ



μ





μ

:

64,91

μ

μ

μ

100.

μ

μ

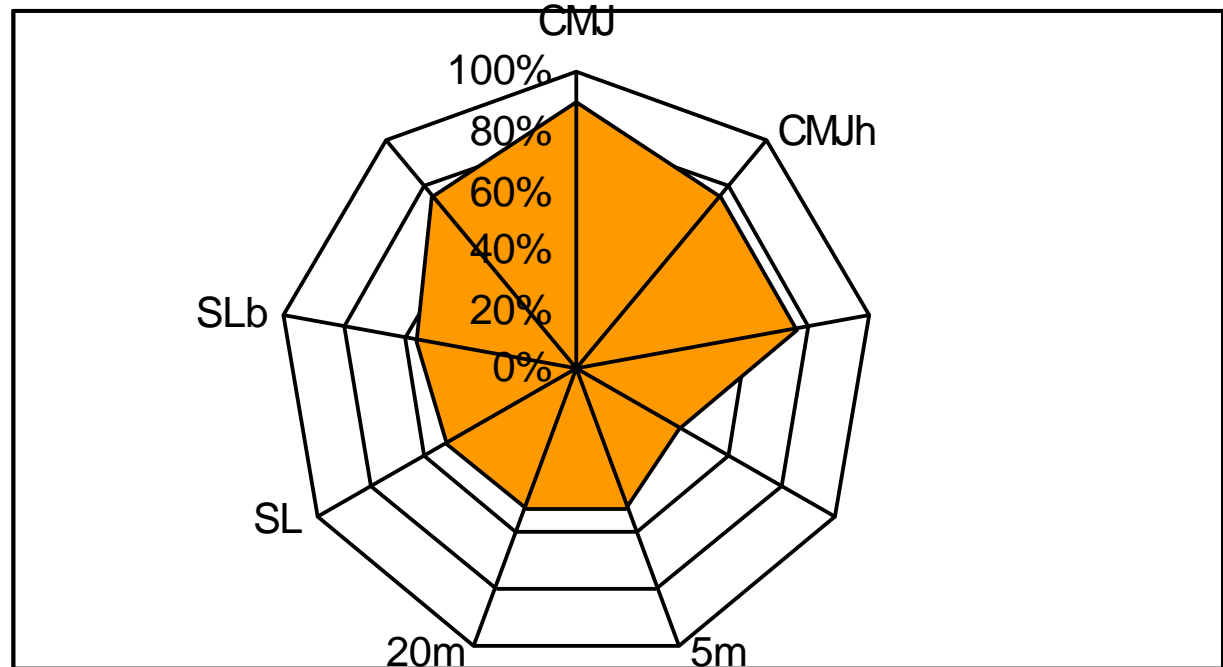
.

μ

μ

μ

.





μ

μ

:



μ

μ

.



μ

(«

μ

»)

μ

μ

.

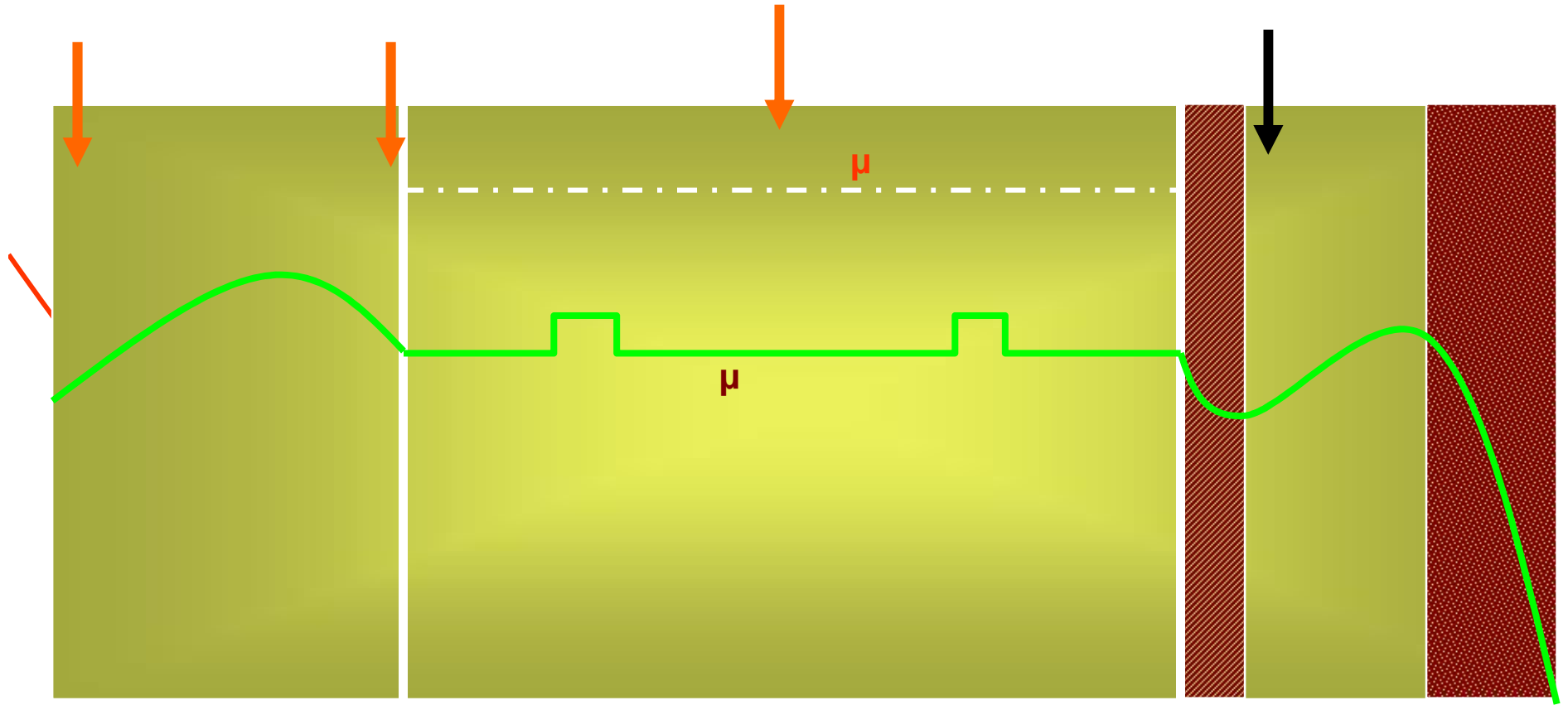
μ

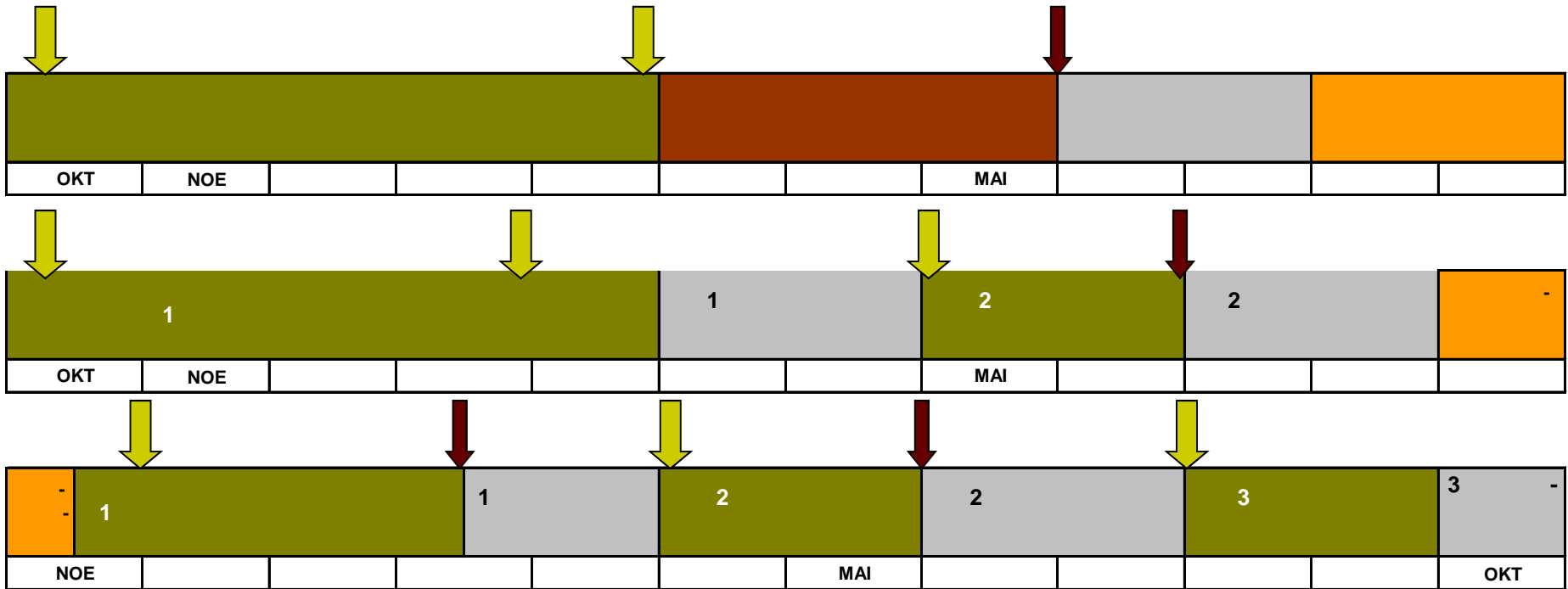
μ

;



μ







μ



$\mu\mu$



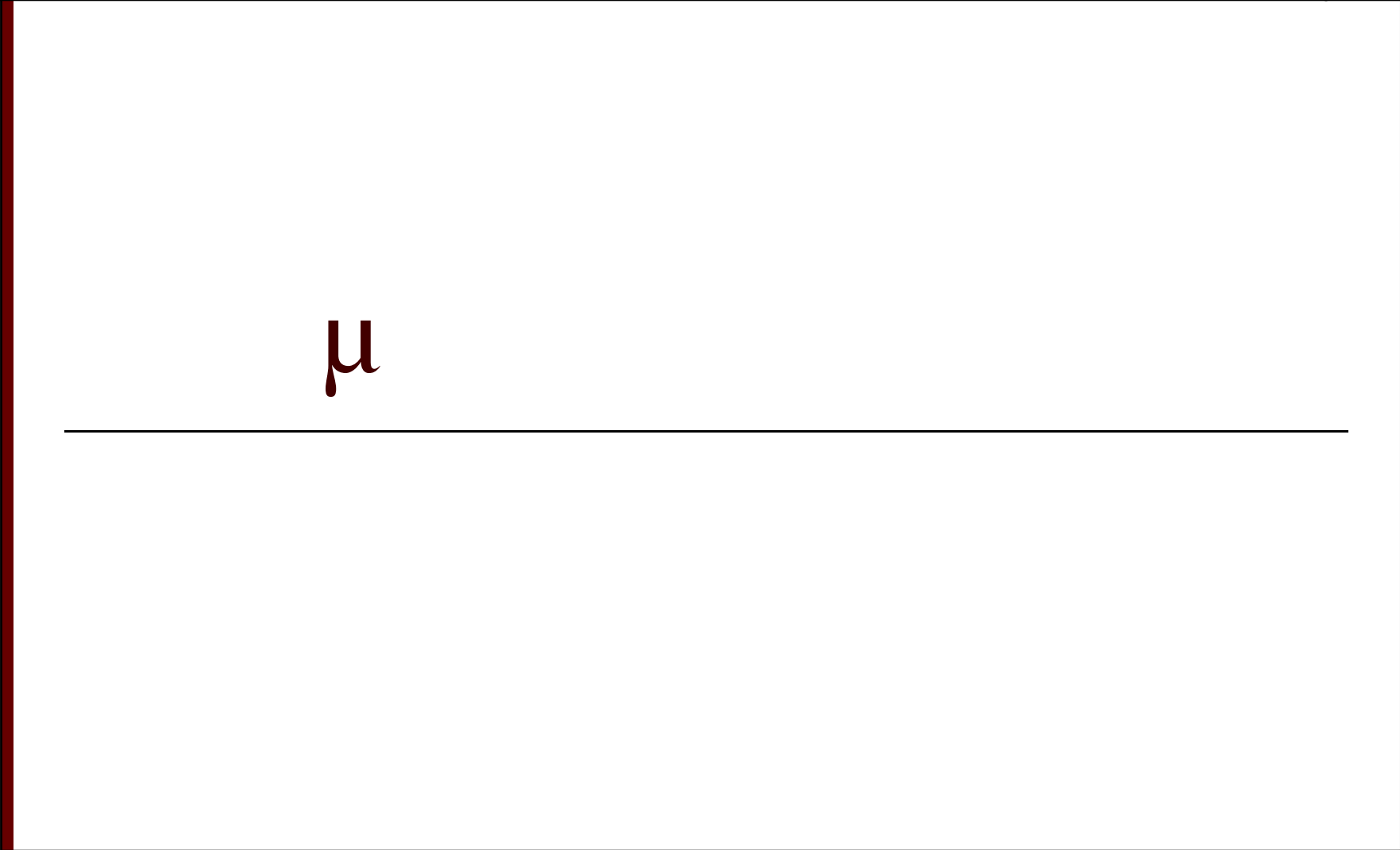
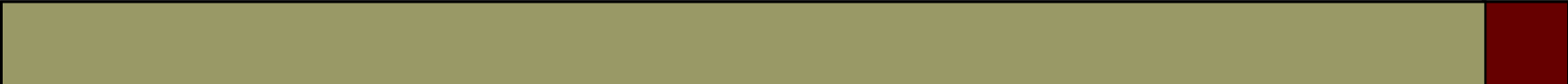
μ

μ

4-8

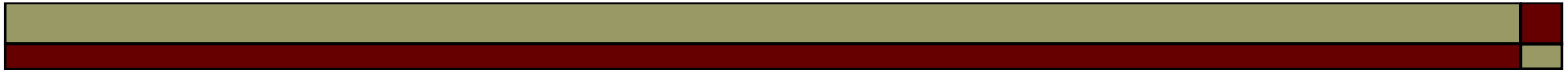
μ

.

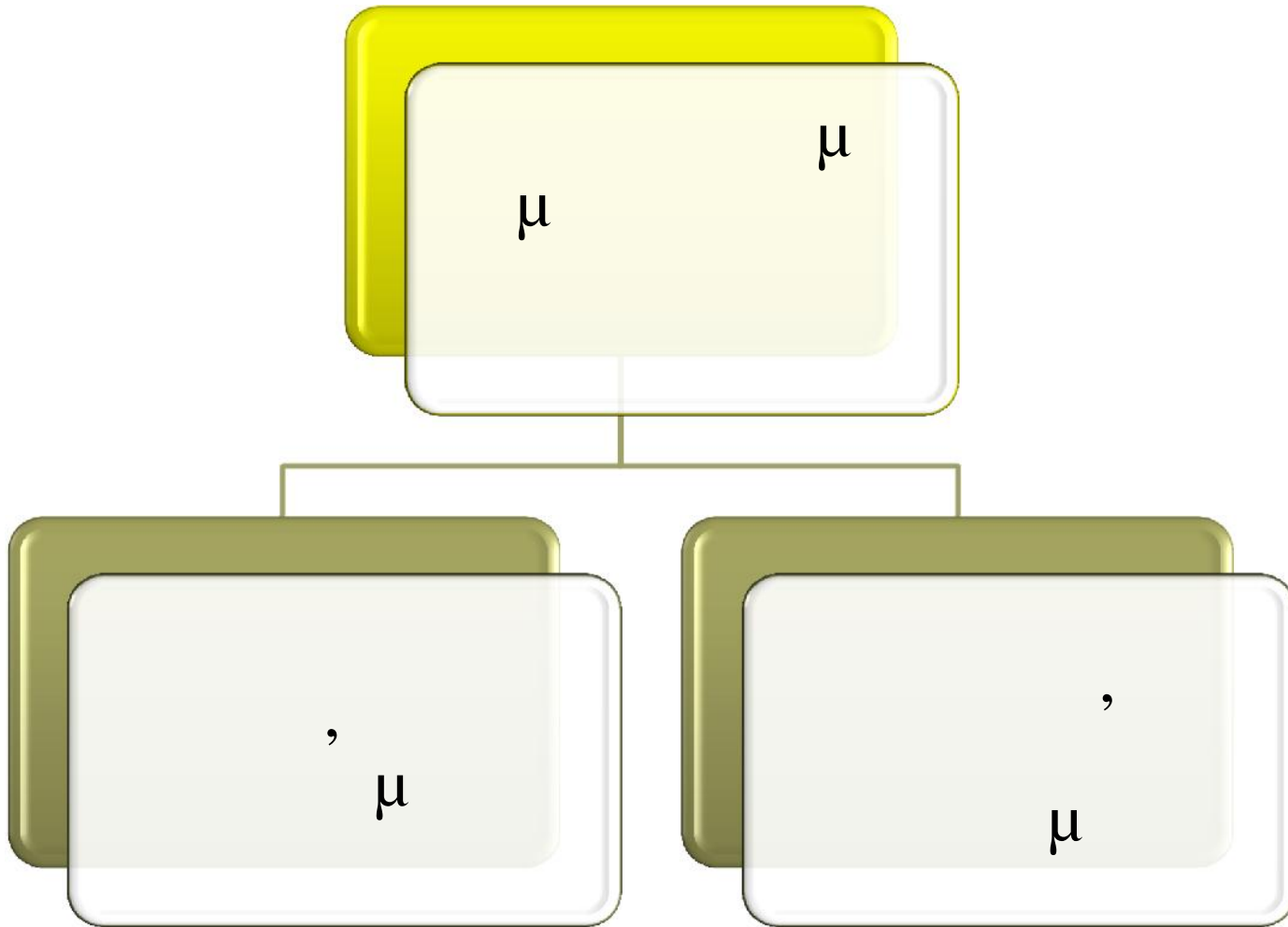


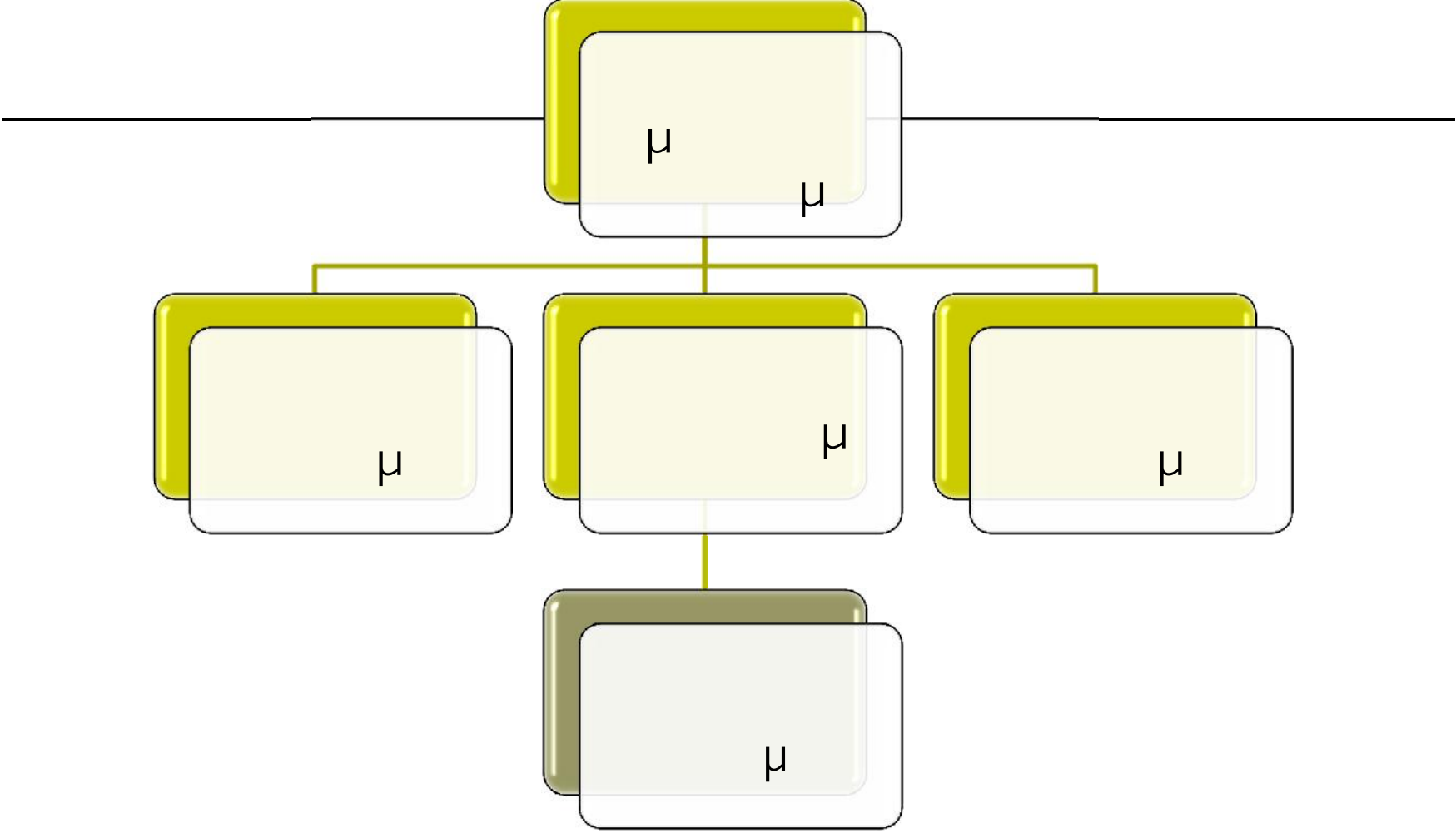
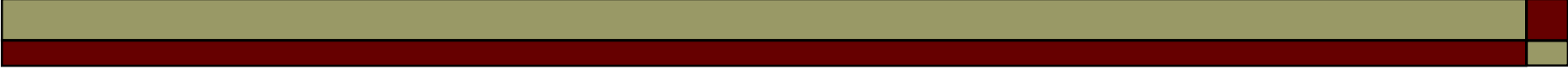
μ

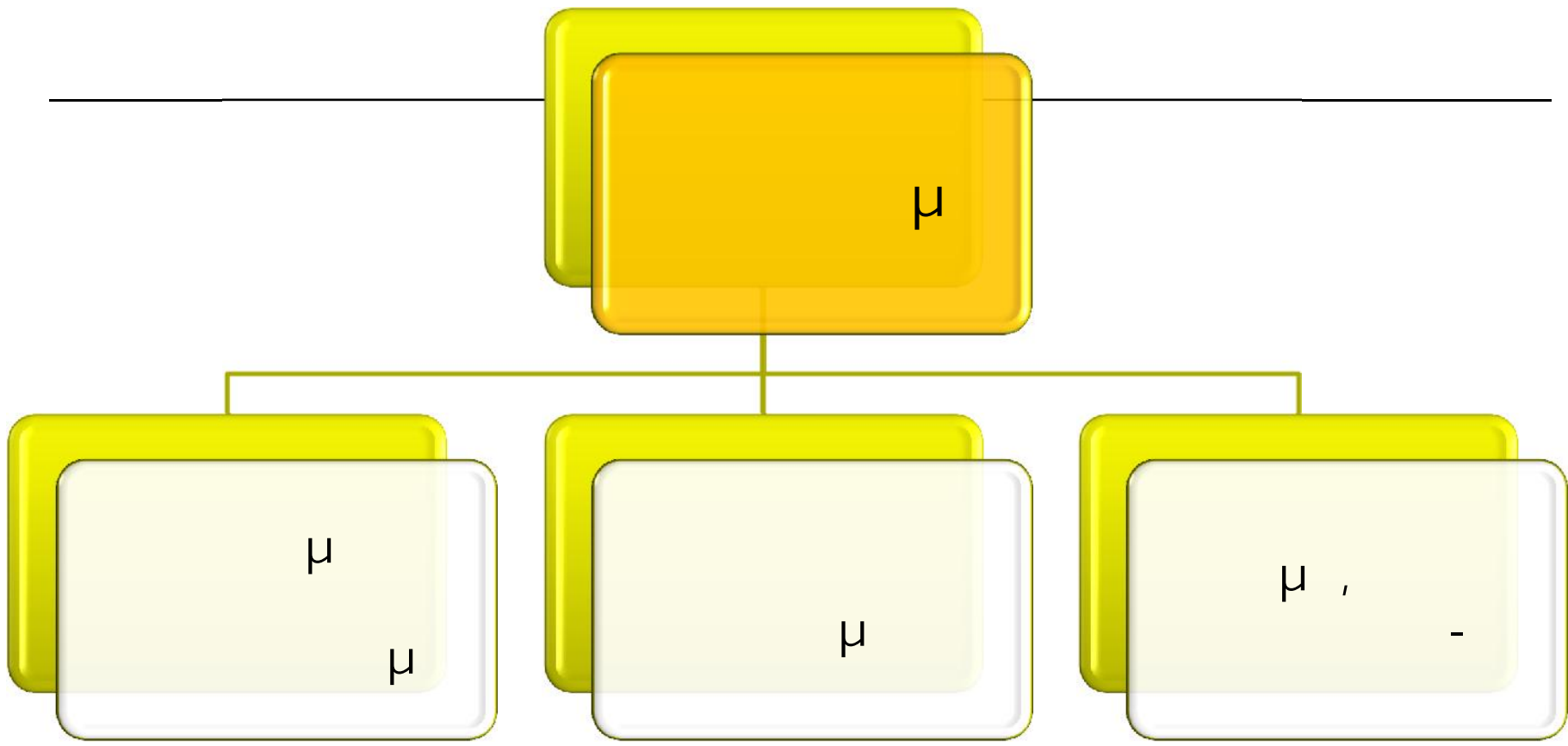
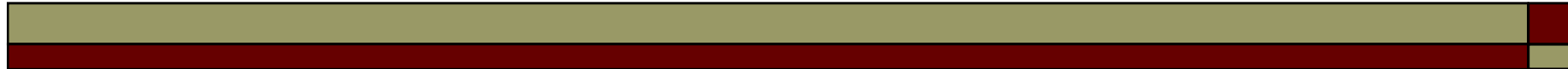




μ - μ







μ

□

.

□

μ

■

μ .

■

μ

μ .

■

μ (1RM).

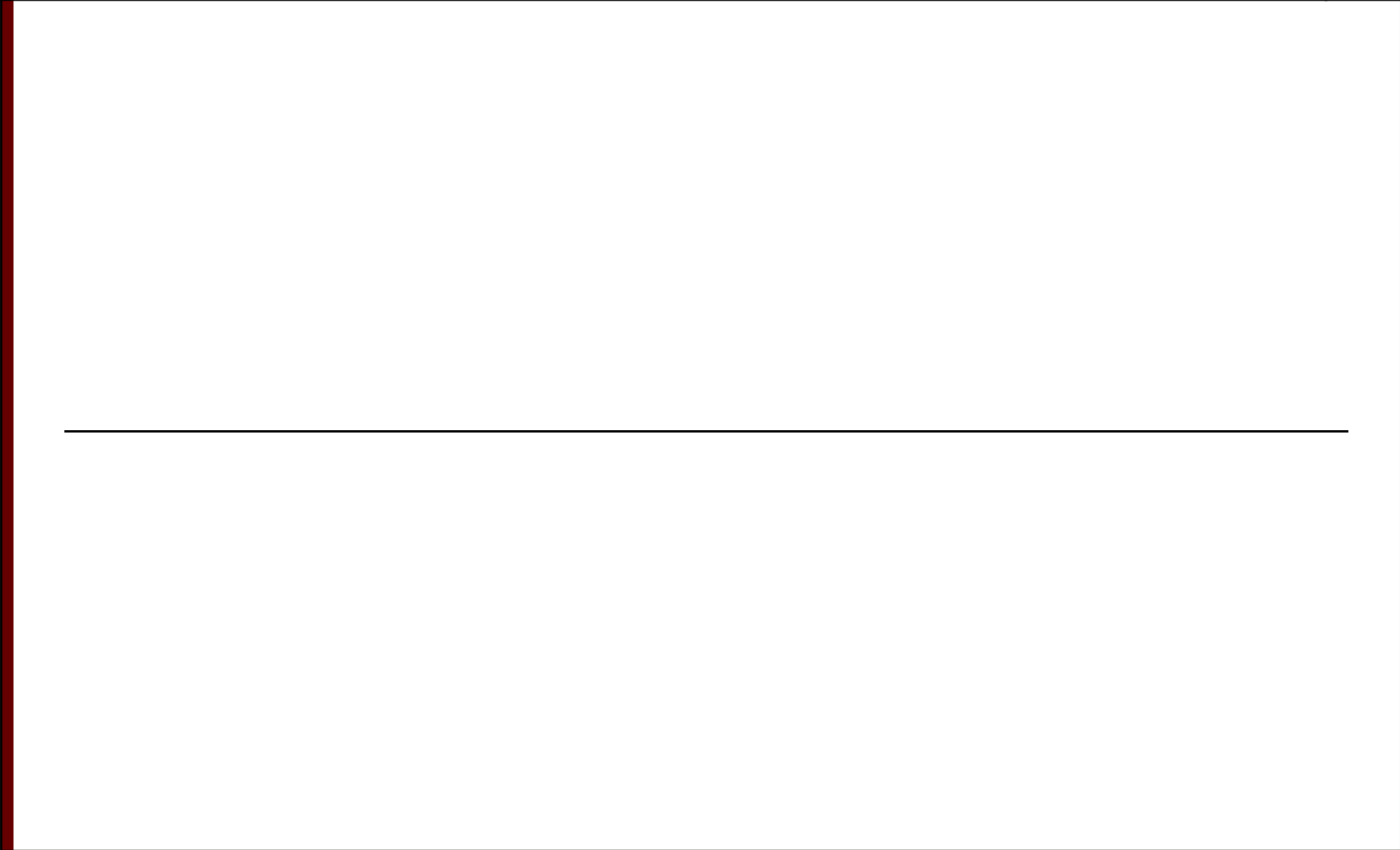
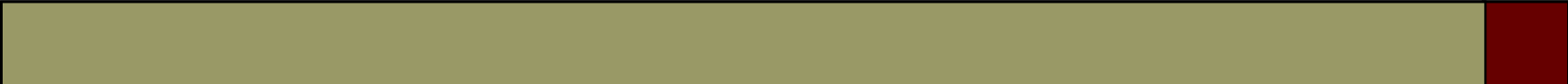


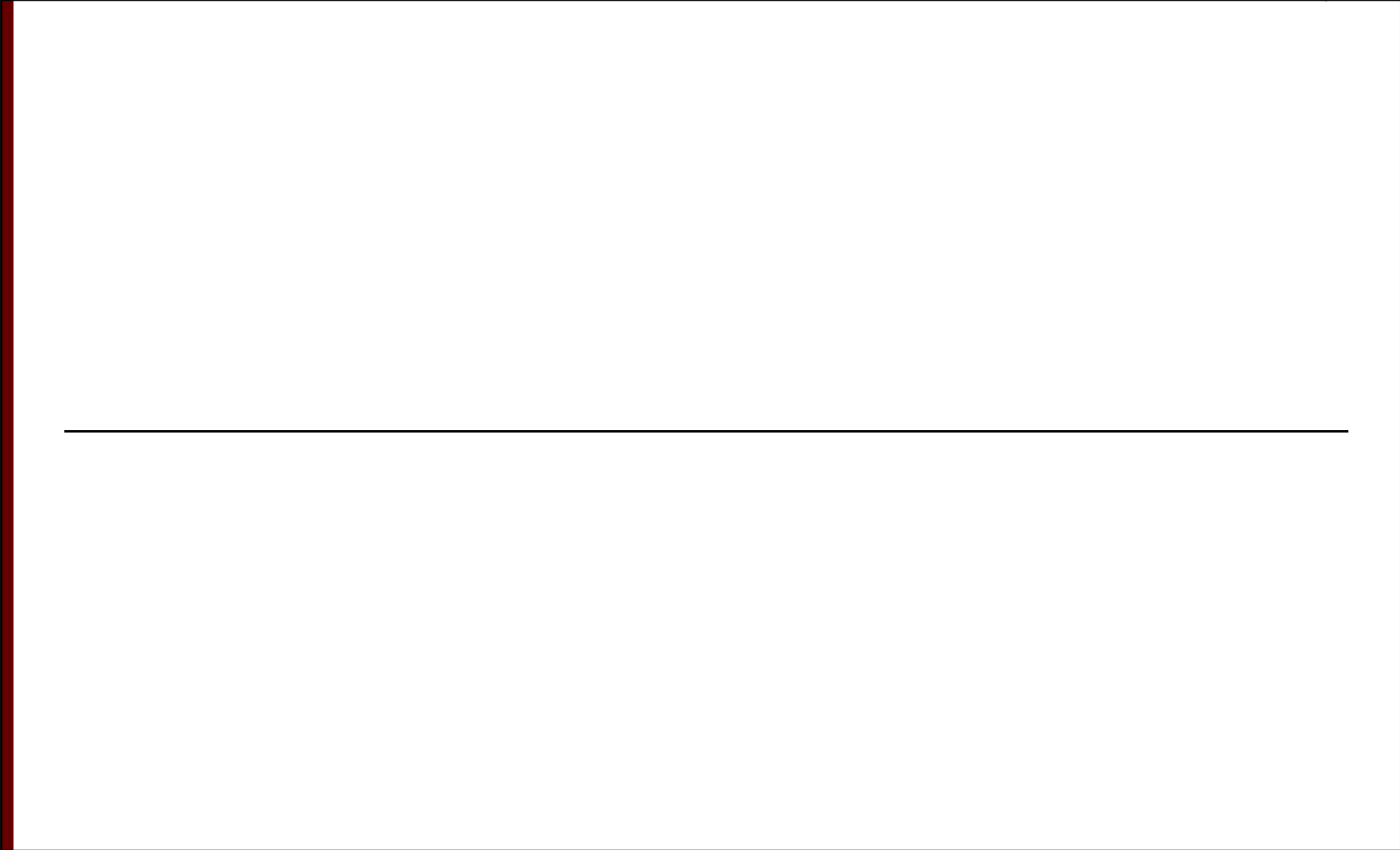
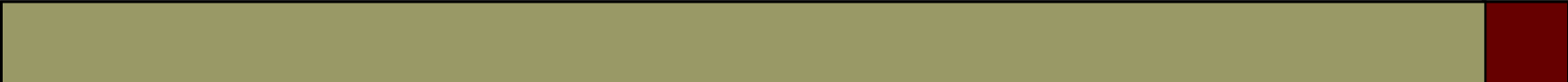
□

.

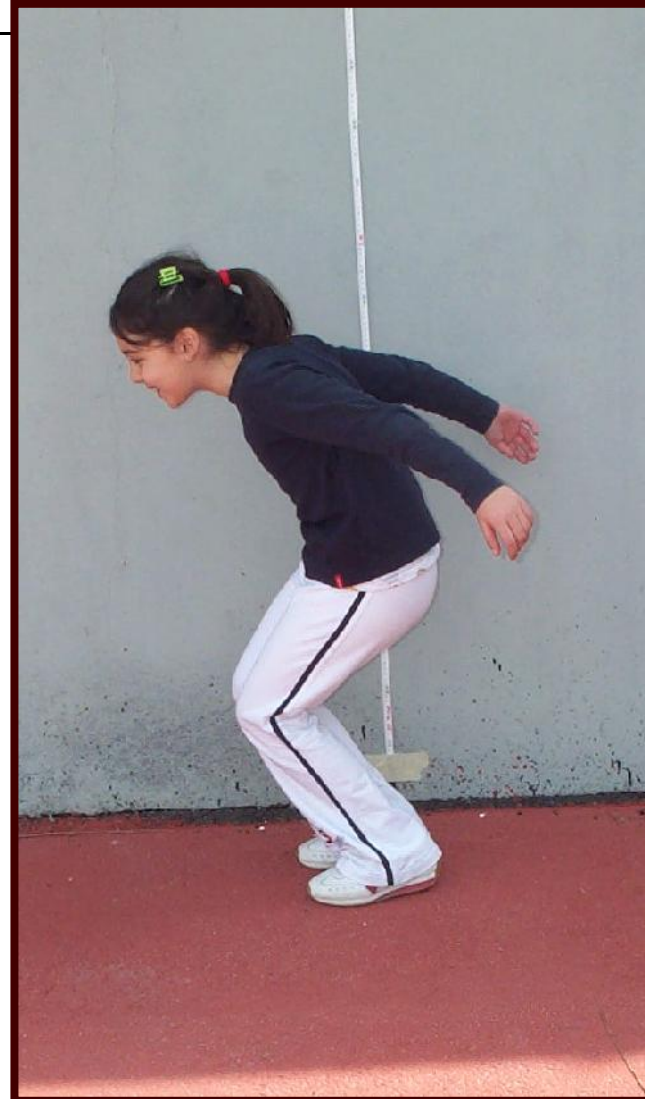
□

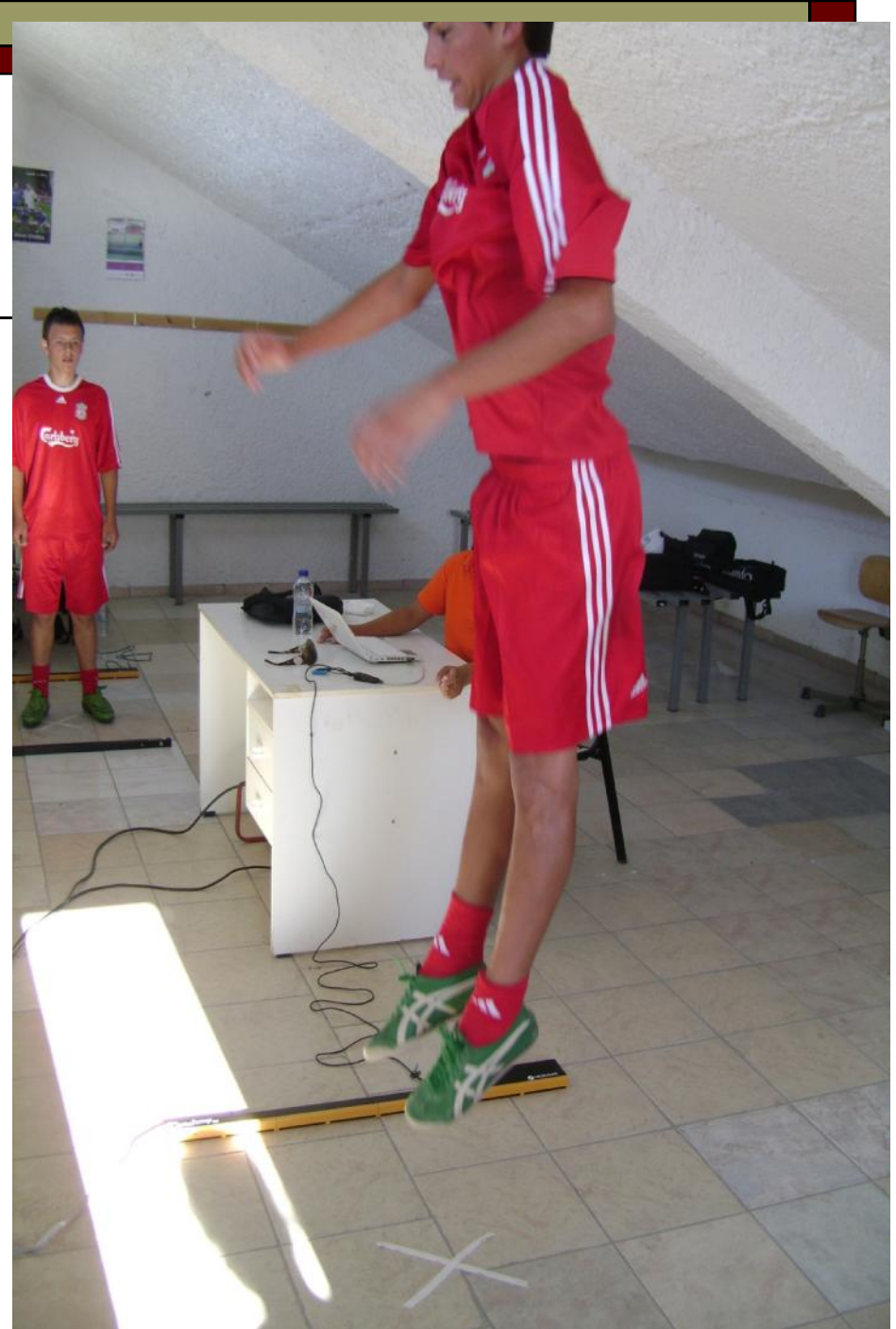
μ (μ).

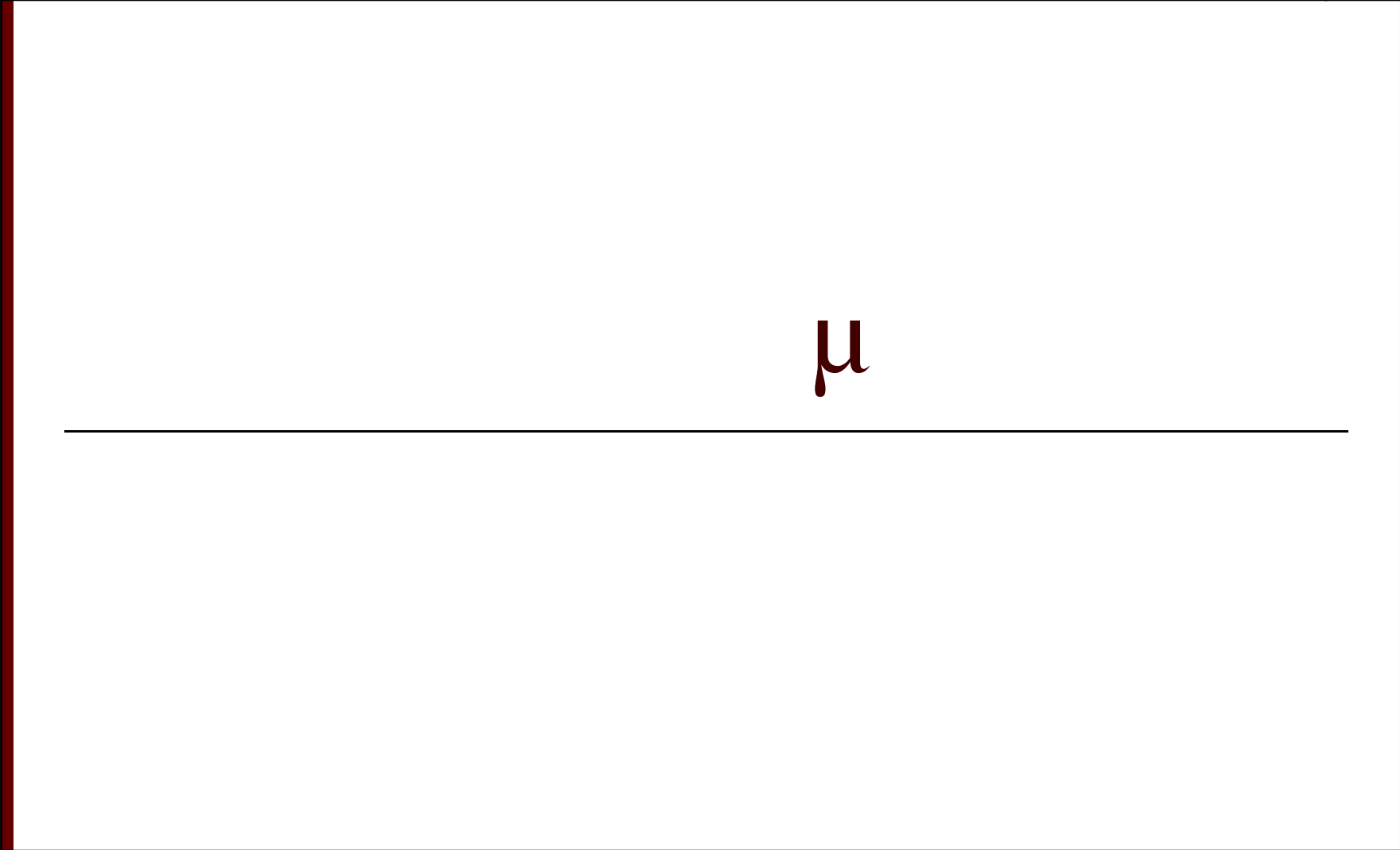
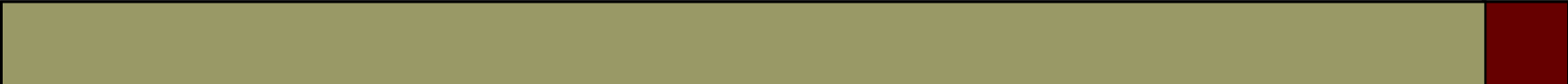




μ μ

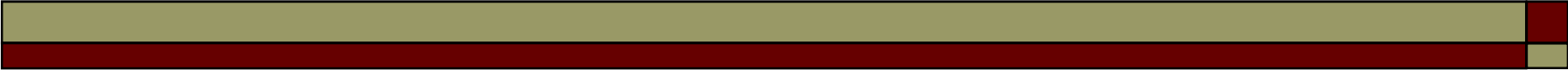






μ

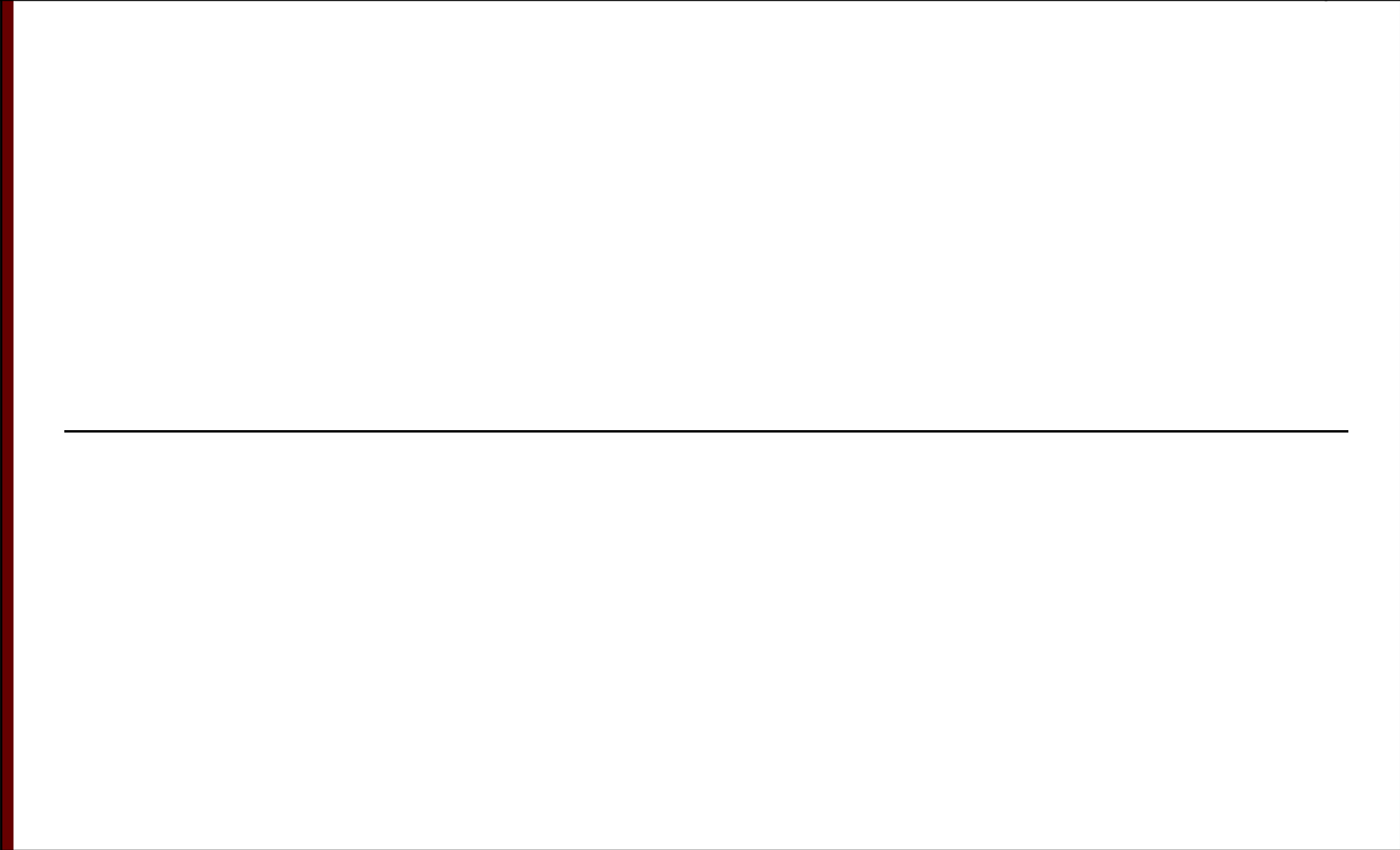
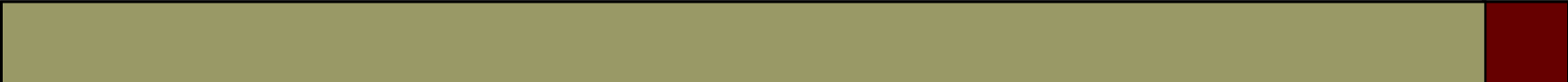




- μ (CMJ) μ (SJ) μ
- μ (CMJ) μ μ
- μ μ (DJ).
- μ .
- μ μ μ .
- μ μ .



μ





μ

□ **1RM:** repetition maximum, ,

.

□ **10RM:** μ μ
(μ μ 10) μ
 μ .



μ : 1RM

μ (μ , μ , μ)
(, ,).
 μ , μ , μ ,
 μ 50%
75%, μ , μ 100% .

μ 1RM

5 επαναλήψεις : 60kg

1 RM = = $60 / \{ 1,0278 - (0.0278 * 5) \} = 68 \text{ kg}$ (Brzycki, 1998)

% 1 RM	100	95	90	85	80	75	70	65	60	55	50
kg	68	65	61	58	54	51	48	44	41	37	34

		1	2	3	4	5	6	7	8	9	10	11	12	15
%1RM	Brzycki	100	95	90	88	86	83	80	78	76	75	72	70	
	Beachle	100	95	93	90	87	85	83	80	77	75		67	65
	dos Remedios	100	92	90	87	85	82		75		70		65	60

(Brzycki, 1998;Baechle et al,2000)

μ

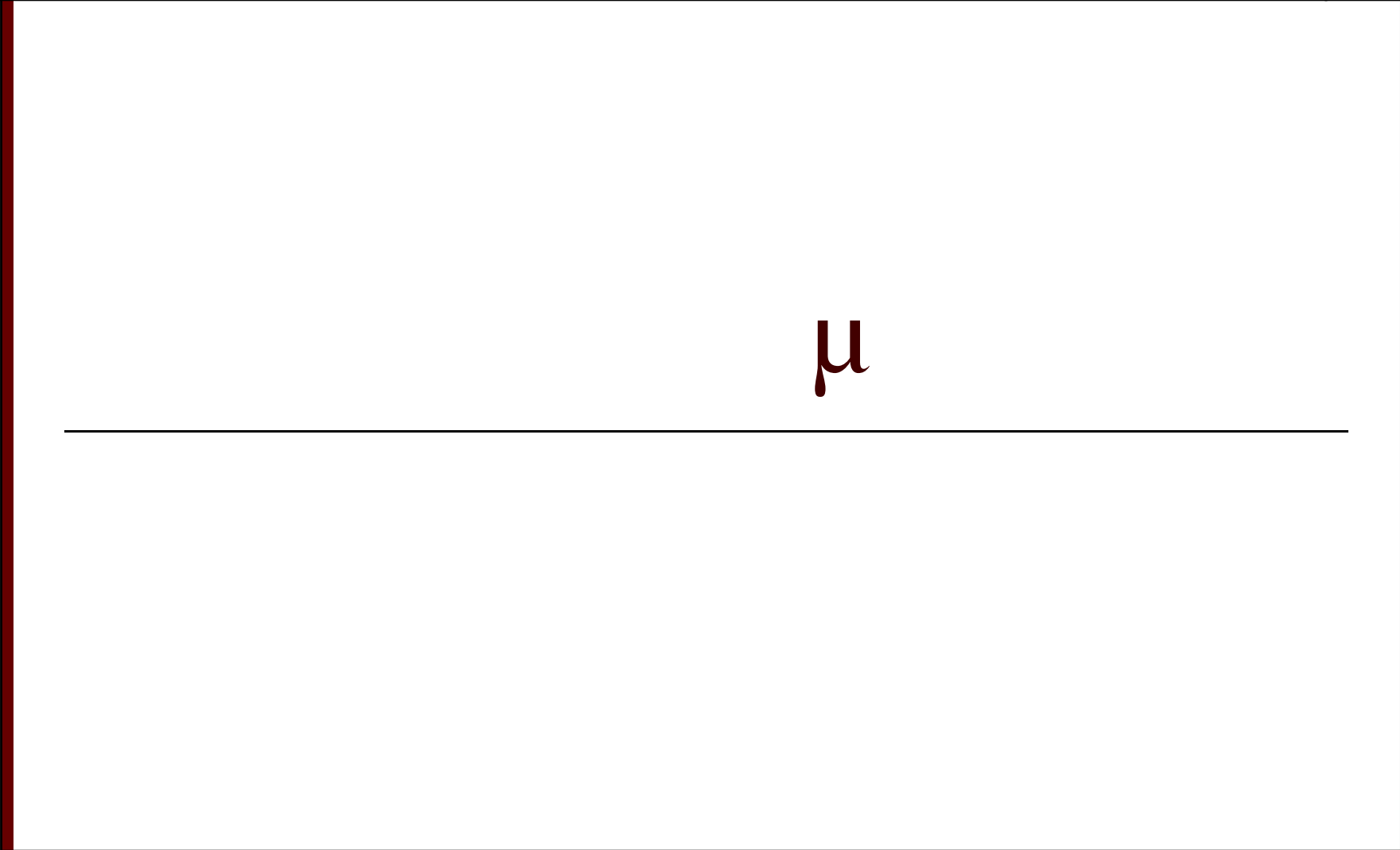
μ 1RM (Lombardi, 1989)

μ	% 1RM		μ :
1	100	1.00	μ 1RM
2	93	1.07	3RM
3	91	1.10	1RM =
4	89	1.13	3RM * 1.10
5	86	1.16	
6	83	1.20	. . 3RM = 100 kg
7	81	1.23	:
8	79	1.27	1RM = 100 * 1.10 = 110
9	76	1.32	kg
10	74	1.36	

μ

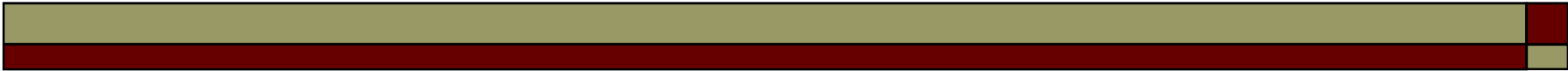
μ

Επαναλήψεις →	6		8		10		12	
Ένταση % ↓	6 RM	57 kg	8 RM	54 kg	10RM	50kg	12 RM	46 kg
80	5 .		6 .		8 .		10 .	
60	4 .		5 .		6 .		7 .	



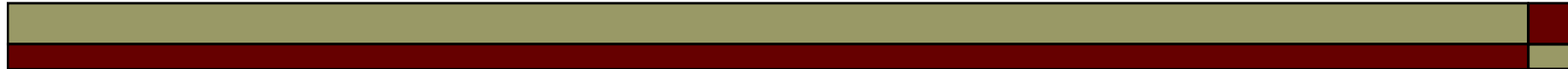
μ



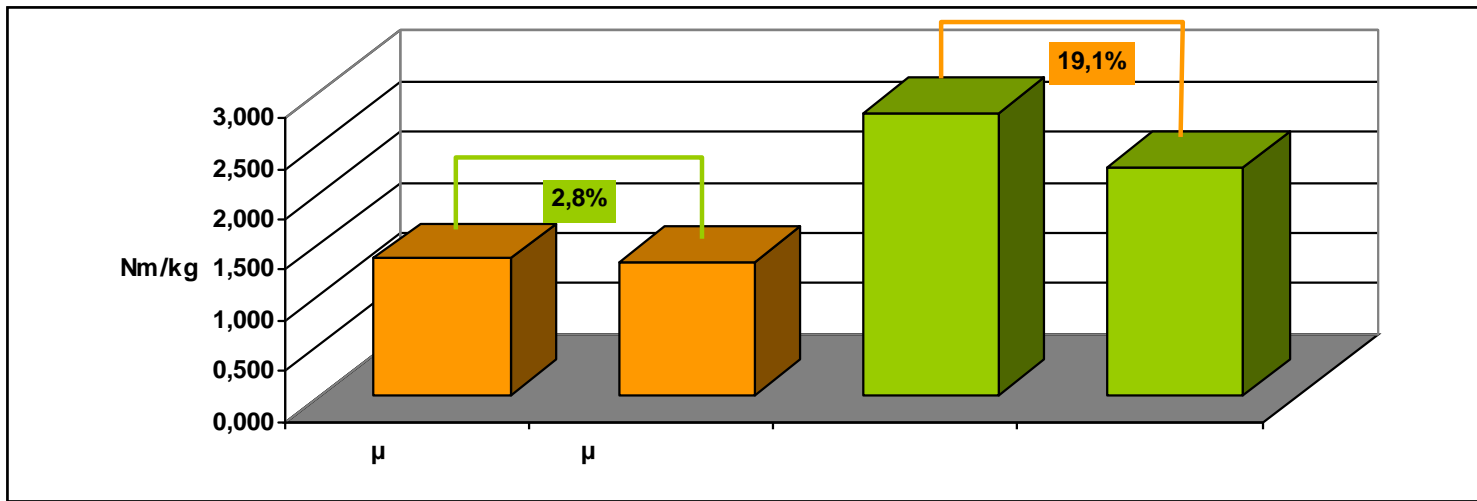


·
—
·
μ ·





μ			μμ μ (%)	
μ	60 /s(Nm):	110,0	106,9	2,8
μ	60°/s (Nm/kg):	1,358	1,320	
	60°/s(Nm):	226,4	183,2	19,1
	60°/s(Nm/ka):	2,795	2,262	
μ	/ 60°/s(%):	48,6	58,4	
μ	180 /s(Nm):	98,1	94,8	
μ	180°/s (Nm/kg):	1,211	1,170	
	180°/s(Nm):	139,6	126,6	
	180°/s(Nm/ka):	1,723	1,563	



60 /s

μ

μ





μ



μ

μ



μ

μ



μ (F_{50ms})



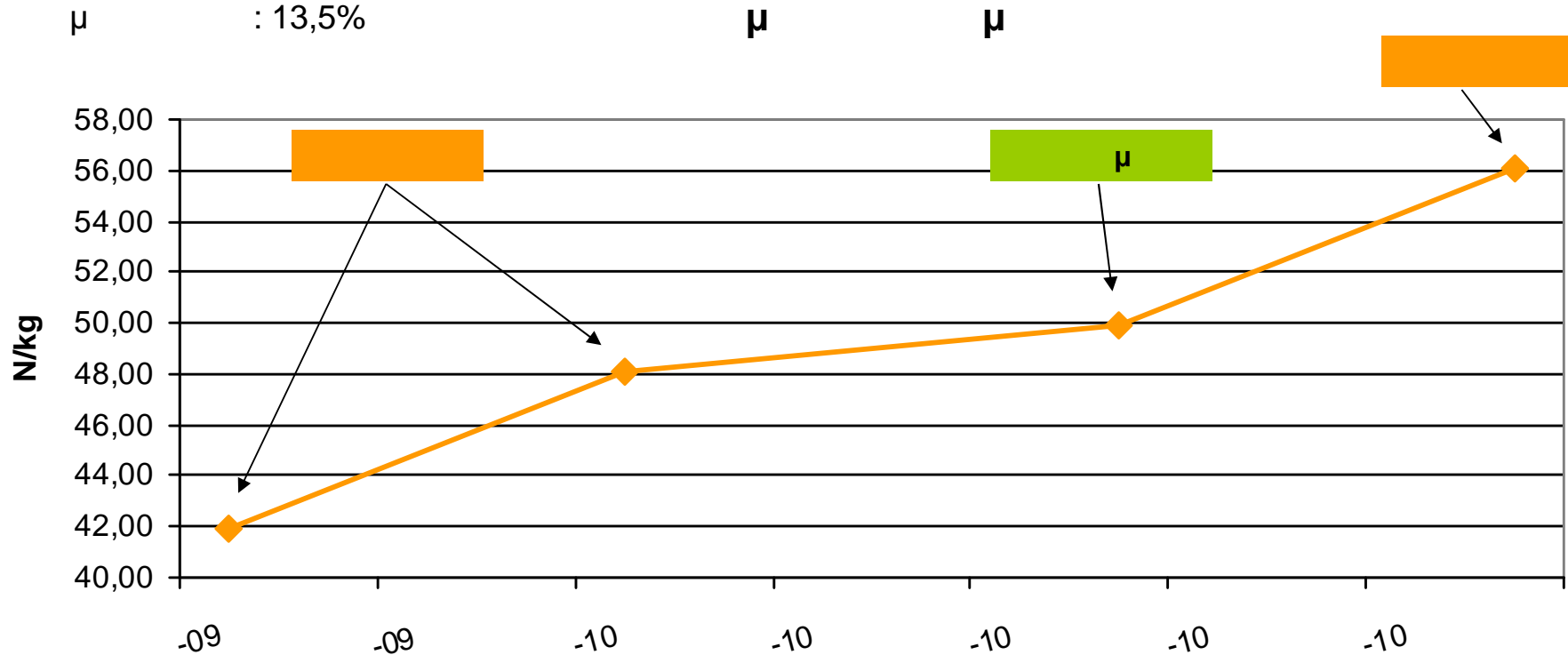
—



μ



- n = 17
- : 19,6
- : 8
- : 6,8 / .
- μ μ : 89,6 kg
- μ : 186,9 cm
- : 190,3 cm
- : 238,2 cm
- μ : 13,5%



μ μ



μ



μμ

μ

Η

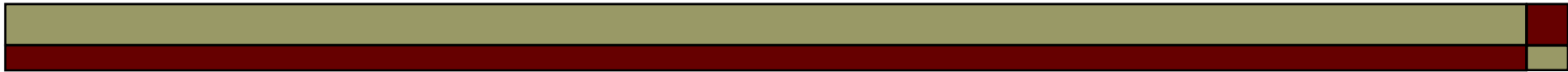
μ

μ





μ μ		μ μ		μ	
					.
μ	A.	✓			✓
μ	B.	✓		✓	
		✓	✓		
		✓	✓		
			✓		✓

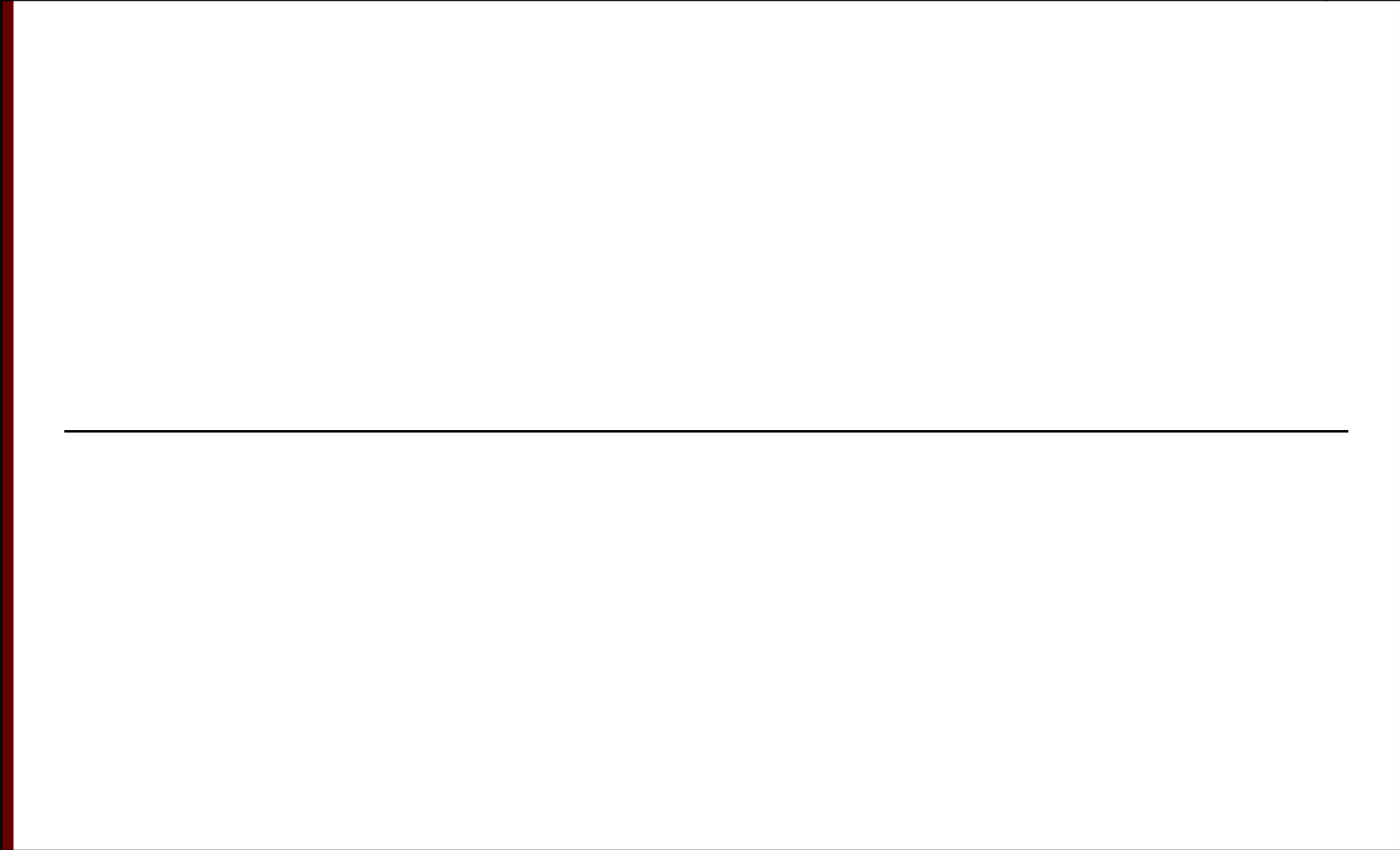
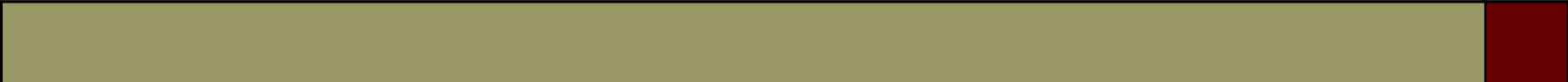


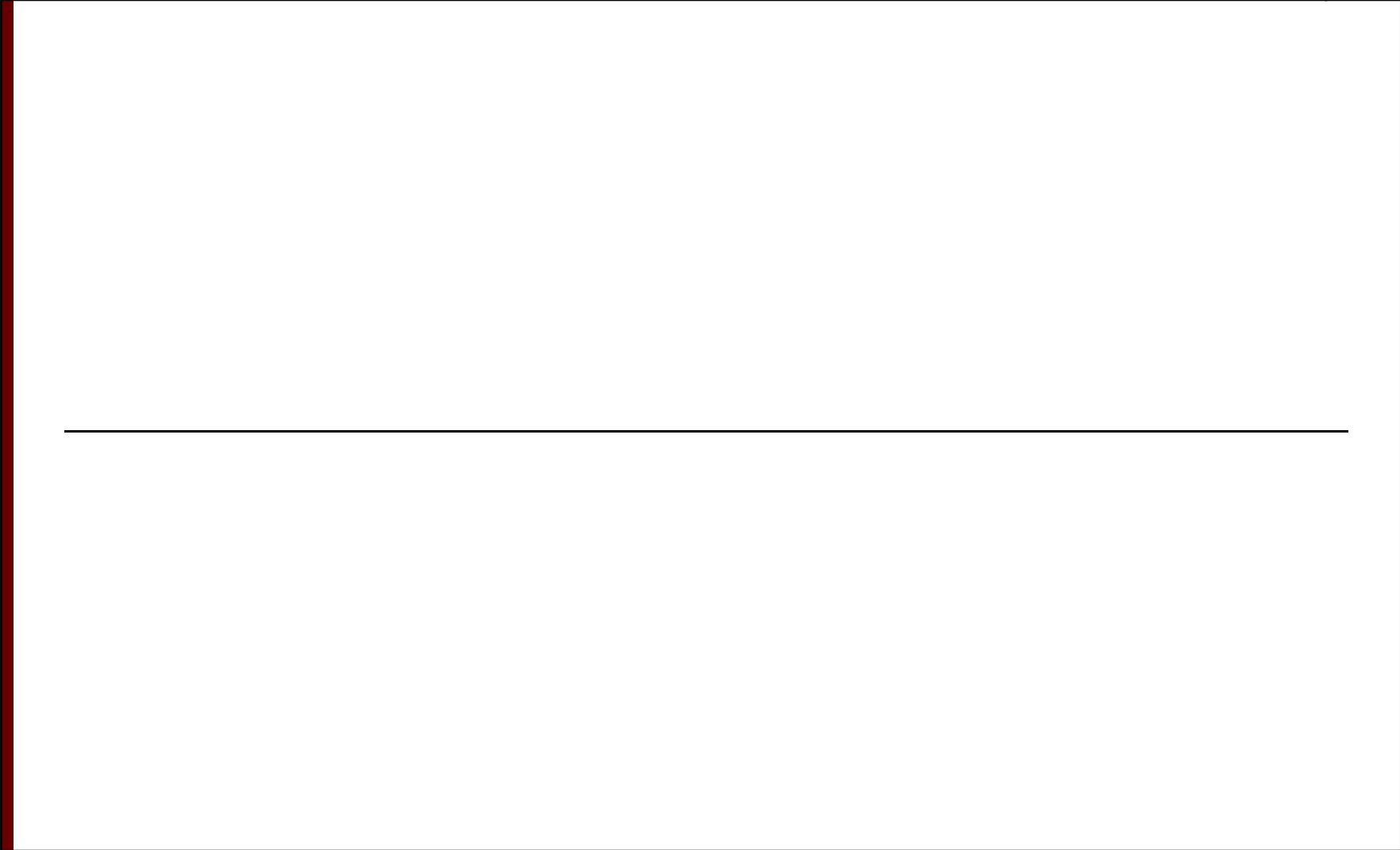
μμ

μ

μ

μ		/	μ ./		/	μ ./
1	3	12-10	3	3	12-10	2
2	4	10-8	3	3	10-8	2
3	5	10-8	3	3	10-8	2
4	5	10-8	3	3	10-8	2





Rebound jumps

5-60 sec

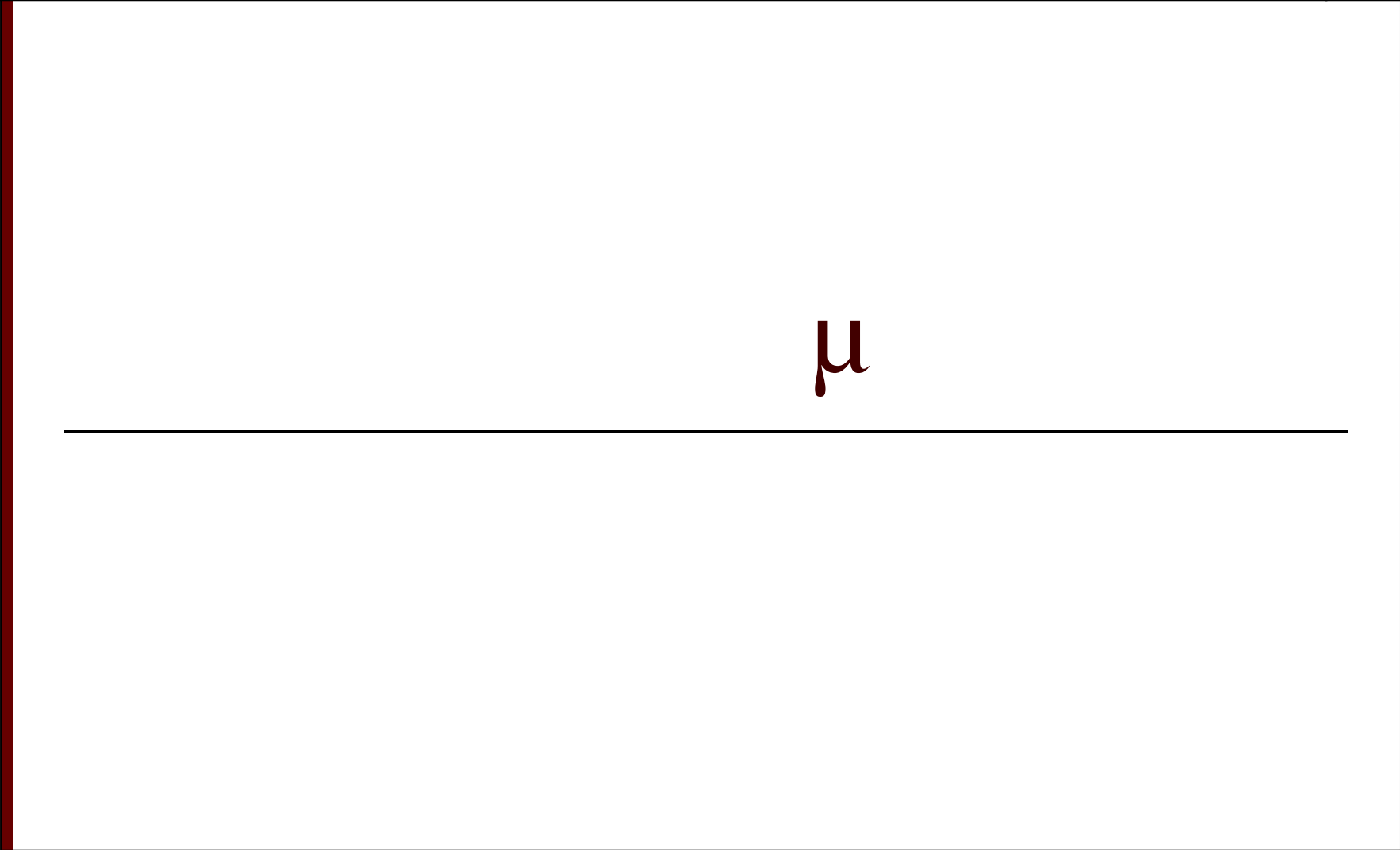
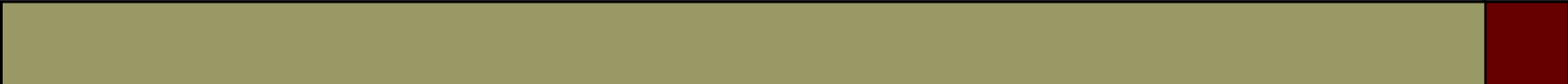


μ μ 5-60 sec

μ (15 sec)
15-60 sec).

: - μ





μ





μ

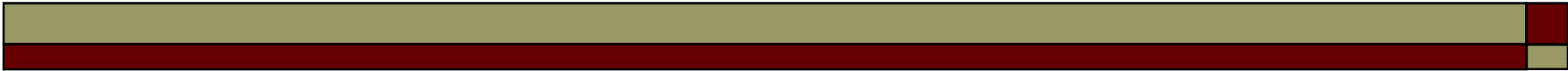


μ



μ

25m	:	0.90
50m	:	0.83
400m	:	0.60



μ



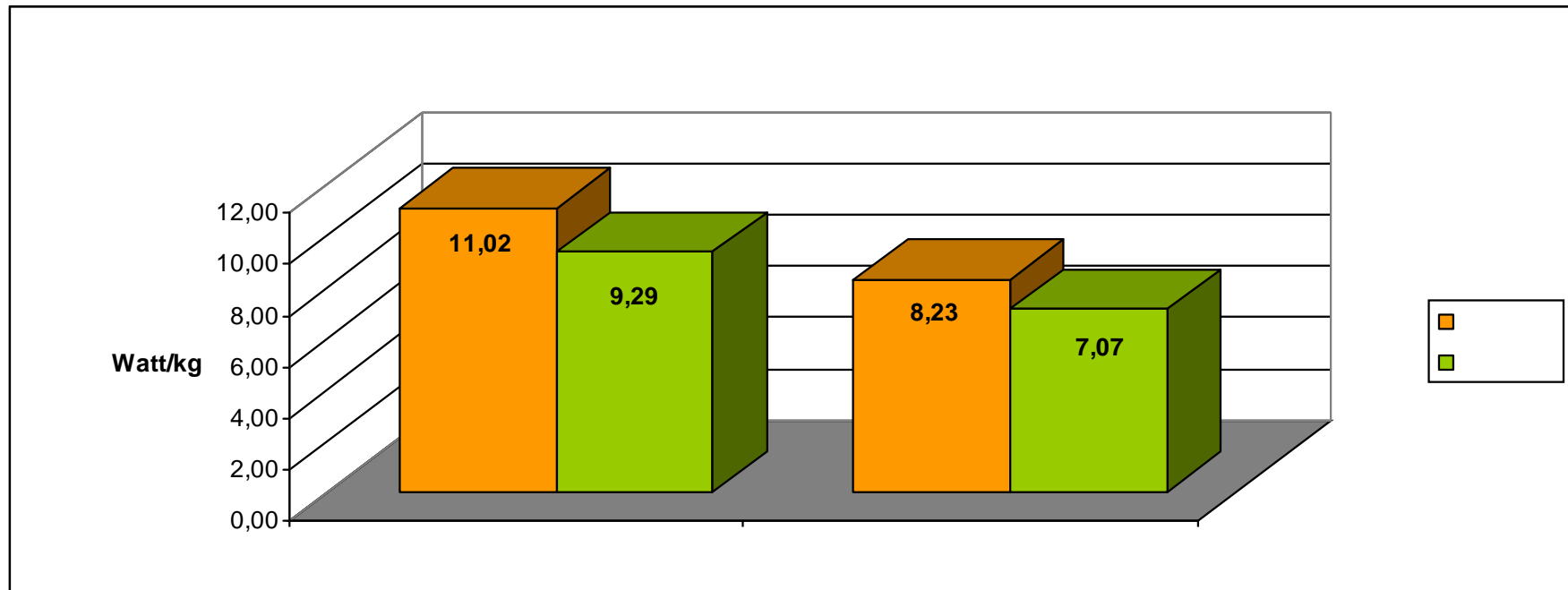
& μ



μ

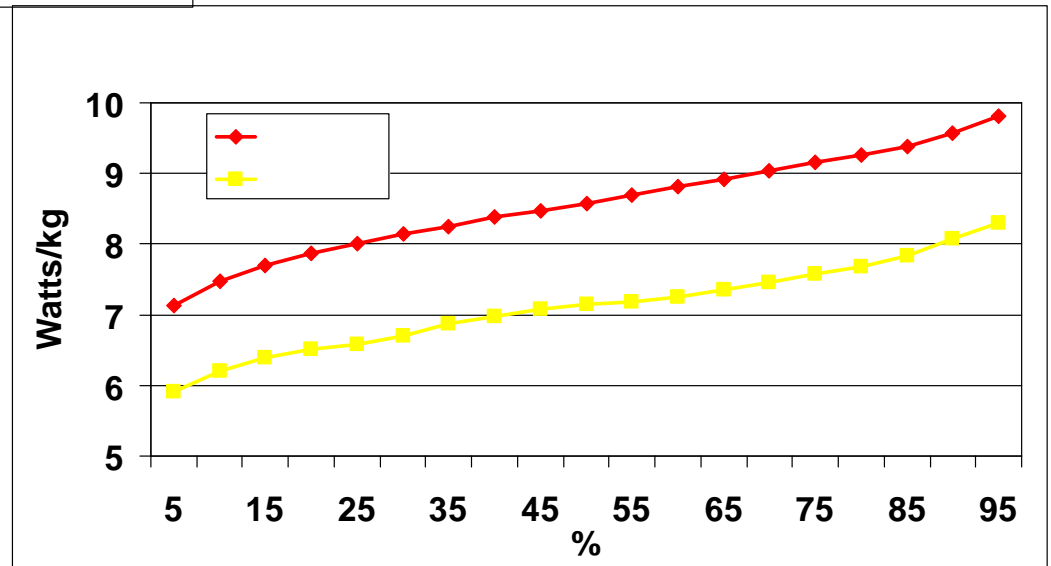
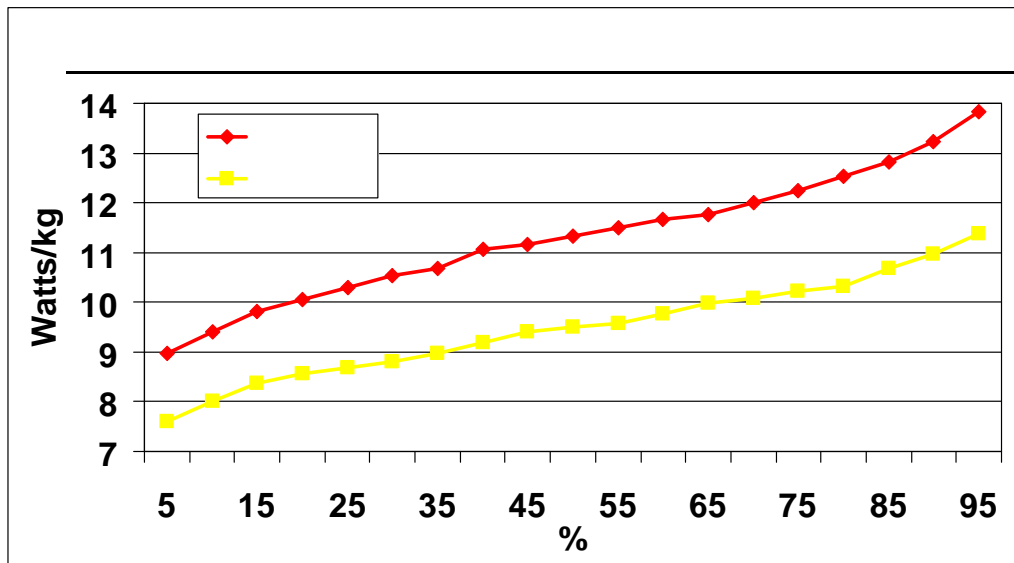
&

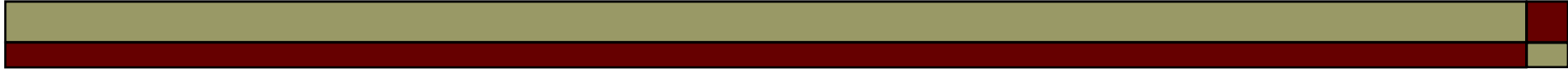
- | | |
|-----------------|-----------------|
| • n = 26 | • n = 85 |
| • : 26,5 | • : 24,3 |
| • : 14,2 | • : 12,5 |
| • : 7,1 / . | • : 6,5 / . |
| • μ μ : 89,0 kg | • μ μ : 68,7 kg |
| • μ : 190,9 cm | • μ : 178,5 cm |
| • : 194,1 cm | • : 179,1 cm |
| • : 243,5 cm | • : 227,3 cm |
| • μ : 12,2% | • μ : 18,2% |



μ

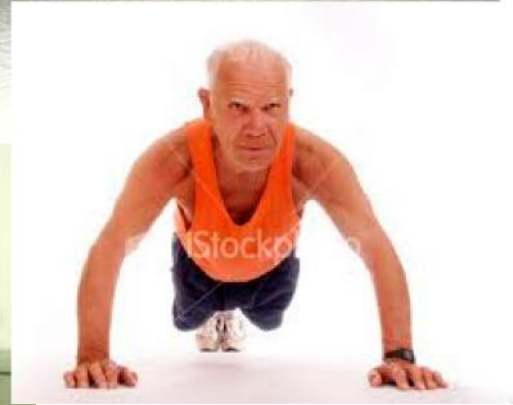
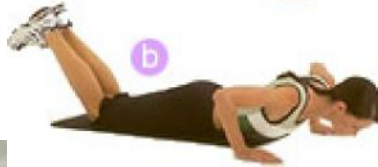
μ





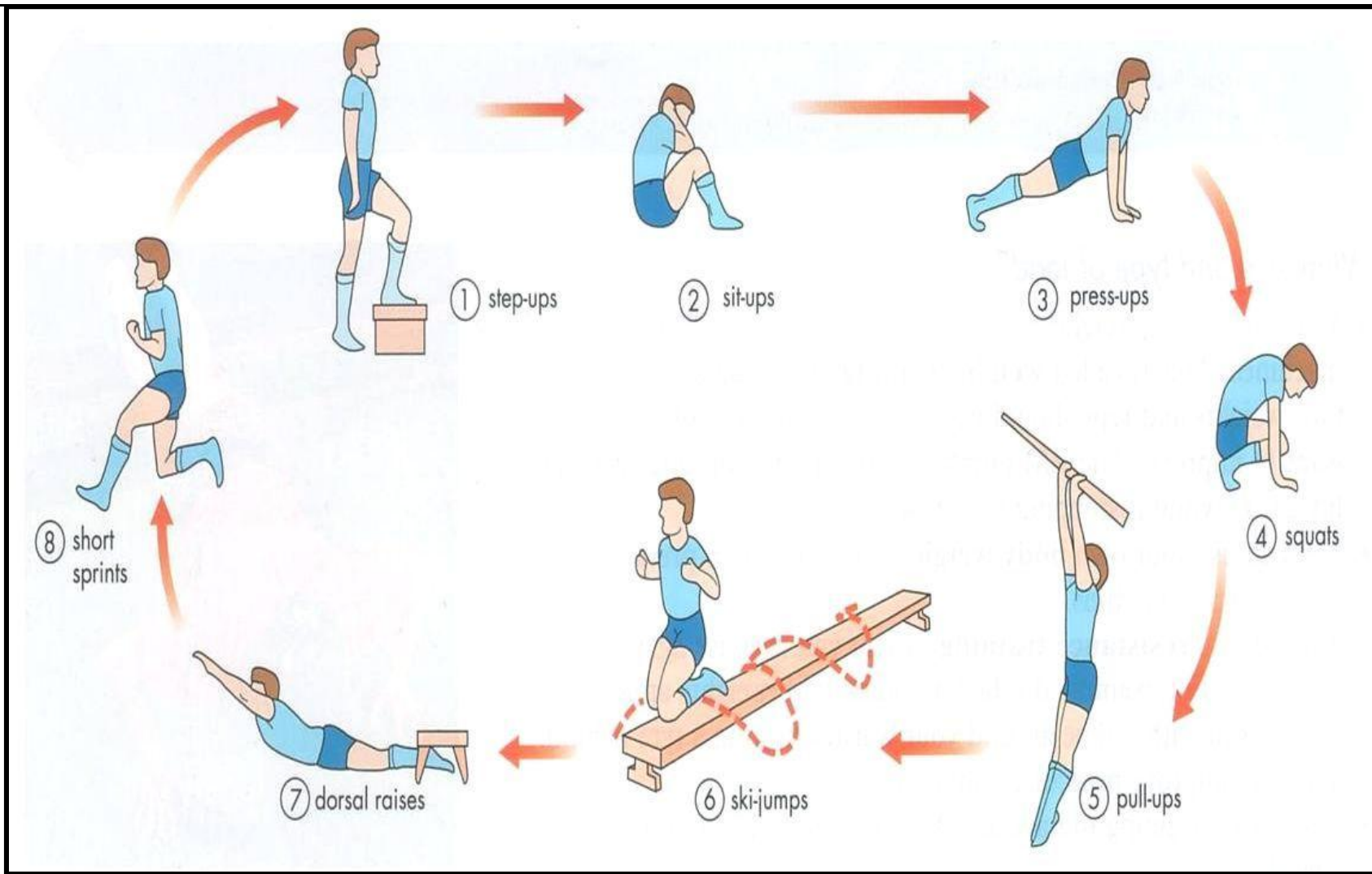
μ

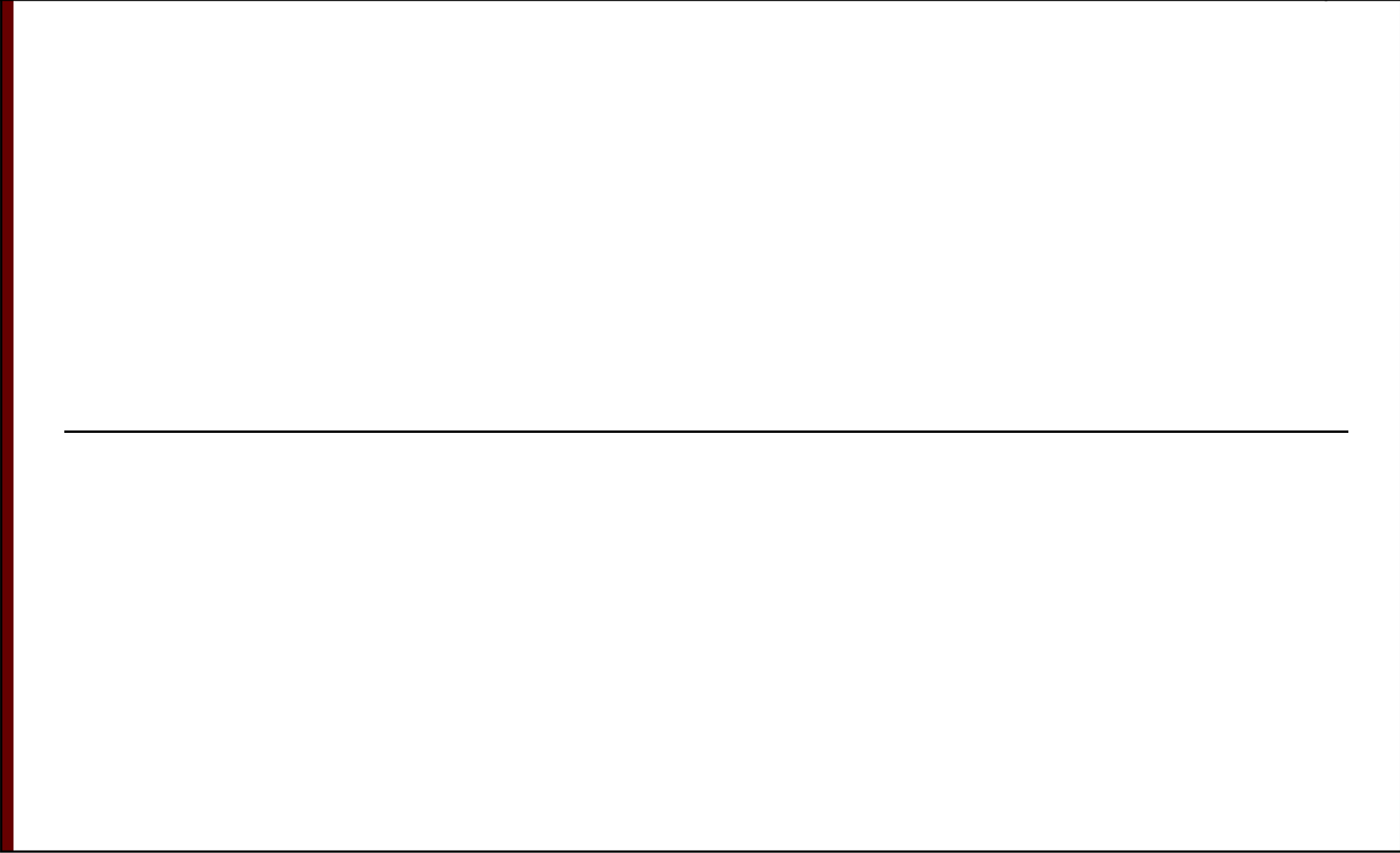
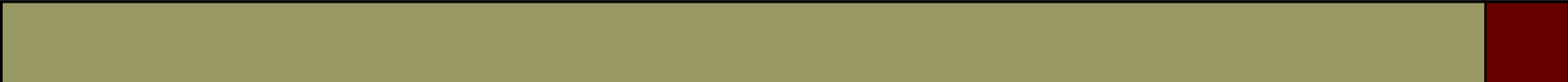
-



μ -

μ







()

μ

□

.

□

), μ μ ($\mu\mu$ -

.

□

- (μ μ).



μ μ μ μ
(
)

- μ ; μ
(μ ; μ)
- (μ , μ); μ μ
- μ ; μ
 μ μ



μ

-

()

(VO₂max).

(HRmax).

μ

(vVO₂max).

μ

.

().

A

().

(% VO₂max).

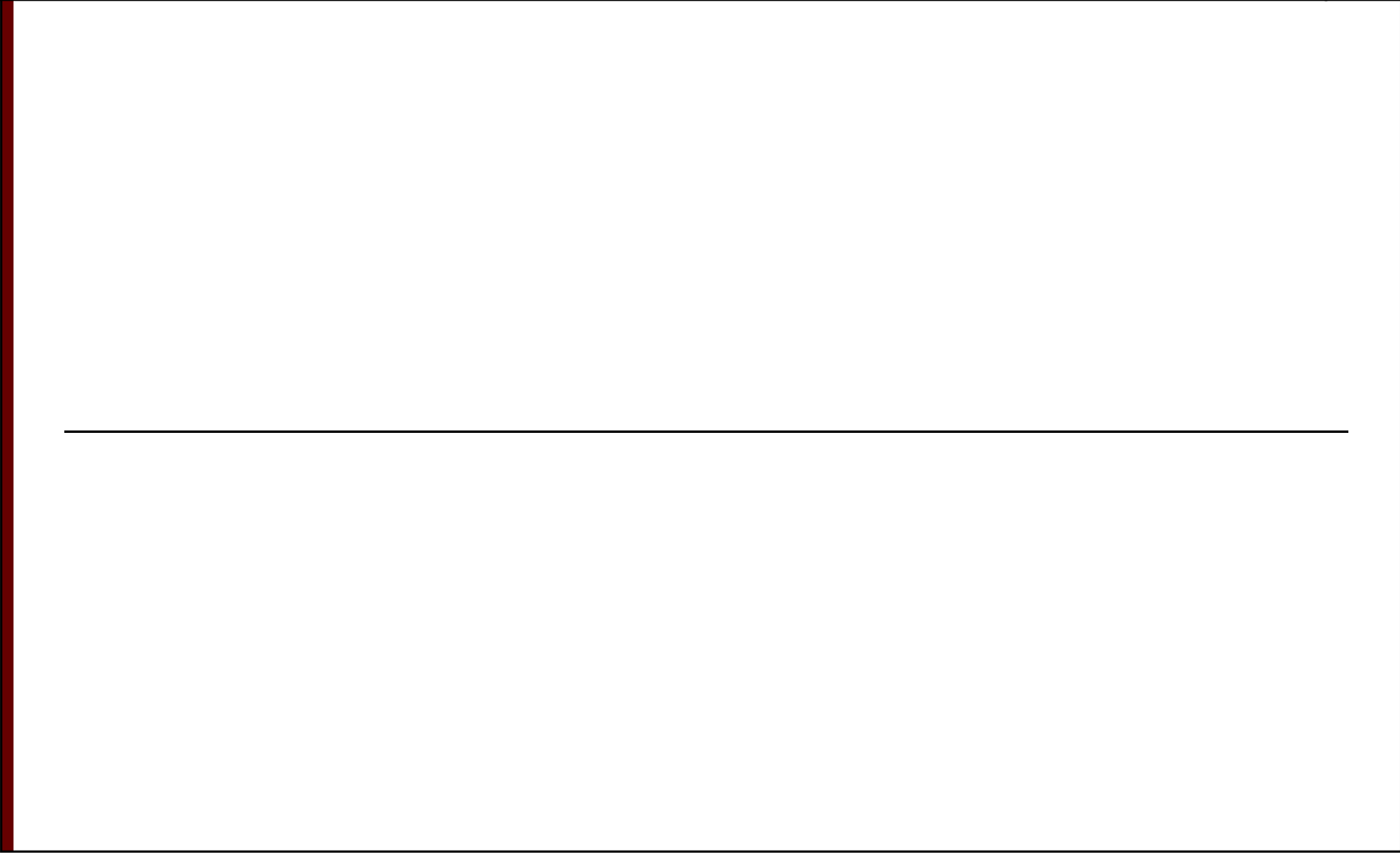
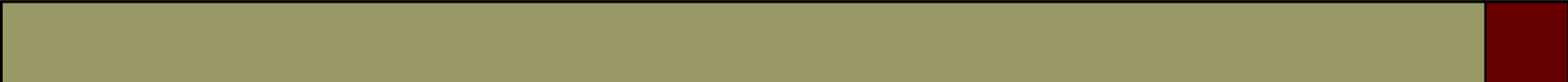
()

μ

.

1

.

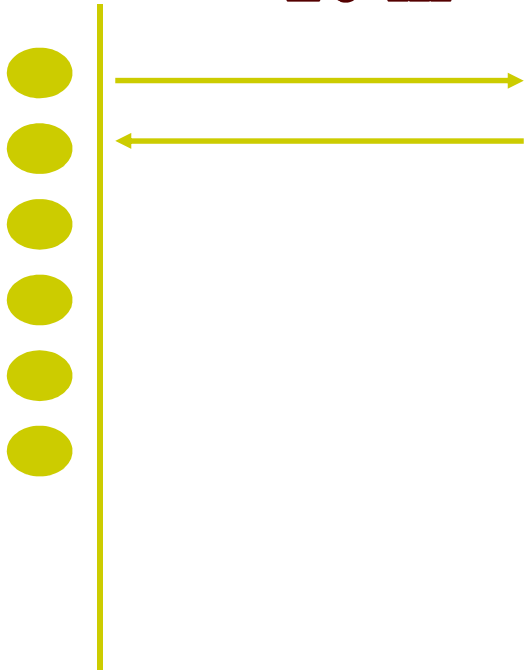




μ

μ

20 m



μ

μ

μ

μμ

.



μ

μ

1

min.



μ

μ

μ



μ

.

μ

μ

μ

μ

μ

.

Yo-Yo Test

- O μ μ μ 20 m 2 ()
- μ 5 m (A) .

- 4 .

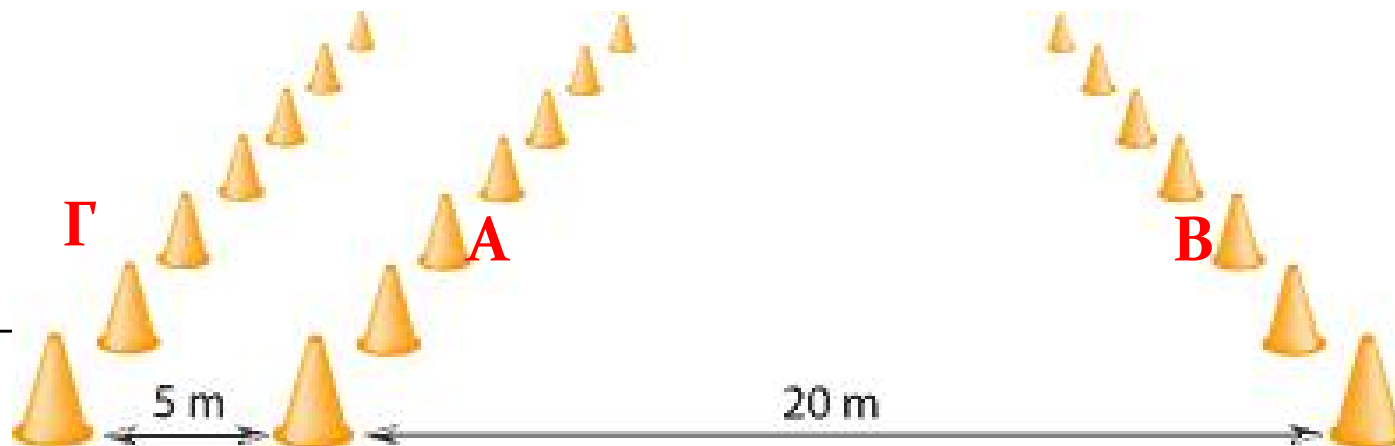
•Yo-Yo Intermittent Test Level 1 (5sec)

•Yo-Yo Intermittent Test Level 2 (5sec)

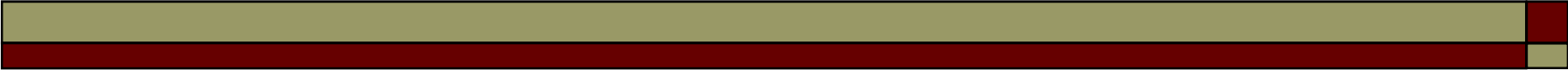
• $(VO_{2max} = \frac{m \times 0.0136 + 45.3}{IR2 \text{ distance in meter} \times 0.0136 + 45.3})$

•Yo-Yo Recovery Test Level 1 (10sec)

•Yo-Yo Recovery Test Level 2 (10sec)







μ

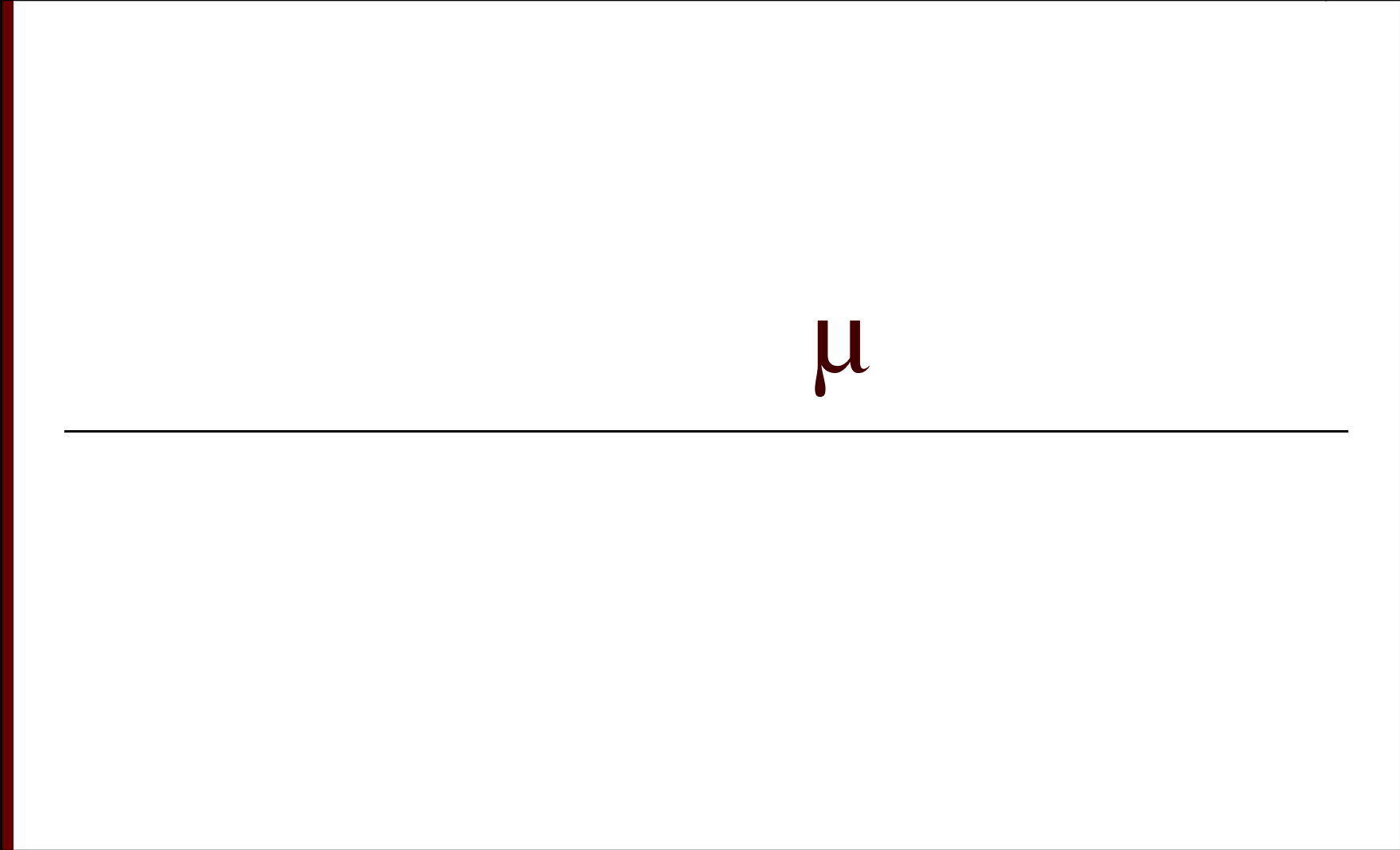
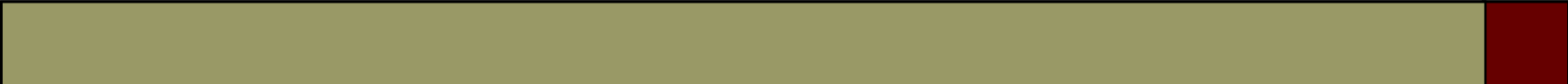
μ

μ		km/h	VO ₂ max (ml/kg/min)							μ
			8	9	10	11	12	13	14	
50-59	7				53,4	52,0	50,5	49,0	47,5	
60-69	8	12,0	58,6	57,2	55,8	54,4	53,0	51,6	50,2	
70-79	9	12,5	60,9	59,6	58,2	56,9	55,6	54,2	52,9	



58

μ

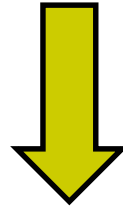


μ





μ ?



VO_2max

μ
 μ



μ

μ

- -

-



μ

μ
 VO_2max

- μ , μ ,
- $\sim 85\% HRmax$



□

μ

□

μ

8

□

μ

μ μ

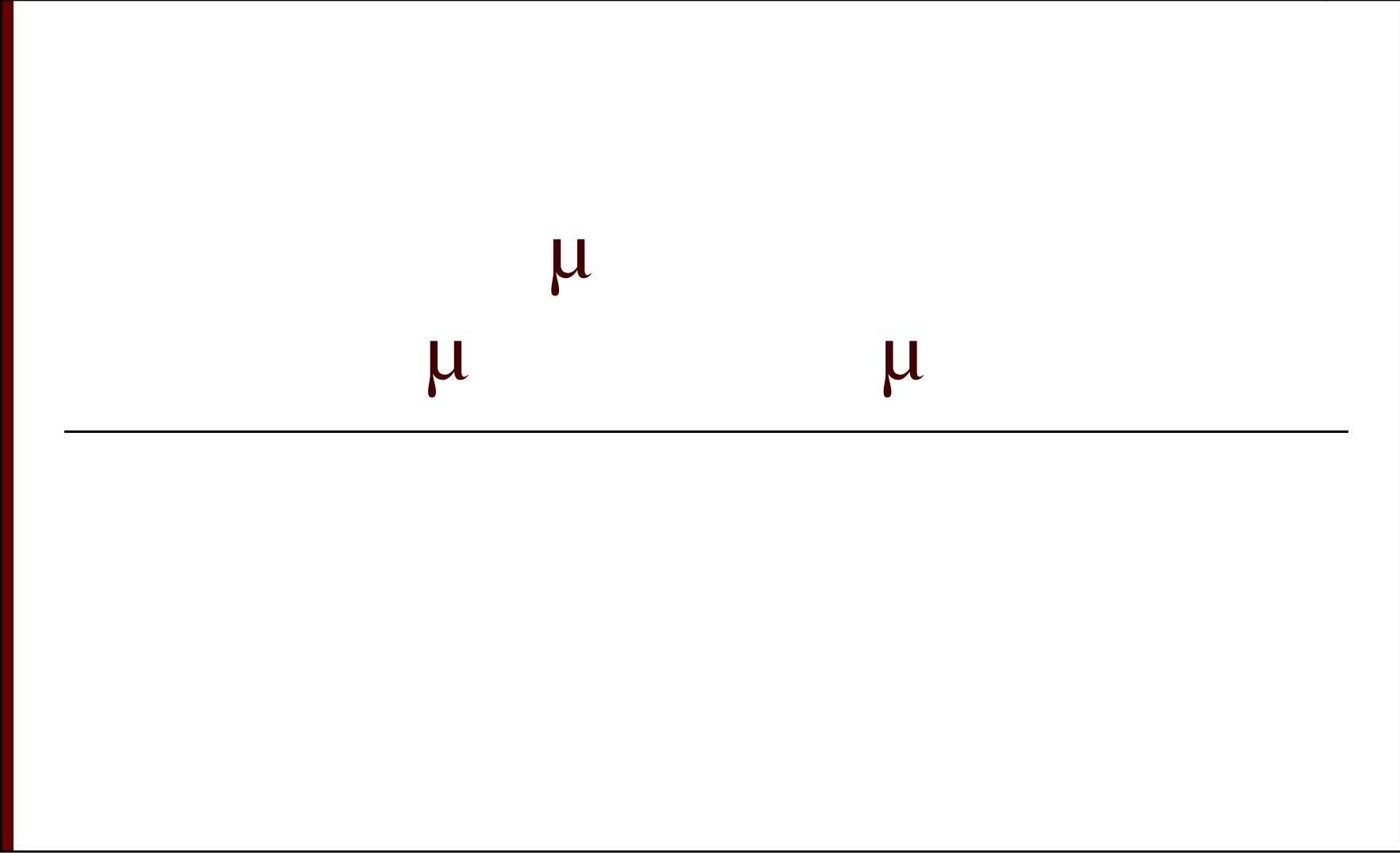
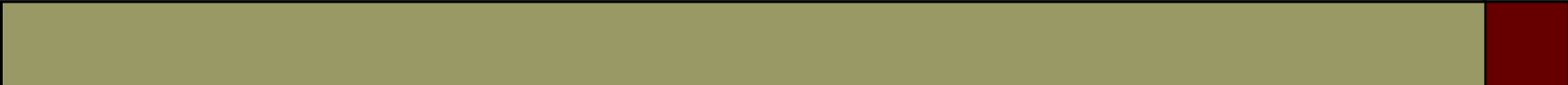
ml/kg/min

μ

□

μ

.

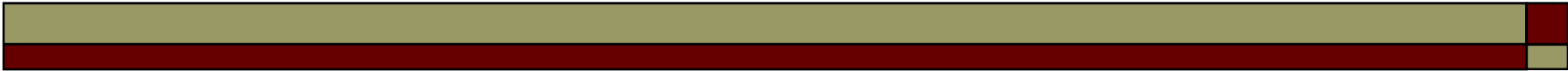


μ

μ

μ





μ μ μ

		HRmax	220-
	41	179	179
	36	188	184
	52	169	168
	31	201	189
	29	209	191
	28	191	192
	41	173	179
	47	195	173
	40	184	180
	44	186	176

μ

39

188

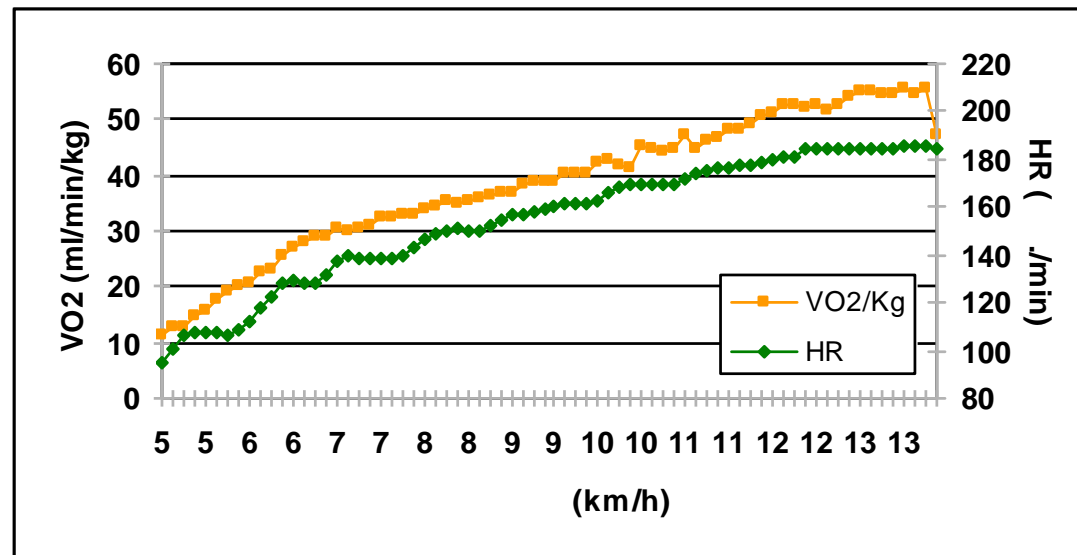
181

μ



- . . .
- $VO_2\text{max}$
- $vVO_2\text{max}$
- VE
- $vVO_2\text{LT}$
- . . . $VO_2\text{LT}$
- μ - μ

μ



Τιμές στη VO ₂ max	
Μέγιστη πρόσληψη οξυγόνου (VO ₂ max):	3236,57
VO ₂ max σχετική τιμή (ml/min/kg):	55,61
Μέγιστη καρδιακή συχνότητα (HRmax) (σφ./min):	186
Μέγιστος πνευμονικός αερισμός (VEmax) (l/min):	86,80
Αναπνευστικό πηλίκο (R):	1,08
Διάρκεια άσκησης (hh:mm:ss):	00:17:45
Ταχύτητα στη μέγιστη πρόσληψη οξυγόνου (vVO ₂ max) (km/h):	13,5
HR αποκατάστασης στο 1 ^ο λεπτό:	141
HR αποκατάσταση στο 3 ^ο λεπτό:	99

Τιμές στο αναερόβιο κατώφλι	
Πρόσληψη οξυγόνου (VO ₂) (ml/min):	2417,25
VO ₂ σχετική τιμή (ml/min/kg):	41,53
Καρδιακή συχνότητα (HR) (σφ./min):	169
Μέγιστος πνευμονικός αερισμός (VE) (l/min):	45,65
Διάρκεια (hh:mm:ss):	00:10:45
Ταχύτητα στο αναερόβιο κατώφλι (vLT) (km/h):	10,0
Αναπνευστικό κατώφλι (% VO ₂ max):	74,69

μ VO²max

μ

	()					
	18-25	26-35	36-45	46-55	56-65	65+
	> 60	> 56	> 51	> 45	> 41	> 37
	52-60	49-56	43-51	39-45	36-41	33-37
	47-51	43-48	39-42	35-38	32-35	29-32
	42-46	40-42	35-38	32-35	30-31	26-28
μ	37-41	35-39	31-34	29-31	26-29	22-25
μ	30-36	30-34	26-30	25-28	22-25	20-21
μ	< 30	< 30	< 26	< 25	< 22	< 20

μ μ

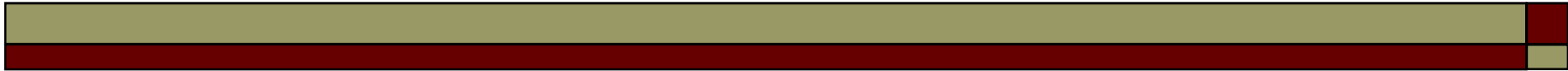
(ml/kg/min)

μ μ

(ml/kg/min)

	()					
	18-25	26-35	36-45	46-55	56-65	65+
	> 56	> 52	> 45	> 40	> 37	> 32
	47-56	45-52	38-45	34-40	32-37	28-32
	42-46	39-44	34-37	31-33	28-31	25-27
	38-41	35-38	31-33	28-30	25-27	22-24
μ	33-37	31-34	27-30	25-27	22-24	19-22
μ	28-32	26-30	22-26	20-24	18-21	17-18
μ	< 28	< 26	< 22	< 20	< 18	< 17

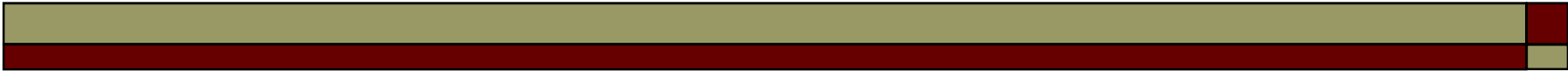




μ **VO2max**
μ / μ

(MacDougall et al. Physiological testing of high performance athletes, 1991)

(μ . .)	69-95	56-74
	70-86	60-75
	65-80	55-72
	58-74	48-68
	56-72	-
μ	54-70	48-68
	50-70	-
	45-65	42-54
	55-65	48-52
	45-60	48-52
	50-55	42-54
	50-65	-
μ	45-55	40-45



μ

μ

(/min)	124
(/min)	145

: 47
 VO₂max: 44,75 ml/min/kg
 VO₂max: 12,5km/h
 : 195 /min
 μ : 53 /min

	1		2		3		4	
/min*	117	136	137	155	156	175	176	185
km/h	7		8		9,5		11	

* μ
 μ μ 10 /min.





μ



μ

μ

:



μ

μ



μ

μ

μ

.



μ

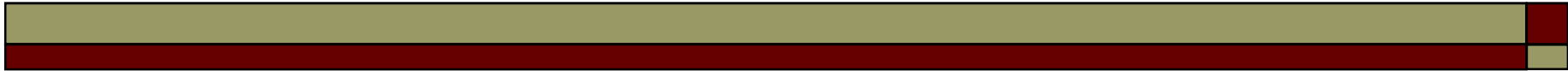
μ

μ

μ

μ

.



μ

μ

μ

• • •

➤		-		-		2		1		()	
		(2)		(1)		(BA2)		(BA1)		()	
➤		5		4		3		2		1	
%		100%	96%	95%	90%	89%	85%	84%	76%	75%	70%
.../min	190	190	182	181	171	169	162	160	144	143	133
.../10s	190	32	30	30	29	28	27	27	24	24	22

μ μ μ μ μ μ

μ	μ	μ	-								
			μ	4 μ		3 μ		2 μ		1 μ	
				95%	92%	91%	86%	85%	80%	79%	70%
		212	201	195	193	182	180	170	167	148	
μ	.	210	200	193	191	181	179	168	166	147	
		200	190	184	182	172	170	160	158	140	
μ	.	199	189	183	181	171	169	159	157	139	
		195	185	179	177	168	166	156	154	137	
		177	168	163	161	152	150	142	140	124	

μ	μ	μ	-								
			μ	4 μ		3 μ		2 μ		1 μ	
				95%	92%	91%	86%	85%	80%	79%	70%
		212	34	33	32	30	30	28	28	25	
μ	.	210	33	32	32	30	30	28	28	25	
		200	32	31	30	29	28	27	26	23	
μ	.	199	32	31	30	29	28	27	26	23	
		195	31	30	30	28	28	27	26	23	
		177	28	27	27	25	25	25	25	25	



μ

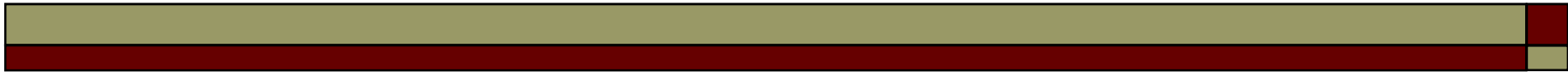
μ

μ

μ

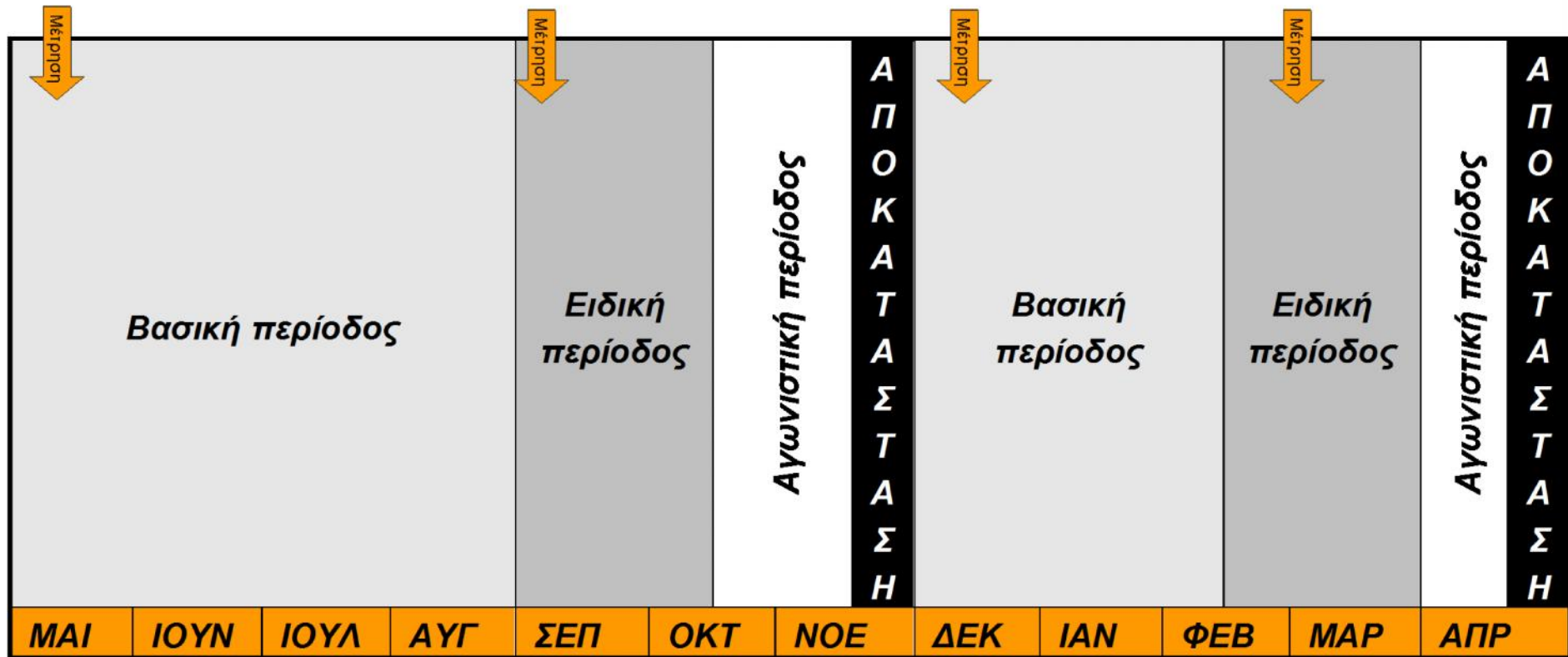
μ

:	42.73 ml/min/kg
μ :	13 km/h.
:	200 /min
:	9.5 km/h
:	170 /min
(h:min:s): μ μ μ	02:20:18
μ μ :	9 km/h 06:39 1000
μ μ :	184 /min
μ μ (h:min:s):	05:41:05
μ :	7.4 km/h 08:05 1000
μ :	176 /min



μμ μ

μ



2 μ

:

μ

μ μ

μ

μμ

μ

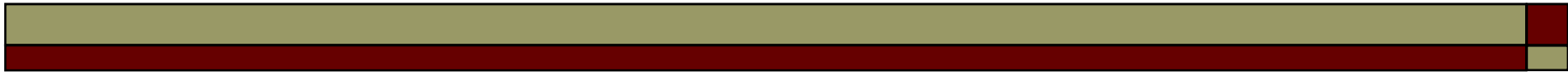
μ 2

μ

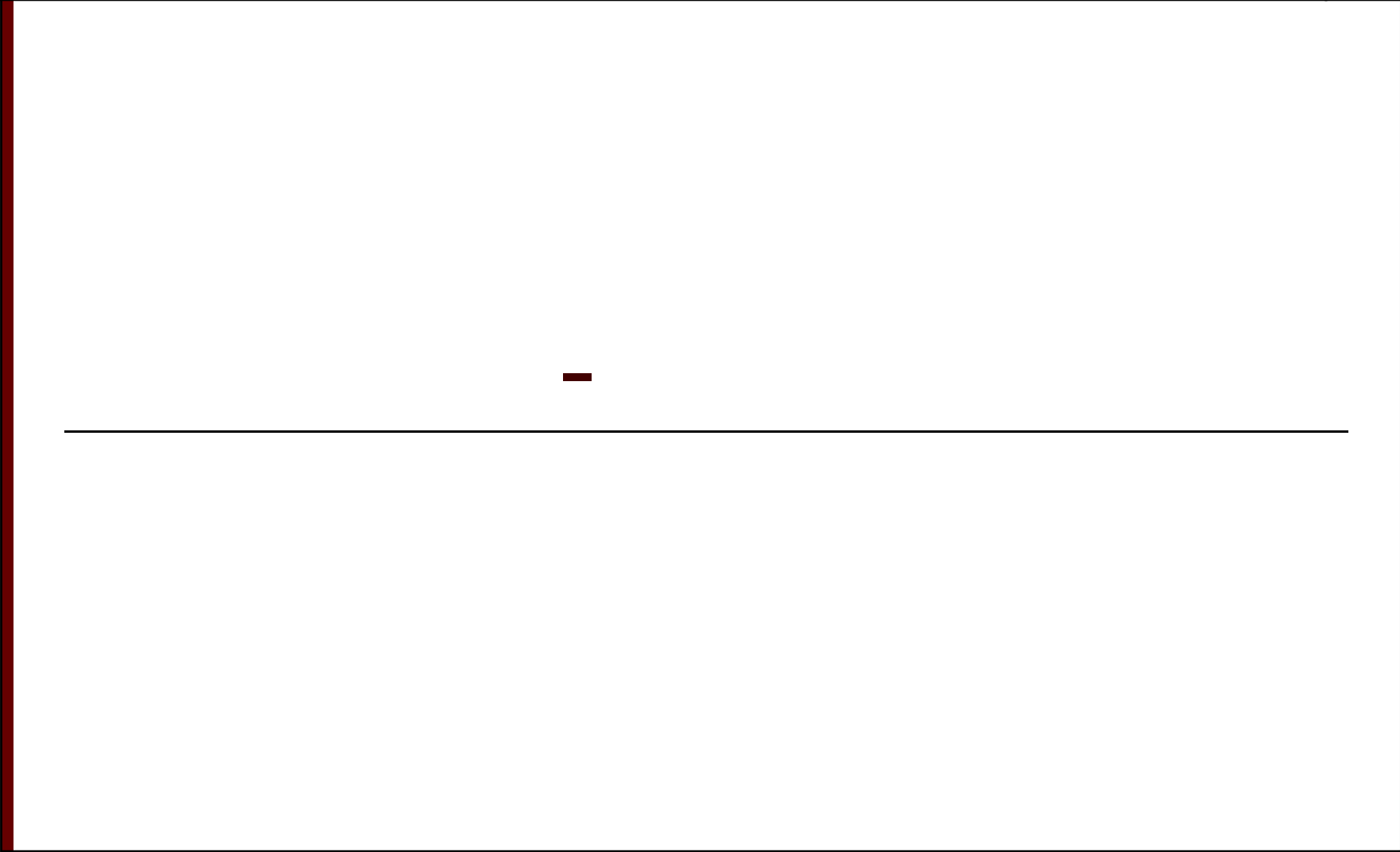
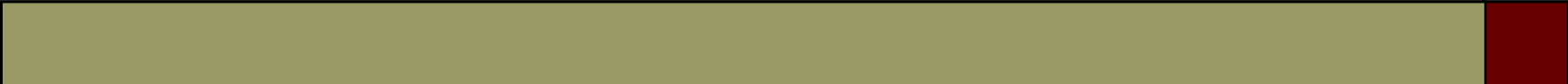
(

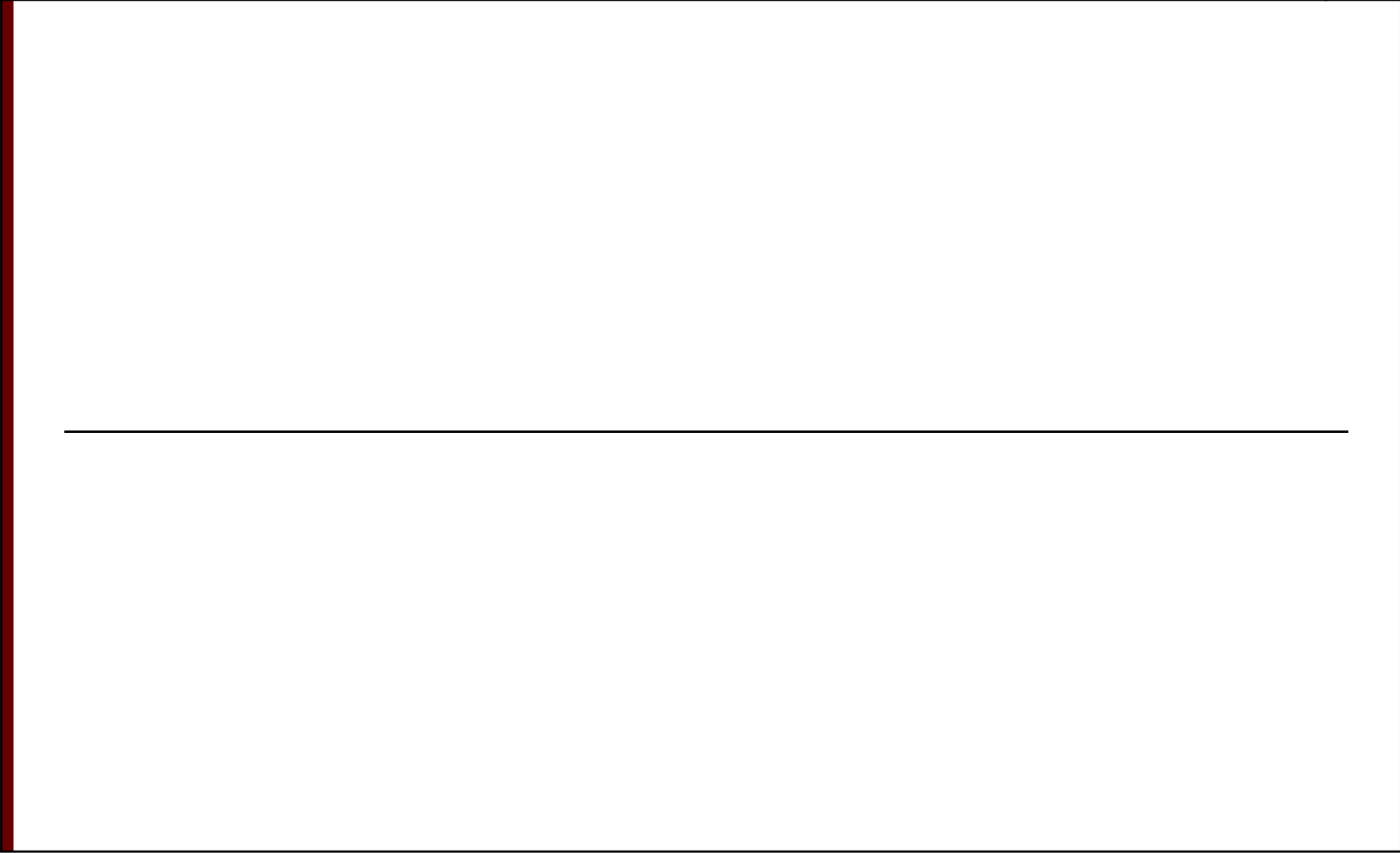
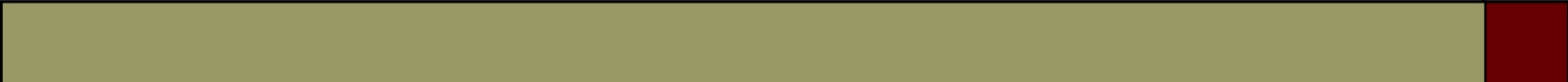
10k





(h:min)	km/ .	/ .	μ / .	μ / .	μ μ / .
2:45	85 75	6 8	90	70	>100
2:55	80 70	6 7	85	65	>90
3:00	75 65	5 6	80	60	> 85







μ 5 20m



μ

20m





н



μ μ 20m

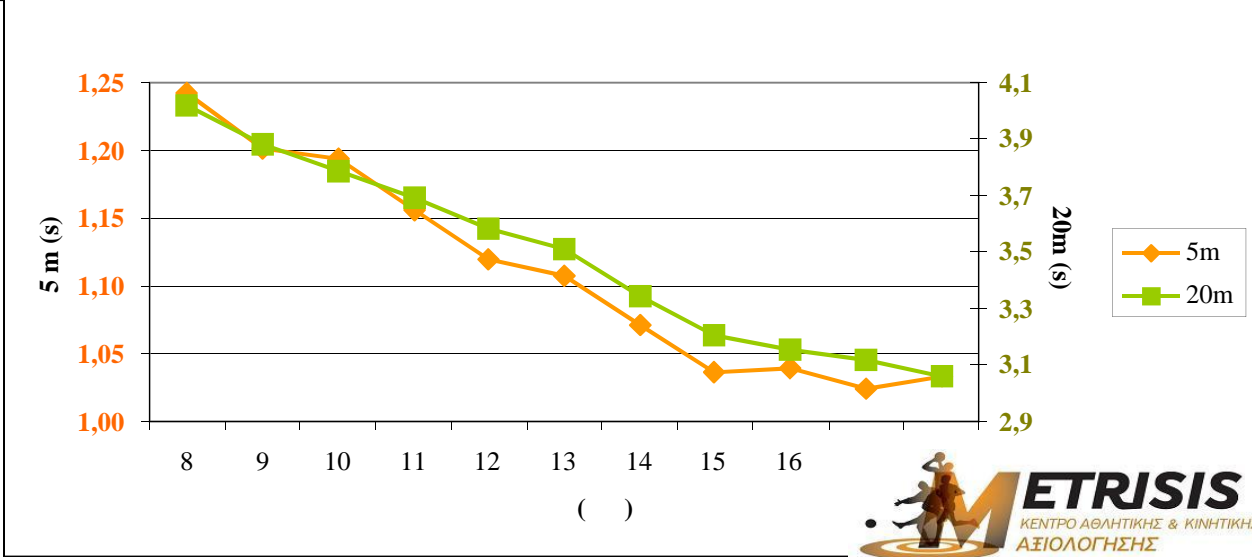
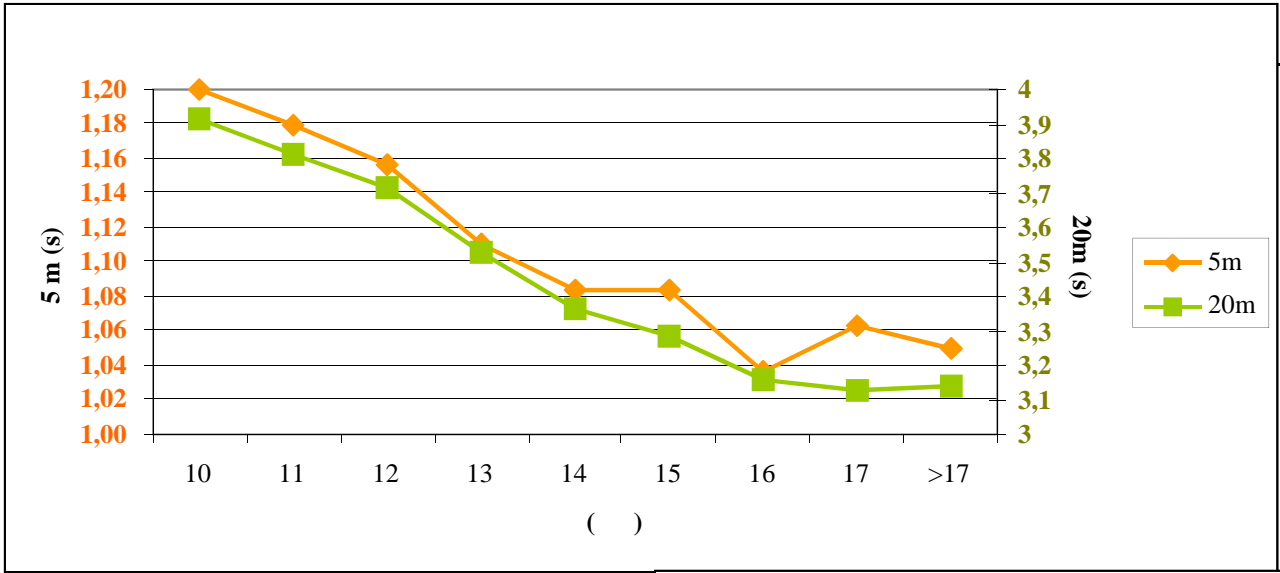
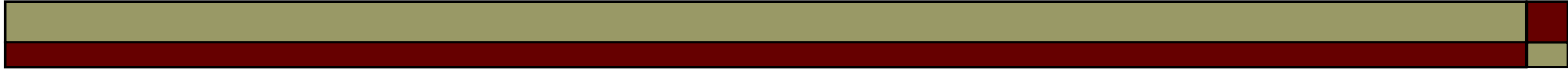


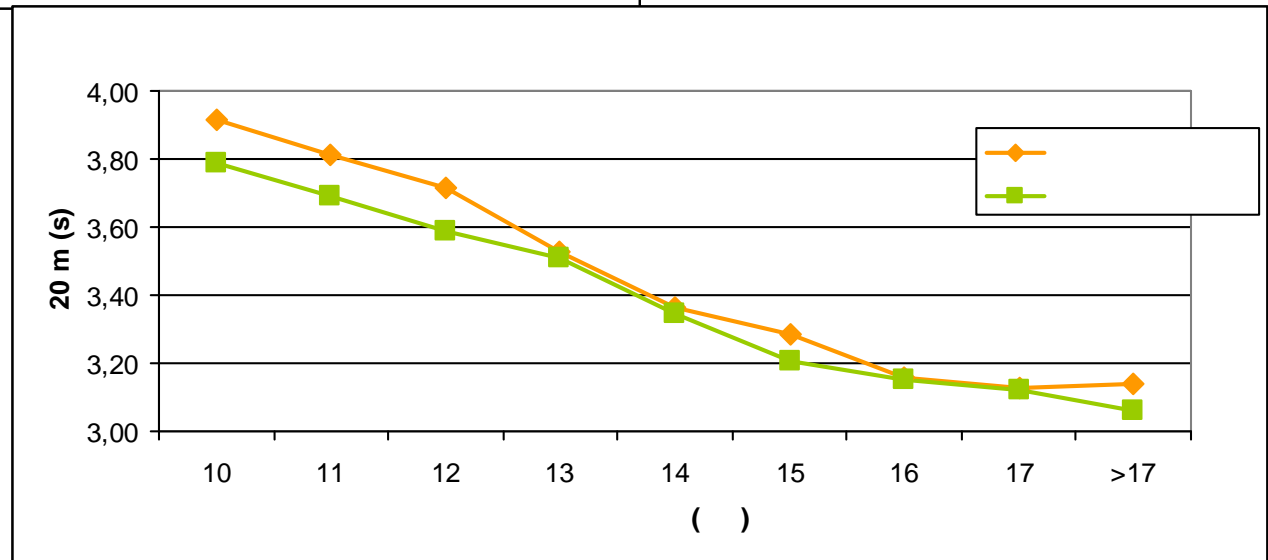
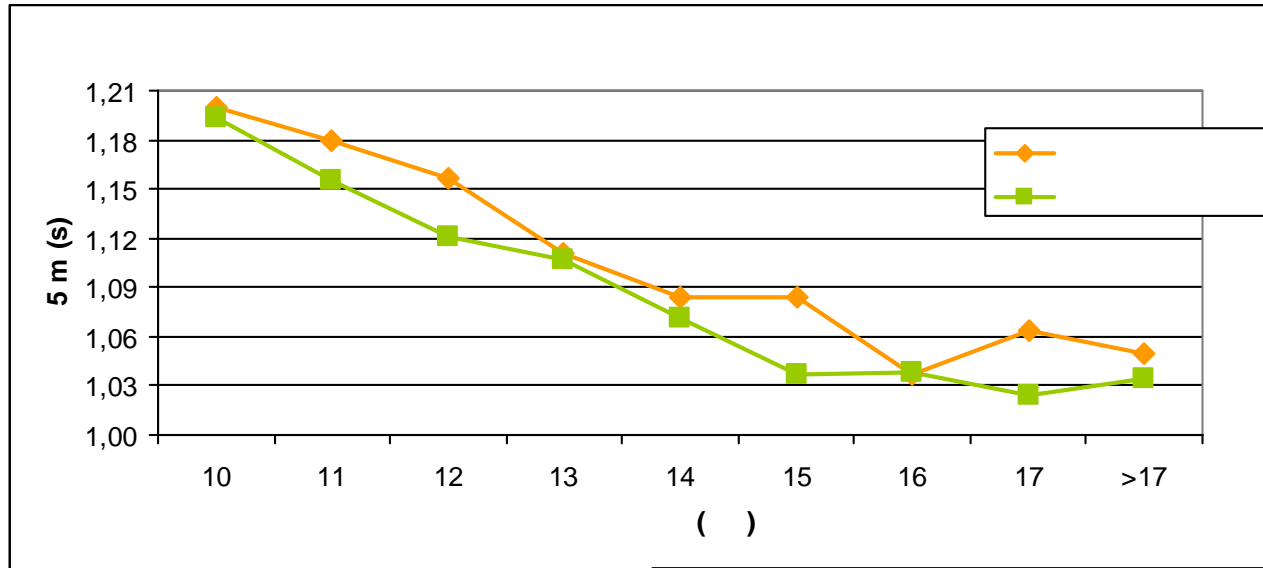
μ - μ μ



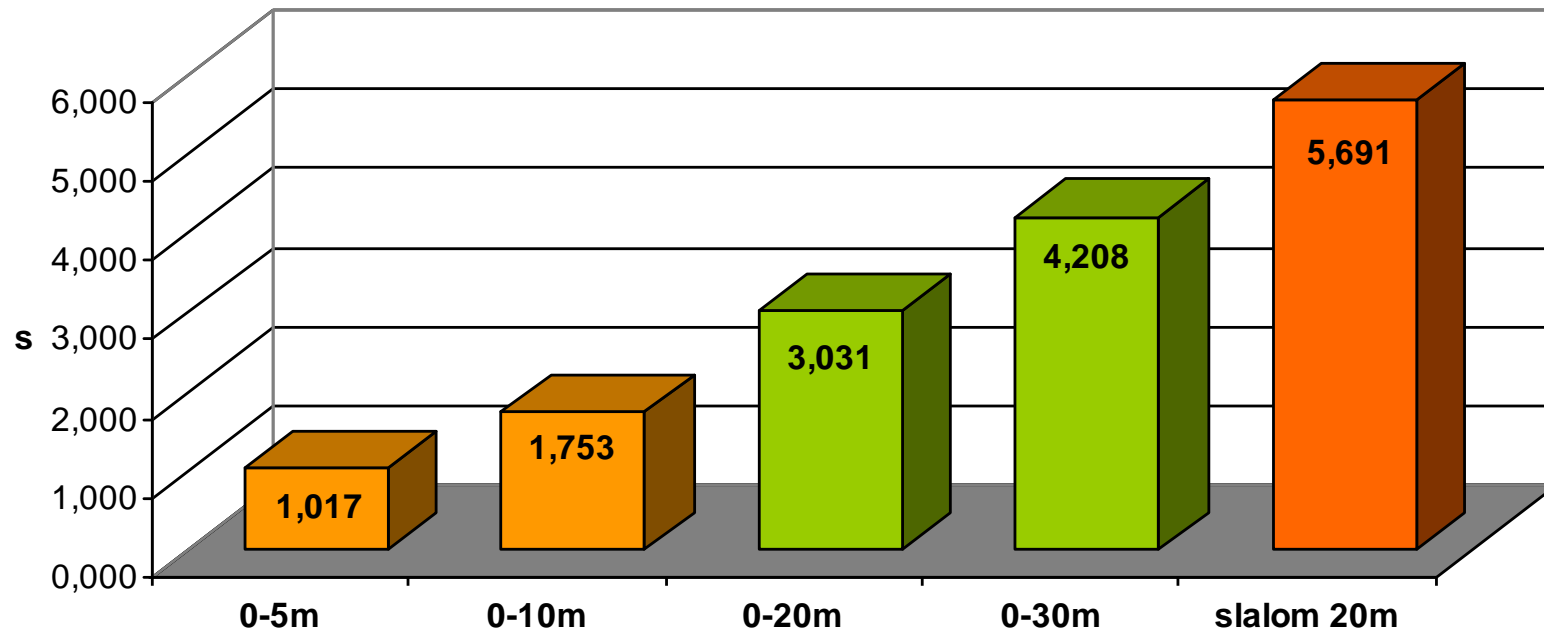


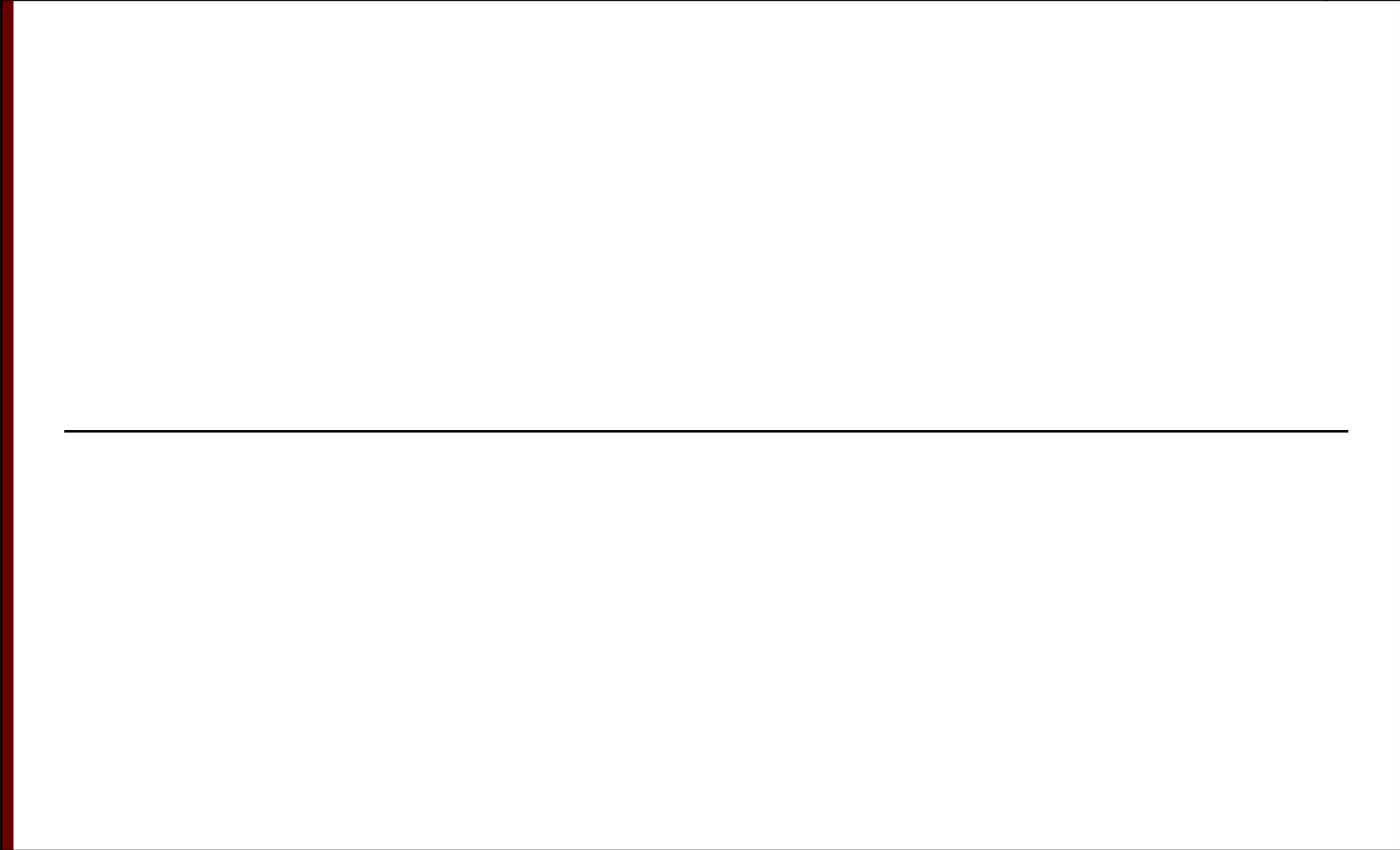
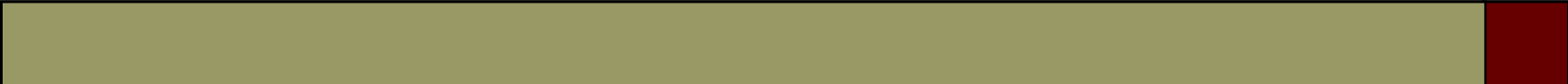
- μ





- n = 97
- : 20,4
- : 9
- : 6,4 / .
- μ μ : 89,4 kg
- μ : 186,5 cm
- : 189,8 cm
- : 237,3 cm
- μ : 13,4%







μ

: **64,91**

μ

μ

μ

100.

μ

μ

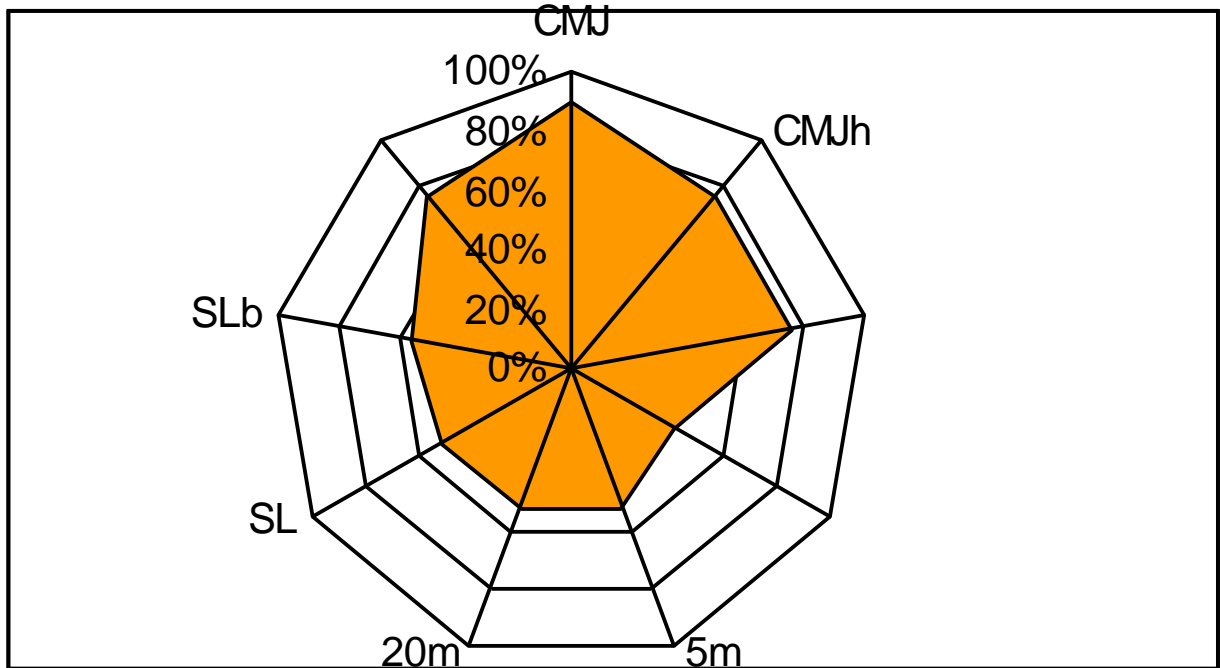
.

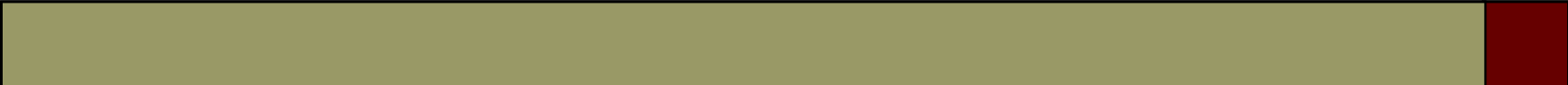
μ

μ

μ

.





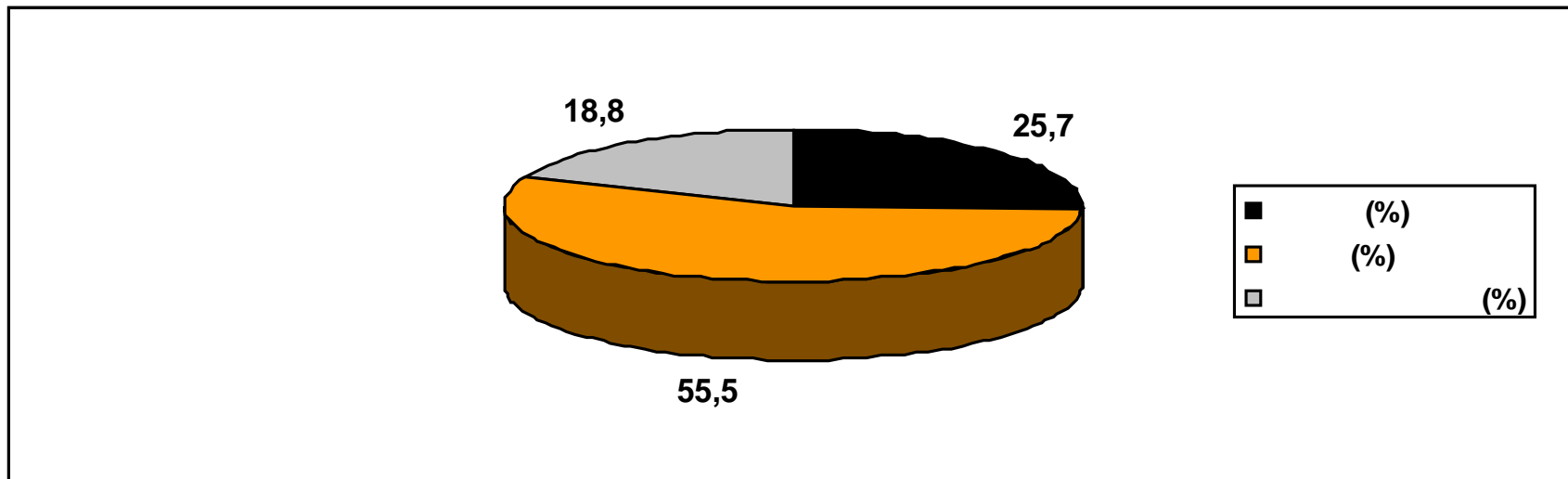
μ

μ

μ

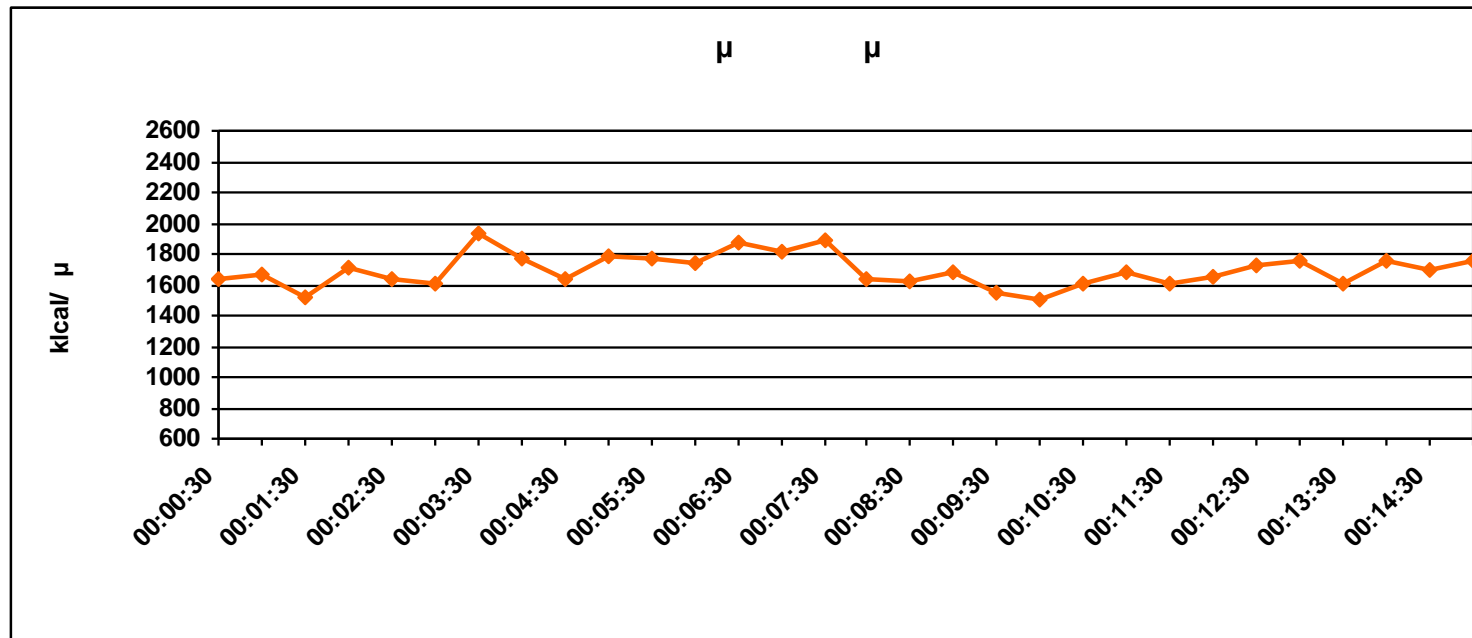


μ μ ()



	Τιμές	Φυσιολογικό εύρος τιμών	Τιμές (%)	Φυσιολογικό εύρος τιμών
Λίπος (kg):	15,42	13,2 - 16,8	25,70	22% - 28%
Άλιπη σωματική μάζα (kg):	44,58	43,2 - 46,8	74,30	72% - 78%
Νερό (lts):	33,30	30,0 - 36,0	55,50	50% - 60%
Μύες και οστά (kg):	11,28		18,80	

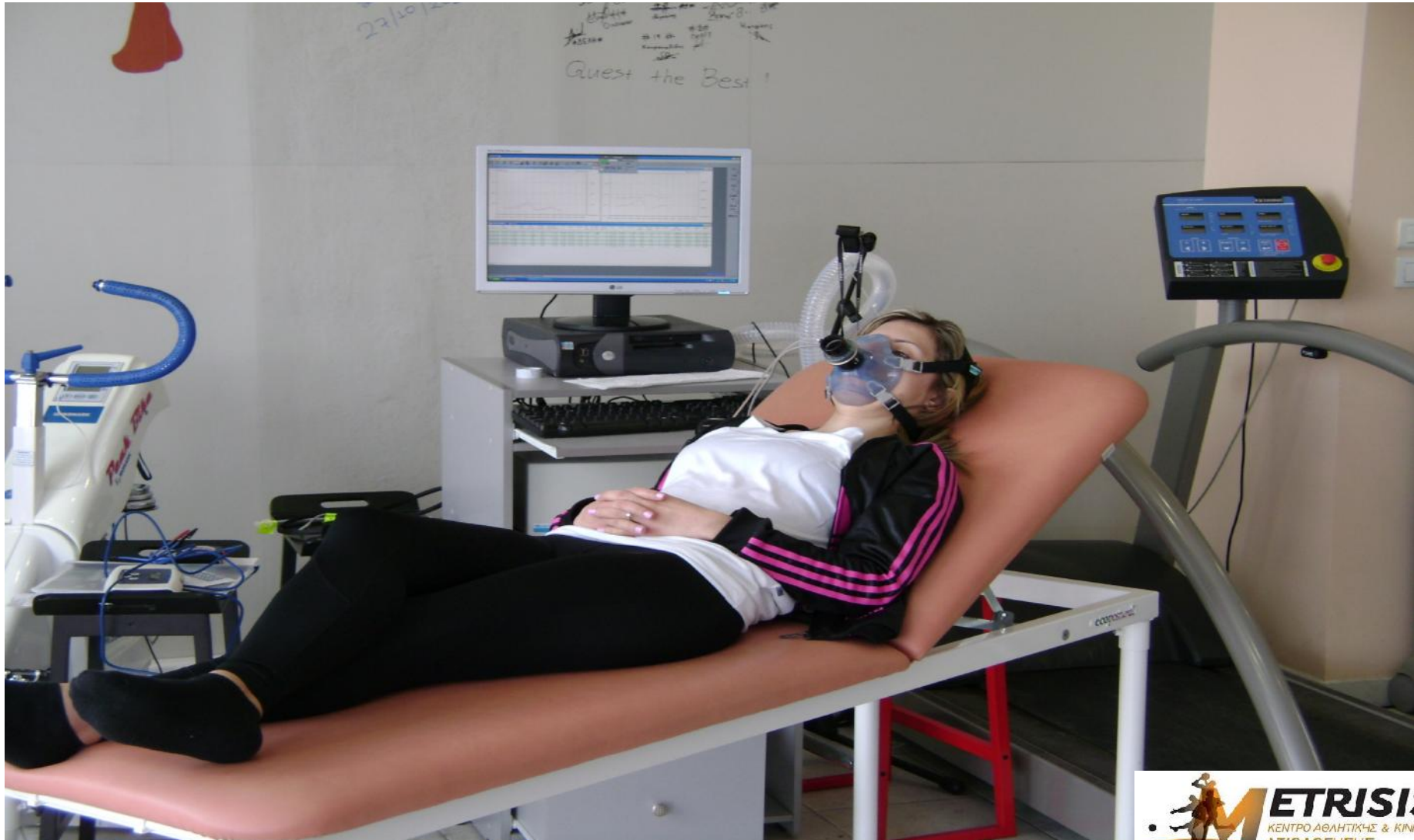
μ μ

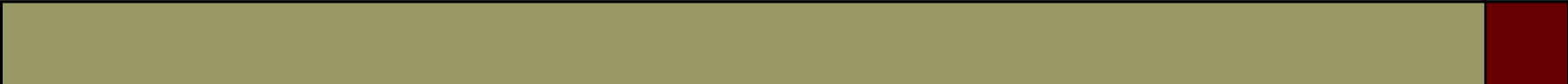


Παράμετροι μέτρησης βασικού μεταβολισμού

Βασικός μεταβολισμός (θερμίδες/ημέρα):	1679
Βασικός μεταβολισμός (θερμίδες/min):	1,2
Ημερήσιες θερμιδικές ανάγκες (θερμίδες/ημέρα):	2896
Καρδιακή συχνότητα ηρεμίας (σφ./min):	53
Πνευμονικός αερισμός (VE) (l/min):	5,66
Αναπνευστικό πηλίκο (R):	0,76

μ μ





μ μ

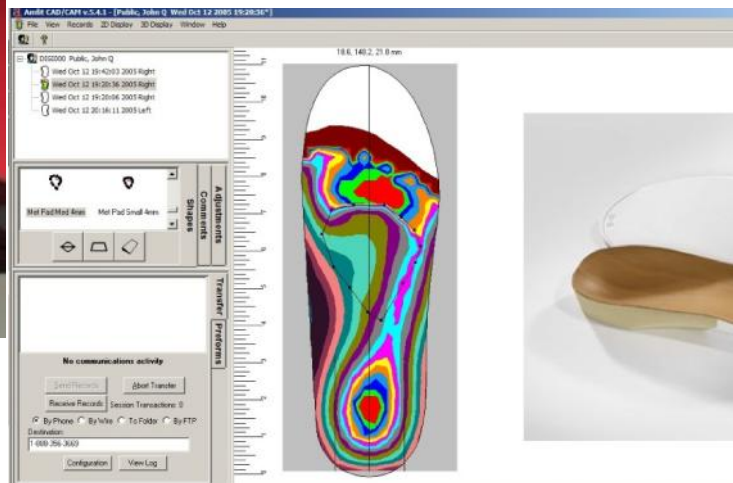
μ AmFit



Scanner μ
μ



AmFit





μ

μ

μ ()



, , μ ..



μ , μ

μ .



$\mu\mu$ μ μ



μ . μ μ μ .

