

Scientific Research Project

Biomechanical Analyses

at the



Final Report

Middle & Long Distance

Race Walk, Steeple

**Biomechanical analyses of selected events at the
12th IAAF World Championships in Athletics,
Berlin 15–23 August 2009**

A Project by the German Athletics Federation

(© Deutscher Leichtathletik-Verband, Alsfelder Strasse 27, 64289 Darmstadt, Germany)

in co-operation with

IAT Leipzig

OSP Berlin

OSP Hessen

OSP Rheinland

Martin Luther-Universität Wittenberg-Halle



DLV Scientific Research Project

Deutscher
Leichtathletik-
Verband



IAT
Institut für Angewandte
Trainingswissenschaft



Olympiastützpunkte
Berlin
Hessen
Rheinland



MLU Halle-Wittenberg

Report-layout:

Helmar HOMMEL (DLV)

Biomechanics-Team:

Helmar HOMMEL (DLV, Project Co-ordinator • helmar.hommel@leichtathletik.de)

Marko BADURA (IAT Leipzig)

Dr. Luis MENDOZA (OSP Hessen)

Jörg BÖTTCHER (OSP Berlin)

Ralf MÜLLER (OSP Rheinland)

Dr. Ralf BUCKWITZ (OSP Berlin)

Eberhard NIXDORF (OSP Hessen)

Dr. Olaf ERNST (IAT Leipzig)

Dr. Bettina PERLT (IAT Leipzig)

Dr. Dieter GOHLITZ (IAT Leipzig)

Wilko SCHAA (IAT Leipzig)

Rolf GRAUBNER (Uni Halle)

Falk SCHADE (OSP Rheinland)

Regine ISELE (OSP Hessen)

Axel SCHLEICHARDT (IAT Leipzig)

Mirko LANDMANN (Uni Halle)

Anja STARKE (Uni Halle)

Dr. Frank LEHMANN (IAT Leipzig)



DLV Scientific Research Project



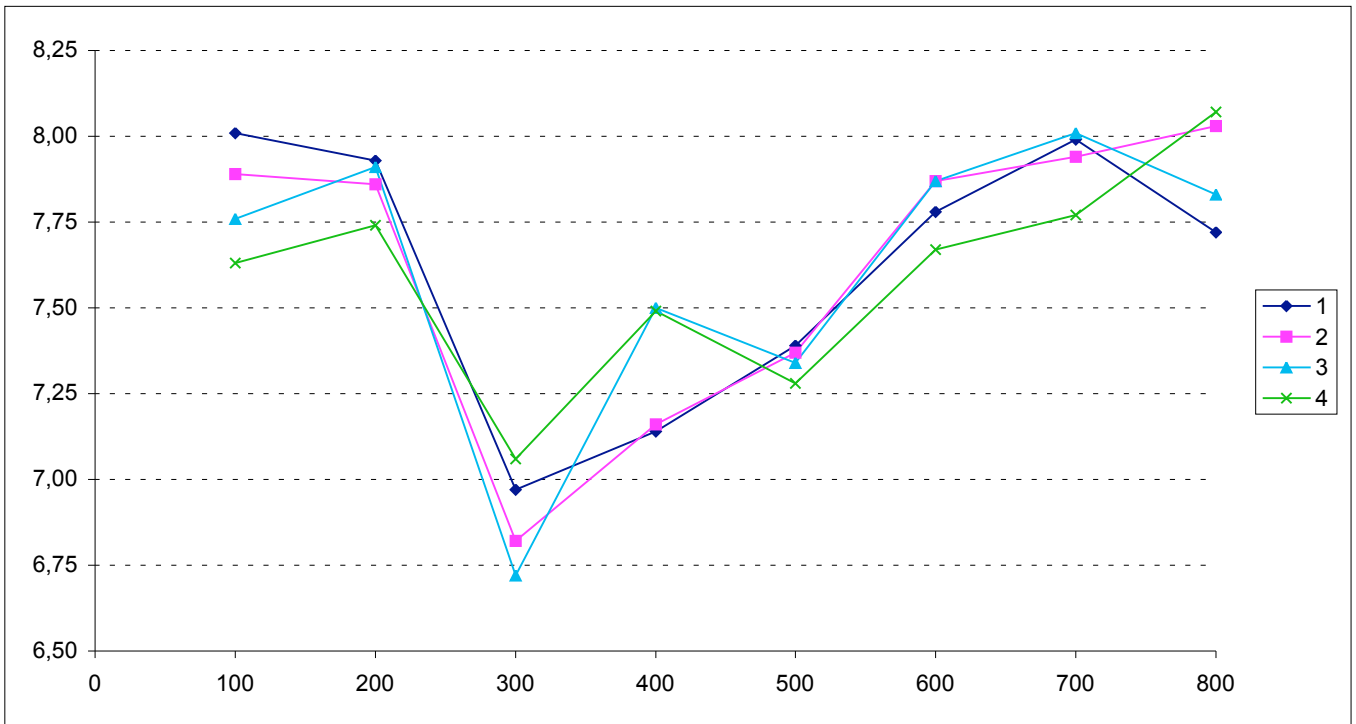
Race analysis 800m men

Berlin, 23.08.2009

- | | | | |
|------------------------|-------|-------------|----------|
| 1. Mulaudzi, Mbulaeni | (RSA) | 1:45,29 min | 7,60 m/s |
| 2. Yego, Alfred Kirwa | (KEN) | 1:45,35 min | 7,59 m/s |
| 3. Kamel, Yusuf Saad | (BRN) | 1:45,35 min | 7,59 m/s |
| 4. Borzakovskiy, Yuriy | (RUS) | 1:45,57 min | 7,58 m/s |

Weg [m]	Zeit	tdiff [s]	v [m/s]	Zeit	tdiff [s]	v [m/s]	Zeit	tdiff [s]	v [m/s]	Zeit	tdiff [s]	v [m/s]
100	12,48	12,48	8,01	12,68	12,68	7,89	12,89	12,89	7,76	13,10	13,10	7,63
200	25,09	12,61	7,93	25,41	12,73	7,86	25,54	12,65	7,91	26,02	12,92	7,74
300	39,44	14,35	6,97	40,07	14,66	6,82	40,42	14,88	6,72	40,18	14,16	7,06
400	53,44	14,00	7,14	54,04	13,97	7,16	53,76	13,34	7,50	53,54	13,36	7,49
500	1:06,97	13,53	7,39	1:07,60	13,56	7,37	1:07,39	13,63	7,34	1:07,28	13,74	7,28
600	1:19,82	12,85	7,78	1:20,31	12,71	7,87	1:20,10	12,71	7,87	1:20,31	13,03	7,67
700	1:32,34	12,52	7,99	1:32,90	12,59	7,94	1:32,58	12,48	8,01	1:33,18	12,87	7,77
800	1:45,29	12,95	7,72	1:45,35	12,45	8,03	1:45,35	12,77	7,83	1:45,57	12,39	8,07

	1. 400 m	2. 400 m	Diff	0-600 m	last 200 m	last 100 m
1)	53,44	51,85	-1.59	1:19,82	25,47	12,95
2)	54,04	51,31	-2.73	1:20,31	25,04	12,45
3)	53,76	51,59	-2.17	1:20,10	25,25	12,77
4)	53,54	52,03	-1.51	1:20,31	25,26	12,39





DLV Scientific Research Project



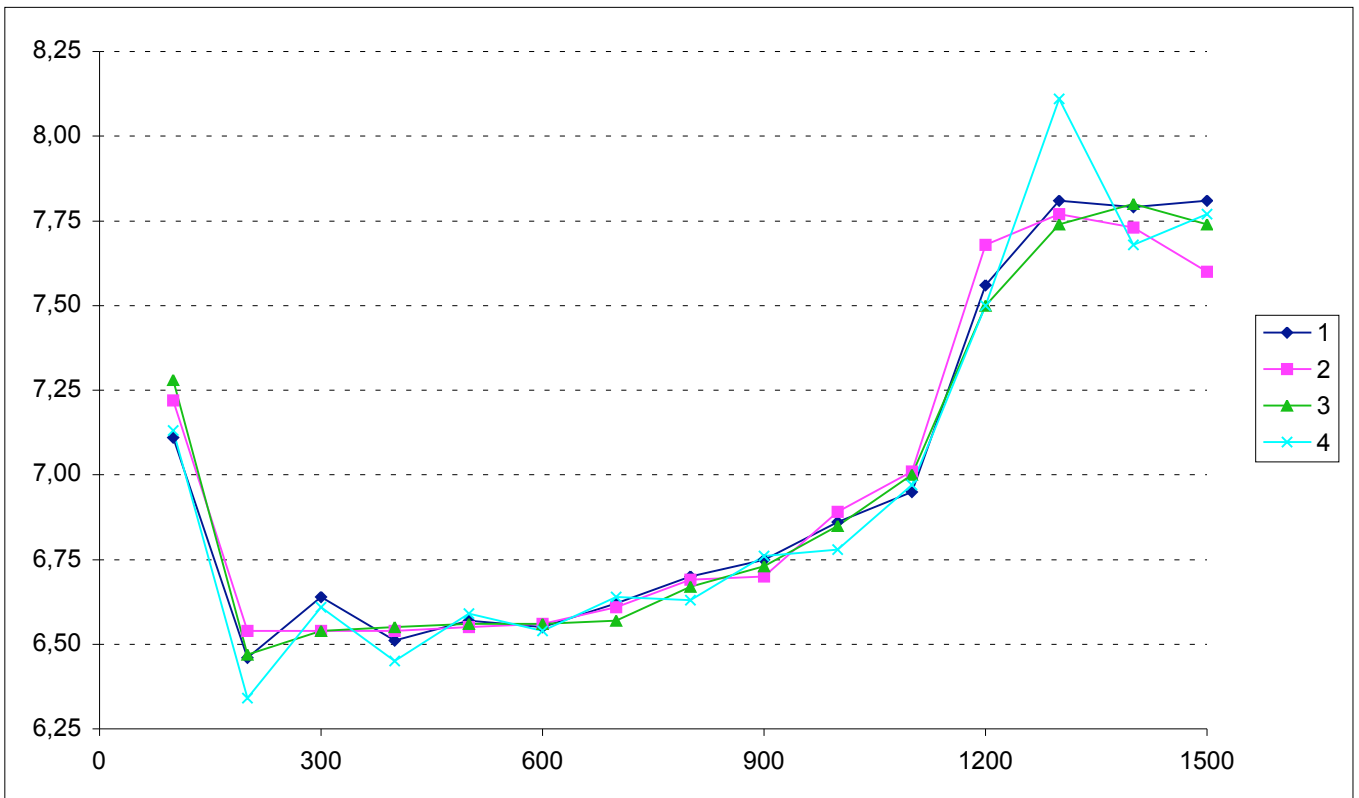
Race analysis 1500m men

Berlin, 19.08.2009

- | | | | |
|----------------------|-------|-------------|----------|
| 1. Kamel, Yusuf Saad | (BRN) | 3:35,93 min | 6,95 m/s |
| 2. Mekonnen, Deresse | (ÄTH) | 3:36,01 min | 6,94 m/s |
| 3. Lagat, Bernard | (USA) | 3:36,20 min | 6,94 m/s |
| 4. Kiprop, Asbel | (KEN) | 3:36,47 min | 6,93 m/s |

[m]	time	tdiff	v	time	tdiff	v	time	tdiff	v	time	tdiff	v
	[s]	[s]	[m/s]		[s]	[m/s]		[s]	[m/s]		[s]	[m/s]
100	14,07	14,07	7,11	13,85	13,85	7,22	13,74	13,74	7,28	14,02	14,02	7,13
200	29,54	15,47	6,46	29,14	15,29	6,54	29,20	15,46	6,47	29,80	15,78	6,34
300	44,61	15,07	6,64	44,44	15,30	6,54	44,50	15,30	6,54	44,92	15,12	6,61
400	59,96	15,35	6,51	59,74	15,30	6,54	59,76	15,26	6,55	1:00,42	15,50	6,45
500	1:15,18	15,22	6,57	1:15,00	15,26	6,55	1:15,01	15,25	6,56	1:15,60	15,18	6,59
600	1:30,44	15,26	6,55	1:30,24	15,24	6,56	1:30,25	15,24	6,56	1:30,88	15,28	6,54
700	1:45,55	15,11	6,62	1:45,38	15,14	6,61	1:45,46	15,21	6,57	1:45,95	15,07	6,64
800	2:00,48	14,93	6,70	2:00,32	14,94	6,69	2:00,46	15,00	6,67	2:01,03	15,08	6,63
900	2:15,30	14,82	6,75	2:15,24	14,92	6,70	2:15,32	14,86	6,73	2:15,82	14,79	6,76
1000	2:29,88	14,58	6,86	2:29,76	14,52	6,89	2:29,92	14,60	6,85	2:30,58	14,76	6,78
1100	2:44,26	14,38	6,95	2:44,02	14,26	7,01	2:44,20	14,28	7,00	2:44,92	14,34	6,97
1200	2:57,48	13,22	7,56	2:57,04	13,02	7,68	2:57,54	13,34	7,50	2:58,25	13,33	7,50
1300	3:10,29	12,81	7,81	3:09,91	12,87	7,77	3:10,46	12,92	7,74	3:10,58	12,33	8,11
1400	3:23,12	12,83	7,79	3:22,85	12,94	7,73	3:23,28	12,82	7,80	3:23,60	13,02	7,68
1500	3:35,93	12,81	7,81	3:36,01	13,16	7,60	3:36,20	12,92	7,74	3:36,47	12,87	7,77

	1. 400 m	2. 400 m	3. 400 m	last 300 m	last 100 m
1)	59,96	1:00,52	57,00	38,45	12,81
2)	59,74	1:00,58	56,72	38,97	13,16
3)	59,76	1:00,70	57,08	38,66	12,92
4)	1:00,42	1:00,61	57,22	38,22	12,87

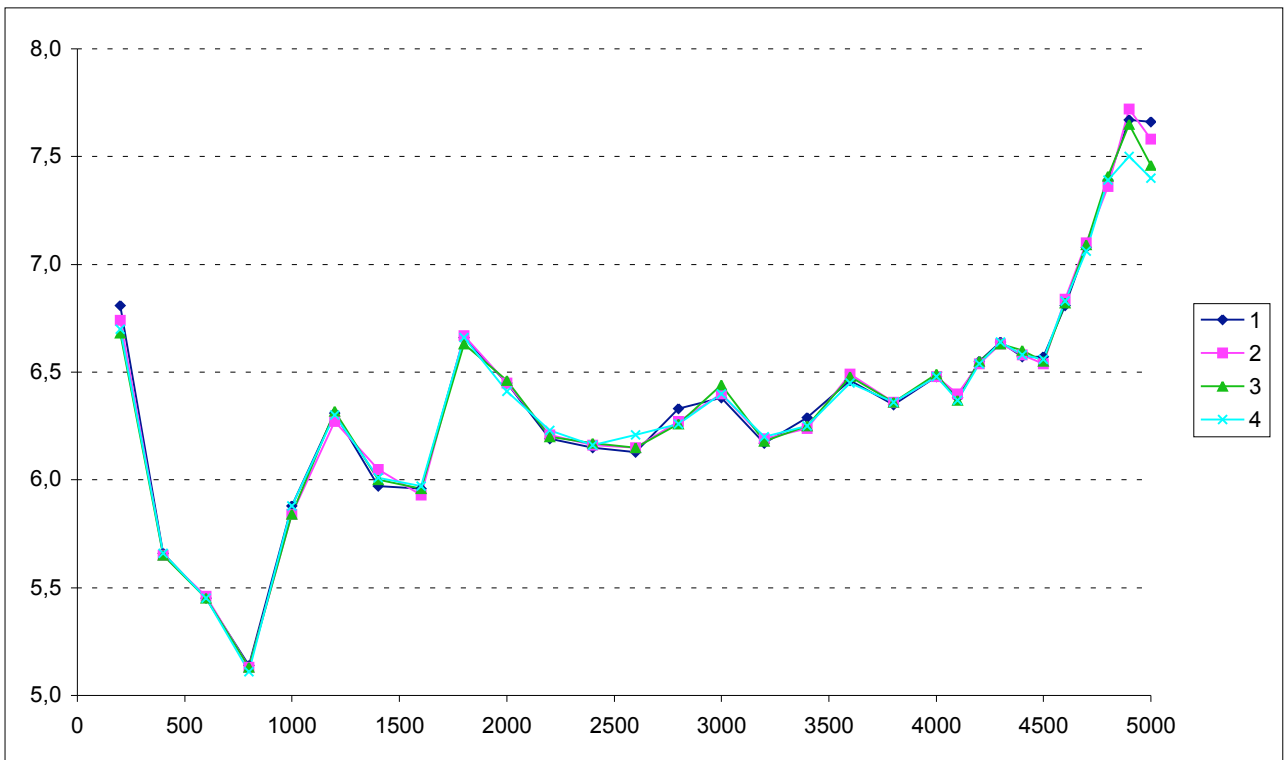


Race analysis 5000m men
Berlin, 23.08.2009

1. Bekele, Kenenisa	(ETH)	13:17,09 min	6,27 m/s
2. Lagat, Bernard	(USA)	13:17,33 min	6,27 m/s
3. C'Kurui, James Kwalia	(QAT)	13:17,78 min	6,27 m/s
4. Kipsiro, Moses Ndiema	(UGA)	13:18,11 min	6,26 m/s

Weg [m]	Zeit	tdiff [s]	v [m/s]	Zeit	tdiff [s]	v [m/s]	Zeit	tdiff [s]	v [m/s]	Zeit	tdiff [s]	v [m/s]
200	29,39	29,39	6,81	29,68	29,68	6,74	29,96	29,96	6,68	29,87	29,87	6,70
400	1:04,71	35,32	5,66	1:05,09	35,41	5,65	1:05,33	35,37	5,65	1:05,18	35,31	5,66
600	1:41,39	36,68	5,45	1:41,73	36,64	5,46	1:42,01	36,68	5,45	1:41,88	36,70	5,45
800	2:20,33	38,94	5,14	2:20,72	38,99	5,13	2:20,97	38,96	5,13	2:21,03	39,15	5,11
1000	2:54,35	34,02	5,88	2:54,99	34,27	5,84	2:55,19	34,22	5,84	2:55,07	34,04	5,88
1200	3:26,07	31,72	6,31	3:26,88	31,89	6,27	3:26,86	31,67	6,32	3:26,83	31,76	6,30
1400	3:59,58	33,51	5,97	3:59,96	33,08	6,05	4:00,17	33,31	6,00	4:00,13	33,30	6,01
1600	4:33,12	33,54	5,96	4:33,67	33,71	5,93	4:33,73	33,56	5,96	4:33,65	33,52	5,97
1800	5:03,16	30,04	6,66	5:03,64	29,97	6,67	5:03,88	30,15	6,63	5:03,66	30,01	6,66
2000	5:34,17	31,01	6,45	5:34,63	30,99	6,45	5:34,85	30,97	6,46	5:34,87	31,21	6,41
2200	6:06,48	32,31	6,19	6:06,86	32,23	6,21	6:07,10	32,25	6,20	6:06,99	32,12	6,23
2400	6:39,02	32,54	6,15	6:39,31	32,45	6,16	6:39,51	32,41	6,17	6:39,45	32,46	6,16
2600	7:11,67	32,65	6,13	7:11,81	32,50	6,15	7:12,03	32,52	6,15	7:11,65	32,20	6,21
2800	7:43,27	31,60	6,33	7:43,69	31,88	6,27	7:43,99	31,96	6,26	7:43,59	31,94	6,26
3000	8:14,63	31,36	6,38	8:14,93	31,24	6,40	8:15,04	31,05	6,44	8:14,82	31,23	6,40
3200	8:47,05	32,42	6,17	8:47,23	32,30	6,19	8:47,41	32,37	6,18	8:47,09	32,27	6,20
3400	9:18,87	31,82	6,29	9:19,26	32,03	6,24	9:19,41	32,00	6,25	9:19,11	32,02	6,25
3600	9:49,84	30,97	6,46	9:50,10	30,84	6,49	9:50,29	30,88	6,48	9:50,10	30,99	6,45
3800	10:21,35	31,51	6,35	10:21,55	31,45	6,36	10:21,75	31,46	6,36	10:21,56	31,46	6,36
4000	10:52,22	30,87	6,48	10:52,41	30,86	6,48	10:52,57	30,82	6,49	10:52,42	30,86	6,48
4100	11:07,90	15,68	6,38	11:08,04	15,63	6,40	11:08,26	15,69	6,37	11:08,11	15,69	6,37
4200	11:23,17	15,27	6,55	11:23,33	15,29	6,54	11:23,53	15,27	6,55	11:23,41	15,30	6,54
4300	11:38,23	15,06	6,64	11:38,42	15,09	6,63	11:38,61	15,08	6,63	11:38,47	15,06	6,64
4400	11:53,46	15,23	6,57	11:53,61	15,19	6,58	11:53,76	15,15	6,60	11:53,66	15,19	6,58
4500	12:08,67	15,21	6,57	12:08,89	15,28	6,54	12:09,03	15,27	6,55	12:08,90	15,24	6,56
4600	12:23,35	14,68	6,81	12:23,50	14,61	6,84	12:23,69	14,66	6,82	12:23,55	14,65	6,83
4700	12:37,47	14,12	7,08	12:37,59	14,09	7,10	12:37,79	14,10	7,09	12:37,71	14,16	7,06
4800	12:51,01	13,54	7,39	12:51,18	13,59	7,36	12:51,29	13,50	7,41	12:51,25	13,54	7,39
4900	13:04,04	13,03	7,67	13:04,13	12,95	7,72	13:04,37	13,08	7,65	13:04,59	13,34	7,50
5000	13:17,09	13,05	7,66	13:17,33	13,20	7,58	13:17,78	13,41	7,46	13:18,11	13,52	7,40

0-3000 m	4. 1000 m	last 1000 m	last 400 m	last 100 m
1) 8:14,63	2:37,59	2:24,87	53,74	13,05
2) 8:14,93	2:37,48	2:24,92	53,83	13,20
3) 8:15,04	2:37,53	2:25,21	54,09	13,41
4) 8:14,82	2:37,60	2:25,69	54,56	13,52



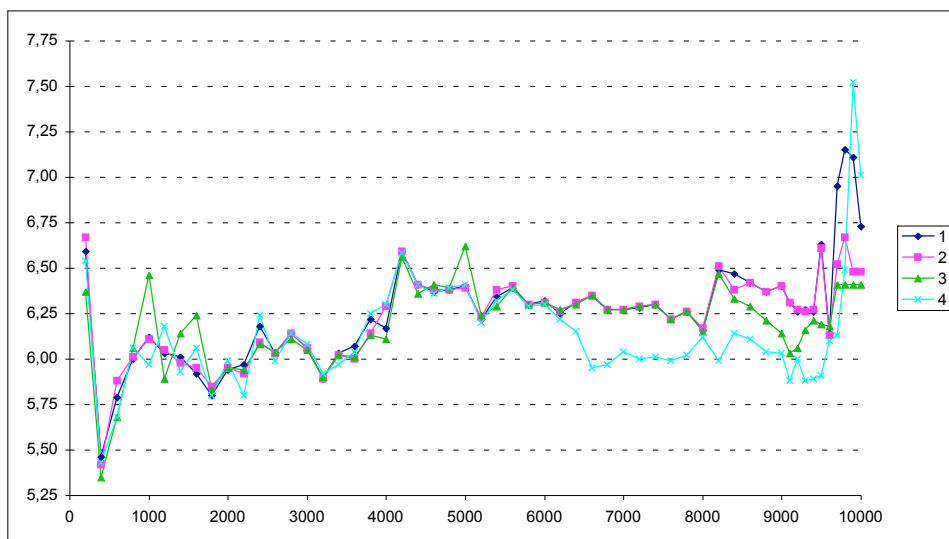
Race analysis 10000m men

Berlin, 17.08.2009

- | | | | |
|------------------------|-------|--------------|----------|
| 1. Bekele, Kenenisa | (ETH) | 26:46,31 min | 6,23 m/s |
| 2. Tadese, Zersenay | (ERI) | 26:50,12 min | 6,21 m/s |
| 3. Masai, Moses Ndiema | (KEN) | 26:57,39 min | 6,18 m/s |
| 4. Merga, Imane | (ETH) | 27:15,94 min | 6,11 m/s |

[m]	time	tdiff	v	time	tdiff	v	time	tdiff	v	time	tdiff	v
[m]	[s]	[s]	[m/s]	[s]	[s]	[m/s]	[s]	[s]	[m/s]	[s]	[s]	[m/s]
200	30,33	30,33	6,59	29,99	29,99	6,67	31,42	31,42	6,37	30,56	30,56	6,54
400	1:06,97	36,64	5,46	1:06,86	36,87	5,42	1:08,82	37,40	5,35	1:07,42	36,86	5,43
600	1:41,52	34,55	5,79	1:40,87	34,01	5,88	1:44,03	35,21	5,68	1:42,62	35,20	5,68
800	2:14,88	33,36	6,00	2:14,17	33,30	6,01	2:17,03	33,00	6,06	2:15,62	33,00	6,06
1000	2:47,54	32,66	6,12	2:46,89	32,72	6,11	2:47,98	30,95	6,46	2:49,14	33,52	5,97
1200	3:20,70	33,16	6,03	3:19,96	33,07	6,05	3:21,94	33,96	5,89	3:21,52	32,38	6,18
1400	3:54,00	33,30	6,01	3:53,40	33,44	5,98	3:54,52	32,58	6,14	3:55,24	33,72	5,93
1600	4:27,76	33,76	5,92	4:27,02	33,62	5,95	4:26,59	32,07	6,24	4:28,23	32,99	6,06
1800	5:02,23	34,47	5,80	5:01,22	34,20	5,85	5:00,92	34,33	5,83	5:02,71	34,48	5,80
2000	5:35,92	33,69	5,94	5:34,83	33,61	5,95	5:34,56	33,64	5,95	5:36,11	33,40	5,99
2200	6:09,42	33,50	5,97	6:08,62	33,79	5,92	6:08,23	33,67	5,94	6:10,61	34,50	5,80
2400	6:41,79	32,37	6,18	6:41,45	32,83	6,09	6:41,11	32,88	6,08	6:42,64	32,03	6,24
2600	7:14,96	33,17	6,03	7:14,62	33,17	6,03	7:14,25	33,14	6,04	7:16,04	33,40	5,99
2800	7:47,55	32,59	6,14	7:47,20	32,58	6,14	7:47,01	32,76	6,11	7:48,60	32,56	6,14
3000	8:20,54	32,99	6,06	8:20,22	33,02	6,06	8:20,07	33,06	6,05	8:21,47	32,87	6,08
3200	8:54,48	33,94	5,89	8:54,17	33,95	5,89	8:53,97	33,90	5,90	8:55,28	33,81	5,92
3400	9:27,67	33,19	6,03	9:27,38	33,21	6,02	9:27,18	33,21	6,02	9:28,77	33,49	5,97
3600	10:00,60	32,93	6,07	10:00,70	33,32	6,00	10:00,44	33,26	6,01	10:01,86	33,09	6,04
3800	10:32,78	32,18	6,22	10:33,25	32,55	6,14	10:33,06	32,62	6,13	10:33,88	32,02	6,25
4000	11:05,22	32,44	6,17	11:05,06	31,81	6,29	11:05,77	32,71	6,11	11:05,61	31,73	6,30
4200	11:35,57	30,35	6,59	11:35,40	30,34	6,59	11:36,25	30,48	6,56	11:36,01	30,40	6,58
4400	12:06,78	31,21	6,41	12:06,58	31,18	6,41	12:07,69	31,44	6,36	12:07,20	31,19	6,41
4600	12:38,19	31,41	6,37	12:37,95	31,37	6,38	12:38,90	31,21	6,41	12:38,63	31,43	6,36
4800	13:09,52	31,33	6,38	13:09,32	31,37	6,38	13:10,22	31,32	6,39	13:09,92	31,29	6,39
5000	13:40,75	31,23	6,40	13:40,60	31,28	6,39	13:40,45	30,23	6,62	13:41,12	31,20	6,41
5200	14:12,92	32,17	6,22	14:12,71	32,11	6,23	14:12,48	32,03	6,24	14:13,37	32,25	6,20
5400	14:44,48	31,56	6,34	14:44,05	31,34	6,38	14:44,27	31,79	6,29	14:45,02	31,65	6,32
5600	15:15,78	31,30	6,39	15:15,28	31,23	6,40	15:15,56	31,29	6,39	15:16,39	31,37	6,38
5800	15:47,53	31,75	6,30	15:47,04	31,76	6,30	15:47,30	31,74	6,30	15:48,18	31,79	6,29
6000	16:19,17	31,64	6,32	16:18,75	31,71	6,31	16:19,00	31,70	6,31	16:19,93	31,75	6,30
6200	16:51,16	31,99	6,25	16:50,71	31,96	6,26	16:50,92	31,92	6,27	16:52,08	32,15	6,22
6400	17:22,84	31,68	6,31	17:22,43	31,72	6,31	17:22,66	31,74	6,30	17:24,59	32,51	6,15
6600	17:54,36	31,52	6,35	17:53,92	31,49	6,35	17:54,14	31,48	6,35	17:58,18	33,59	5,95
6800	18:26,27	31,91	6,27	18:25,83	31,91	6,27	18:26,05	31,91	6,27	18:31,67	33,49	5,97
7000	18:58,15	31,88	6,27	18:57,73	31,90	6,27	18:57,94	31,89	6,27	19:04,77	33,10	6,04
7200	19:29,99	31,84	6,28	19:29,55	31,82	6,29	19:29,76	31,82	6,29	19:38,09	33,32	6,00
7400	20:01,75	31,76	6,30	20:01,32	31,77	6,30	20:01,53	31,77	6,30	20:11,39	33,30	6,01
7600	20:33,91	32,16	6,22	20:33,45	32,13	6,22	20:33,68	32,15	6,22	20:44,77	33,38	5,99
7800	21:05,85	31,94	6,26	21:05,41	31,96	6,26	21:05,62	31,94	6,26	21:18,02	33,25	6,02
8000	21:38,33	32,48	6,16	21:37,80	32,39	6,17	21:38,14	32,52	6,15	21:50,72	32,70	6,12
8200	22:09,14	30,81	6,49	22:08,54	30,74	6,51	22:09,03	30,89	6,47	22:24,09	33,37	5,99
8400	22:40,07	30,93	6,47	22:39,88	31,34	6,38	22:40,64	31,61	6,33	22:56,64	32,55	6,14
8600	23:11,24	31,17	6,42	23:11,04	31,16	6,42	23:12,46	31,82	6,29	23:29,36	32,72	6,11
8800	23:42,65	31,41	6,37	23:42,46	31,42	6,37	23:44,68	32,22	6,21	24:02,48	33,12	6,04
9000	24:13,91	31,26	6,40	24:13,73	31,27	6,40	24:17,24	32,56	6,14	24:35,64	33,16	6,03
9100	24:29,76	15,85	6,31	24:29,57	15,84	6,31	24:33,82	16,58	6,03	24:52,66	17,02	5,88
9200	24:45,73	15,97	6,26	24:45,53	15,96	6,27	24:50,32	16,50	6,06	25:09,33	16,67	6,00
9300	25:01,68	15,95	6,27	25:01,50	15,97	6,26	25:06,56	16,24	6,16	25:26,34	17,01	5,88
9400	25:17,66	15,98	6,26	25:17,46	15,96	6,27	25:22,66	16,10	6,21	25:43,32	16,98	5,89
9500	25:32,75	15,09	6,63	25:32,59	15,13	6,61	25:38,82	16,16	6,19	26:00,25	16,93	5,91
9600	25:49,03	16,28	6,14	25:48,91	16,32	6,13	25:55,01	16,19	6,18	26:16,65	16,40	6,10
9700	26:03,41	14,38	6,95	26:04,25	15,34	6,52				26:32,96	16,31	6,13
9800	26:17,39	13,98	7,15	26:19,25	15,00	6,67				26:48,37	15,41	6,49
9900	26:31,45	14,06	7,11	26:34,68	15,43	6,48				27:01,67	13,30	7,52
10000	26:46,31	14,86	6,73	26:50,12	15,44	6,48	26:57,39	1:02,38	6,41	27:15,94	14,27	7,01

- | | | | | | |
|-------------|-----------|----------|-------------|------------|------------|
| 1. 5000 m | 2. 5000 m | 0-3000 m | last 1000 m | last 400 m | last 100 m |
| 1) 13:40,75 | 13:05,56 | 8:20,54 | 2:32,40 | 57,28 | 14,86 |
| 2) 13:40,60 | 13:09,52 | 8:20,22 | 2:36,39 | 1:01,21 | 15,44 |
| 3) 13:40,45 | 13:16,94 | 8:20,07 | 2:40,15 | 1:02,38 | |
| 4) 13:41,12 | 13:34,82 | 8:21,47 | 2:40,30 | 59,29 | 14,27 |





DLV Scientific Research Project

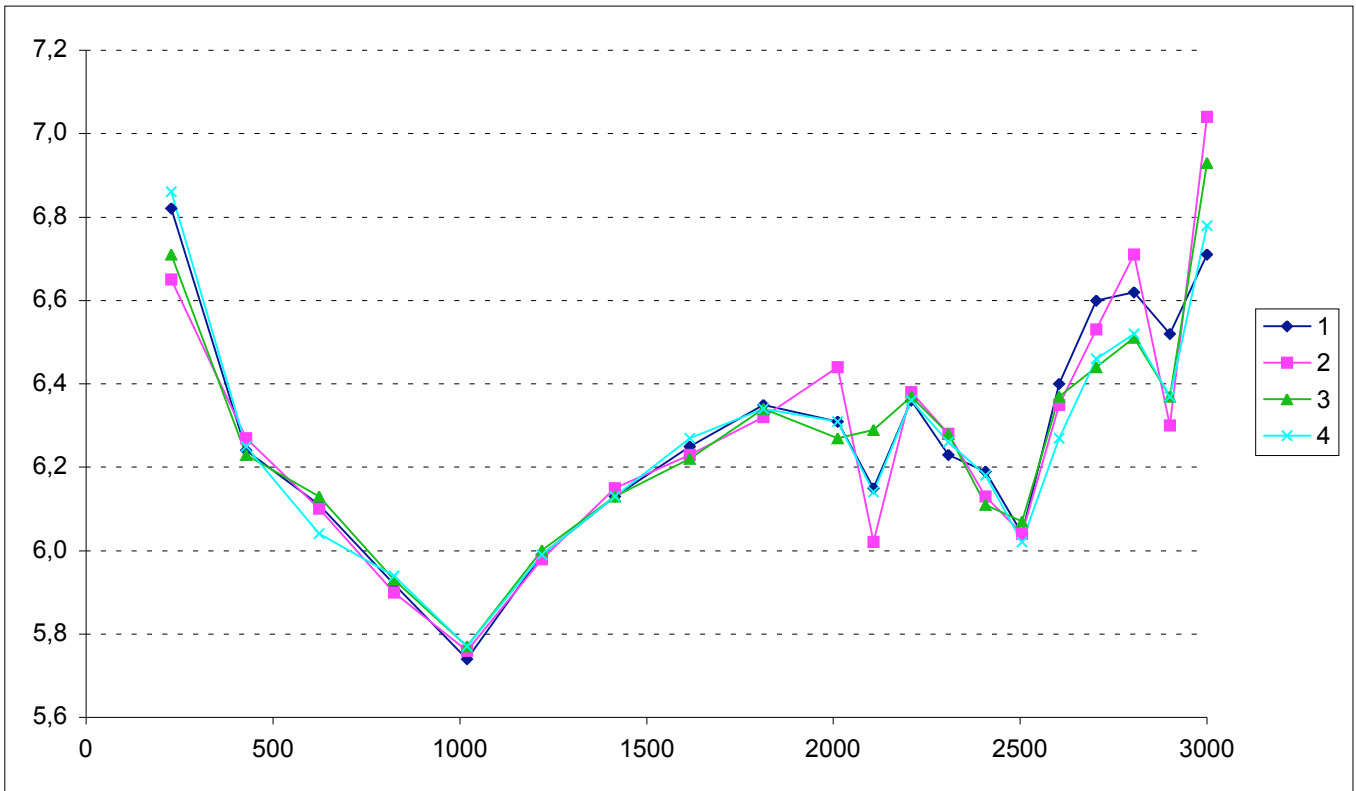


Race analysis 3000m steeple chase men

Berlin, 18.08.2009

- 1. Kemboi, Ezekiel (KEN) 8:00,43 min 6,24 m/s
- 2. Mateelong, Richard Kipkemboi (KEN) 8:00,89 min 6,24 m/s
- 3. Tahri, Bouabdellah (FRA) 8:01,18 min 6,23 m/s
- 4. Koech, Paul Kipsiele (KEN) 8:01,26 min 6,23 m/s

[m]	time	tdiff	v	time	tdiff	v	time	tdiff	v	time	tdiff	v
	[s]	[s]	[m/s]	[s]	[s]	[m/s]	[s]	[s]	[m/s]	[s]	[s]	[m/s]
228	33,43	33,43	6,82	34,28	34,28	6,65	34,00	34,00	6,71	33,24	33,24	6,86
428	1:05,48	32,05	6,24	1:06,17	31,89	6,27	1:06,10	32,10	6,23	1:05,26	32,02	6,25
624	1:37,54	32,06	6,11	1:38,30	32,13	6,10	1:38,08	31,98	6,13	1:37,72	32,46	6,04
824	2:11,35	33,81	5,92	2:12,22	33,92	5,90	2:11,81	33,73	5,93	2:11,38	33,66	5,94
1020	2:45,51	34,16	5,74	2:46,24	34,02	5,76	2:45,78	33,97	5,77	2:45,34	33,96	5,77
1220	3:18,91	33,40	5,99	3:19,66	33,42	5,98	3:19,12	33,34	6,00	3:18,72	33,38	5,99
1416	3:50,90	31,99	6,13	3:51,51	31,85	6,15	3:51,09	31,97	6,13	3:50,70	31,98	6,13
1616	4:22,89	31,99	6,25	4:23,63	32,12	6,23	4:23,24	32,15	6,22	4:22,62	31,92	6,27
1812	4:53,78	30,89	6,35	4:54,62	30,99	6,32	4:54,14	30,90	6,34	4:53,54	30,92	6,34
2012	5:25,47	31,69	6,31	5:25,70	31,08	6,44	5:26,05	31,91	6,27	5:25,25	31,71	6,31
2108	5:41,08	15,61	6,15	5:41,66	15,96	6,02	5:41,32	15,27	6,29	5:40,88	15,63	6,14
2208	5:56,80	15,72	6,36	5:57,34	15,68	6,38	5:57,01	15,69	6,37	5:56,60	15,72	6,36
2308	6:12,84	16,04	6,23	6:13,27	15,93	6,28	6:12,94	15,93	6,28	6:12,58	15,98	6,26
2408	6:28,99	16,15	6,19	6:29,57	16,30	6,13	6:29,31	16,37	6,11	6:28,77	16,19	6,18
2504	6:44,89	15,90	6,04	6:45,46	15,89	6,04	6:45,12	15,81	6,07	6:44,72	15,95	6,02
2604	7:00,52	15,63	6,40	7:01,22	15,76	6,35	7:00,82	15,70	6,37	7:00,66	15,94	6,27
2704	7:15,68	15,16	6,60	7:16,54	15,32	6,53	7:16,35	15,53	6,44	7:16,13	15,47	6,46
2804	7:30,79	15,11	6,62	7:31,45	14,91	6,71	7:31,70	15,35	6,51	7:31,46	15,33	6,52
2900	7:45,52	14,73	6,52	7:46,68	15,23	6,30	7:46,76	15,06	6,37	7:46,52	15,06	6,37
3000	8:00,43	14,91	6,71	8:00,89	14,21	7,04	8:01,18	14,42	6,93	8:01,26	14,74	6,78





DLV Scientific Research Project



Race analysis marathon men

Berlin, 22.08.2009

- 1. Kirui, Abel (KEN) 2:06:54 min 5,54 m/s
- 2. Mutai, Emmanuel Kipchirchir (KEN) 2:07:48 min 5,50 m/s
- 3. Kebede, Tsegay (ETH) 2:08:35 min 5,47 m/s
- 4. Tsegay, Yemane (ETH) 2:08:42 min 5,46 m/s

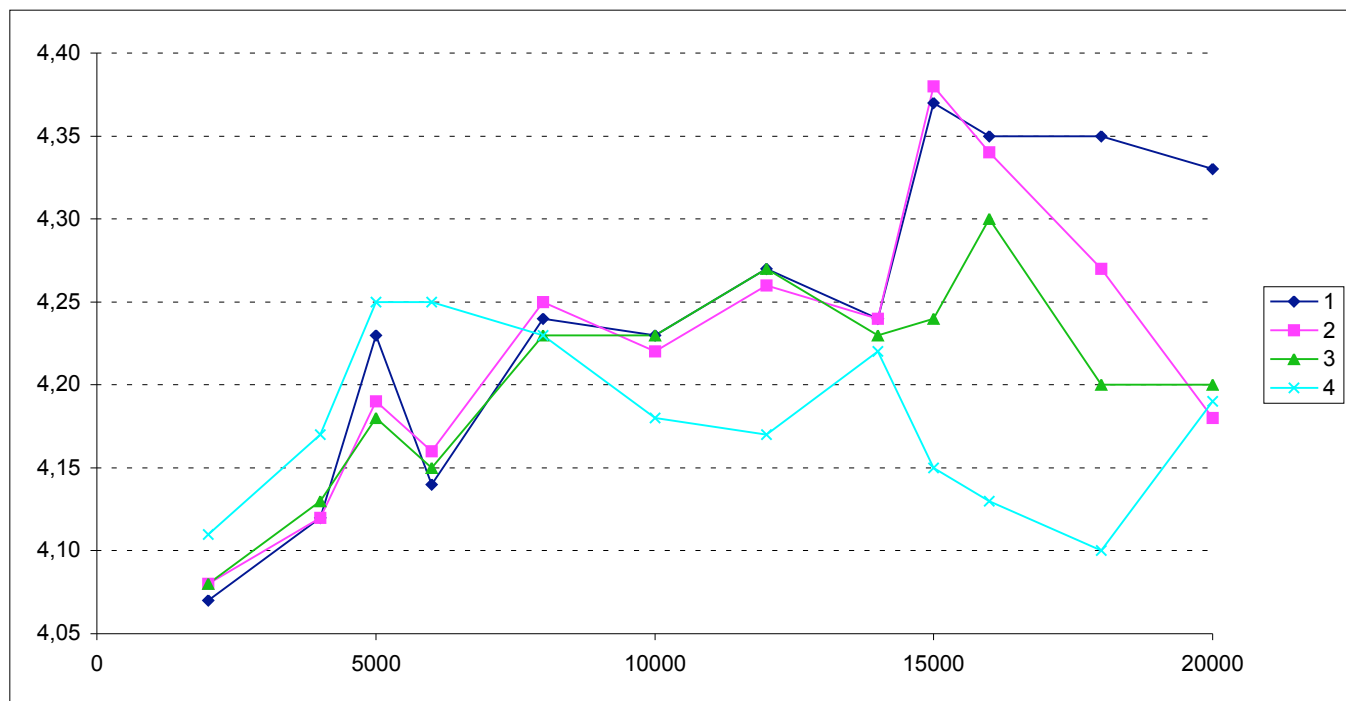
[m]	time	tdiff	v	time	tdiff	v	time	tdiff	v	time	tdiff	v
	[min]	[min]	[m/s]	[min]	[min]	[m/s]	[min]	[min]	[m/s]	[min]	[min]	[m/s]
5000	15:10	15:10	5,49	15:10	15:10	5,49	15:10	15:10	5,49	15:10	15:10	5,49
10000	30:09	14:59	5,56	30:10	15:00	5,56	30:09	14:59	5,56	30:09	14:59	5,56
15000	44:58	14:49	5,62	44:57	14:47	5,64	44:57	14:48	5,63	45:01	14:52	5,61
20000	59:42	14:44	5,66	59:42	14:45	5,65	59:42	14:45	5,65	1:00:10	15:09	5,50
21097	1:03:03	3:21	5,46	1:03:03	3:21	5,46	1:03:03	3:21	5,46	1:03:34	3:24	5,38
25000	1:14:38	11:35	5,62	1:14:38	11:35	5,62	1:14:43	11:40	5,58	1:15:27	11:53	5,47
30000	1:29:43	15:05	5,52	1:29:43	15:05	5,52	1:29:51	15:08	5,51	1:30:26	14:59	5,56
35000	1:44:56	15:13	5,48	1:44:56	15:13	5,48	1:45:18	15:27	5,39	1:46:03	15:37	5,34
40000	2:00:10	15:14	5,47	2:00:30	15:34	5,35	2:01:16	15:58	5,22	2:01:28	15:25	5,41
42195	2:06:54	6:44	5,43	2:07:48	7:18	5,01	2:08:35	7:19	5,00	2:08:42	7:14	5,06



Race analysis 20km race walk men Berlin, 15.08.2009

- | | | | |
|---------------------|-------|-------------|----------|
| 1. Borchin, Valeriy | (RUS) | 1:18:41 min | 4,24 m/s |
| 2. Wang, Hao | (CHN) | 1:19:06 min | 4,21 m/s |
| 3. Sánchez, Eder | (MEX) | 1:19:22 min | 4,20 m/s |
| 4. Rubino, Giorgio | (ITA) | 1:19:50 min | 4,18 m/s |

[m]	time	tdiff	v	time	tdiff	v	time	tdiff	v	time	tdiff	v
	[min]	[min]	[m/s]		[min]	[m/s]		[min]	[m/s]		[min]	[m/s]
2000	8:11	8:11	4,07	8:10	8:10	4,08	8:11	8:11	4,08	8:06	8:06	4,11
4000	16:17	8:05	4,12	16:15	8:05	4,12	16:15	8:04	4,13	16:06	7:59	4,17
5000	20:13	3:56	4,23	20:14	3:59	4,19	20:14	3:59	4,18	20:01	3:55	4,25
6000	24:15	4:02	4,14	24:14	4:00	4,16	24:15	4:01	4,15	23:56	3:55	4,25
8000	32:07	7:52	4,24	32:05	7:51	4,25	32:07	7:52	4,23	31:50	7:53	4,23
10000	40:00	7:53	4,23	39:59	7:54	4,22	40:00	7:53	4,23	39:48	7:58	4,18
12000	47:49	7:49	4,27	47:49	7:50	4,26	47:49	7:49	4,27	47:48	8:00	4,17
14000	55:40	7:51	4,24	55:41	7:52	4,24	55:41	7:53	4,23	55:42	7:54	4,22
15000	59:29	3:49	4,37	59:29	3:48	4,38	59:37	3:56	4,24	59:43	4:01	4,15
16000	1:03:19	3:50	4,35	1:03:19	3:50	4,34	1:03:30	3:53	4,30	1:03:45	4:02	4,13
18000	1:10:59	7:40	4,35	1:11:08	7:49	4,27	1:11:26	7:56	4,20	1:11:53	8:08	4,10
20000	1:18:41	7:42	4,33	1:19:06	7:58	4,18	1:19:22	7:56	4,20	1:19:50	7:57	4,19

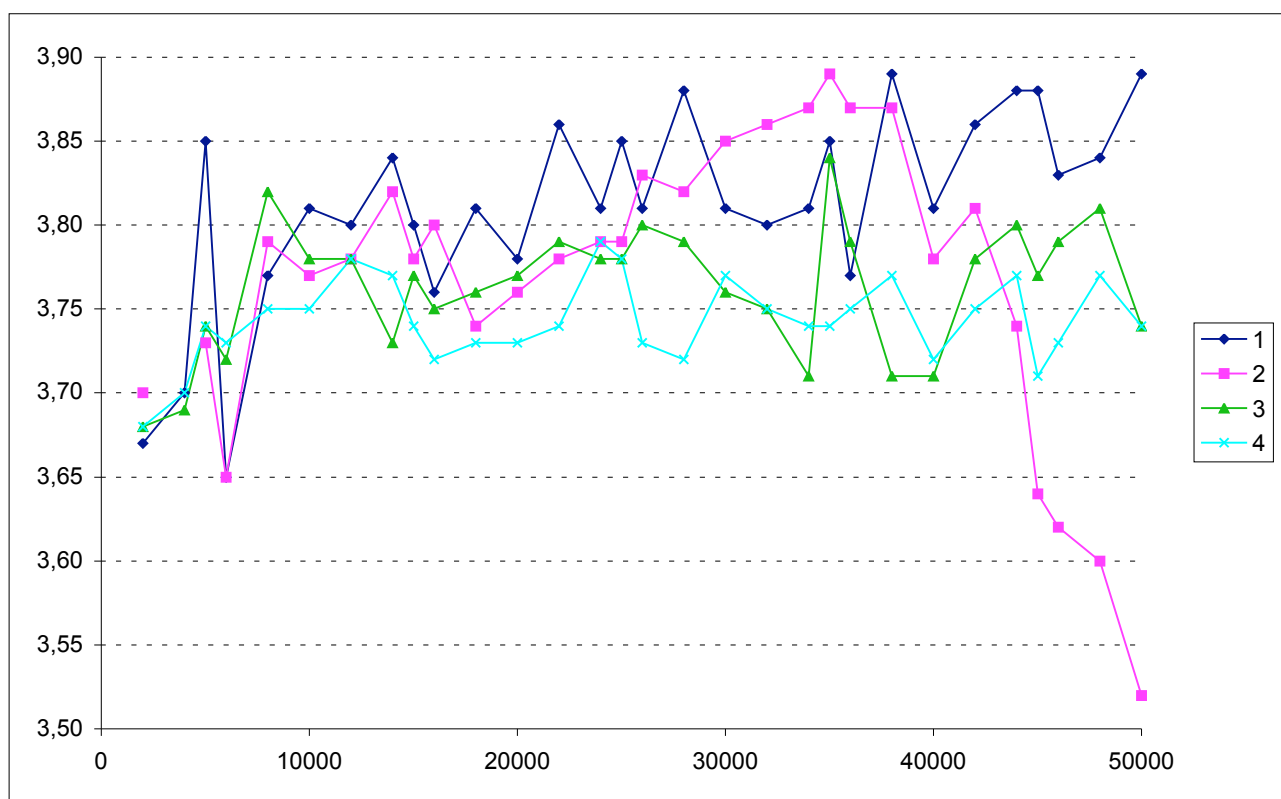


Race analysis 50km race walk men

Berlin, 21.08.2009

- | | | | |
|------------------------|-------|-------------|----------|
| 1. Kirdyapkin, Sergey | (RUS) | 3:38:35 min | 3,81 m/s |
| 2. Nymark, Trond | (NOR) | 3:41:16 min | 3,77 m/s |
| 3. García, Jesús Angel | (ESP) | 3:41:37 min | 3,76 m/s |
| 4. Sudol, Grzegorz | (POL) | 3:42:34 min | 3,74 m/s |

[m]	time	tdiff	v	time	tdiff	v	time	tdiff	v	time	tdiff	v
[m]	[min]	[min]	[m/s]	[min]	[min]	[m/s]	[min]	[min]	[m/s]	[min]	[min]	[m/s]
2000	9:05	9:05	3,67	9:01	9:01	3,70	9:04	9:04	3,68	9:04	9:04	3,68
4000	18:06	9:01	3,70				18:06	9:02	3,69	18:05	9:01	3,70
5000	22:26	4:20	3,85	22:25	13:24	3,73	22:34	4:28	3,74	22:33	4:28	3,74
6000	27:00	4:34	3,65	26:59	4:34	3,65	27:03	4:29	3,72	27:01	4:28	3,73
8000	35:51	8:51	3,77	35:46	8:47	3,79	35:47	8:44	3,82	35:54	8:53	3,75
10000	44:36	8:45	3,81	44:36	8:50	3,77	44:36	8:49	3,78	44:47	8:53	3,75
12000	53:22	8:46	3,80	53:25	8:49	3,78	53:25	8:49	3,78	53:36	8:49	3,78
14000	1:02:03	8:41	3,84	1:02:08	8:43	3,82	1:02:22	8:57	3,73	1:02:27	8:51	3,77
15000	1:06:26	4:23	3,80	1:06:32	4:24	3,78	1:06:47	4:25	3,77	1:06:54	4:27	3,74
16000	1:10:52	4:26	3,76	1:10:55	4:23	3,80	1:11:14	4:27	3,75	1:11:22	4:28	3,72
18000	1:19:37	8:44	3,81	1:19:51	8:55	3,74	1:20:05	8:51	3,76	1:20:18	8:56	3,73
20000	1:28:26	8:49	3,78	1:28:42	8:51	3,76	1:28:55	8:50	3,77	1:29:15	8:57	3,73
22000	1:37:04	8:38	3,86	1:37:31	8:49	3,78	1:37:43	8:48	3,79	1:38:09	8:54	3,74
24000	1:45:48	8:45	3,81	1:46:19	8:48	3,79	1:46:32	8:49	3,78	1:46:57	8:48	3,79
25000	1:50:08	4:20	3,85	1:50:43	4:24	3,79	1:50:57	4:25	3,78	1:51:22	4:25	3,78
26000	1:54:31	4:23	3,81	1:55:04	4:21	3,83	1:55:20	4:23	3,80	1:55:50	4:28	3,73
28000	2:03:07	8:36	3,88	2:03:47	8:43	3,82	2:04:08	8:48	3,79	2:04:47	8:57	3,72
30000	2:11:52	8:45	3,81	2:12:27	8:40	3,85	2:13:00	8:52	3,76	2:13:38	8:51	3,77
32000	2:20:38	8:46	3,80	2:21:05	8:38	3,86	2:21:53	8:53	3,75	2:22:32	8:54	3,75
34000	2:29:24	8:46	3,81	2:29:42	8:37	3,87	2:30:51	8:59	3,71			
35000	2:33:43	4:19	3,85	2:33:59	4:17	3,89	2:35:12	4:21	3,84	2:35:54	13:22	3,74
36000	2:38:08	4:25	3,77	2:38:17	4:18	3,87	2:39:36	4:24	3,79	2:40:20	4:26	3,75
38000	2:46:42	8:34	3,89	2:46:53	8:36	3,87	2:48:35	8:59	3,71	2:49:11	8:50	3,77
40000	2:55:27	8:45	3,81	2:55:42	8:49	3,78	2:57:34	8:59	3,71	2:58:08	8:57	3,72
42000	3:04:05	8:38	3,86	3:04:27	8:45	3,81	3:06:23	8:49	3,78	3:07:01	8:53	3,75
44000	3:12:40	8:35	3,88	3:13:21	8:54	3,74	3:15:09	8:46	3,80	3:15:52	8:51	3,77
45000	3:16:58	4:18	3,88	3:17:56	4:35	3,64	3:19:34	4:25	3,77	3:20:21	4:29	3,71
46000	3:21:19	4:21	3,83	3:22:33	4:37	3,62	3:23:58	4:24	3,79	3:24:49	4:28	3,73
48000	3:30:00	8:41	3,84	3:31:48	9:15	3,60	3:32:43	8:45	3,81	3:33:39	8:50	3,77
50000	3:38:35	8:35	3,89	3:41:16	9:28	3,52	3:41:37	8:54	3,74	3:42:34	8:55	3,74





DLV Scientific Research Project



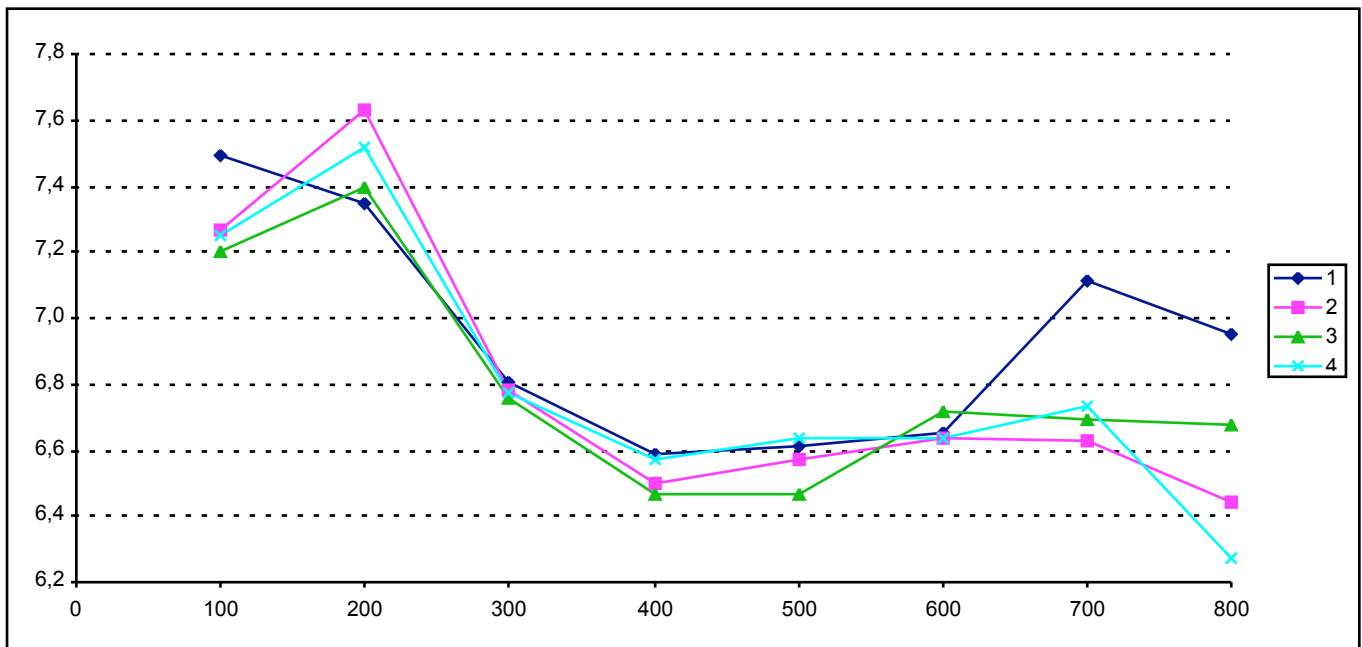
Race analysis 800m women

Berlin, 19.08.2009

1. Semenya, Caster	(RSA)	1:55,45 min	6,93 m/s
2. Busienei, Janeth Jepkosgei	(KEN)	1:57,90 min	6,79 m/s
3. Meadows, Jennifer	(GBR)	1:57,93 min	6,78 m/s
4. Krevsun, Yuliya	(UKR)	1:58,00 min	6,78 m/s

[m]	time	tdiff	v	time	tdiff	v	time	tdiff	v	time	tdiff	v
[m]	[s]	[s]	[m/s]	[s]	[s]	[m/s]	[s]	[s]	[m/s]	[s]	[s]	[m/s]
100	13,36	13,36	7,49	13,76	13,76	7,27	13,89	13,89	7,20	13,79	13,79	7,25
200	26,97	13,61	7,35	26,87	13,11	7,63	27,41	13,52	7,40	27,09	13,30	7,52
300	41,66	14,69	6,81	41,62	14,75	6,78	42,20	14,79	6,76	41,86	14,77	6,77
400	56,83	15,17	6,59	57,00	15,38	6,50	57,66	15,46	6,47	57,09	15,23	6,57
500	1:11,96	15,13	6,61	1:12,22	15,22	6,57	1:13,12	15,46	6,47	1:12,14	15,05	6,64
600	1:26,99	15,03	6,65	1:27,27	15,05	6,64	1:28,00	14,88	6,72	1:27,20	15,06	6,64
700	1:41,06	14,07	7,11	1:42,36	15,09	6,63	1:42,95	14,95	6,69	1:42,06	14,86	6,73
800	1:55,45	14,39	6,95	1:57,90	15,54	6,44	1:57,93	14,98	6,68	1:58,00	15,94	6,27

	1. 400 m	2. 400 m	diff	0-600 m	last 200 m	last 100 m
1)	56,83	58,62	1.79	1:26,99	28,46	14,39
2)	57,00	1:00,90	3.90	1:27,27	30,63	15,54
3)	57,66	1:00,27	2.61	1:28,00	29,93	14,98
4)	57,09	1:00,91	3.82	1:27,20	30,80	15,94





DLV Scientific Research Project



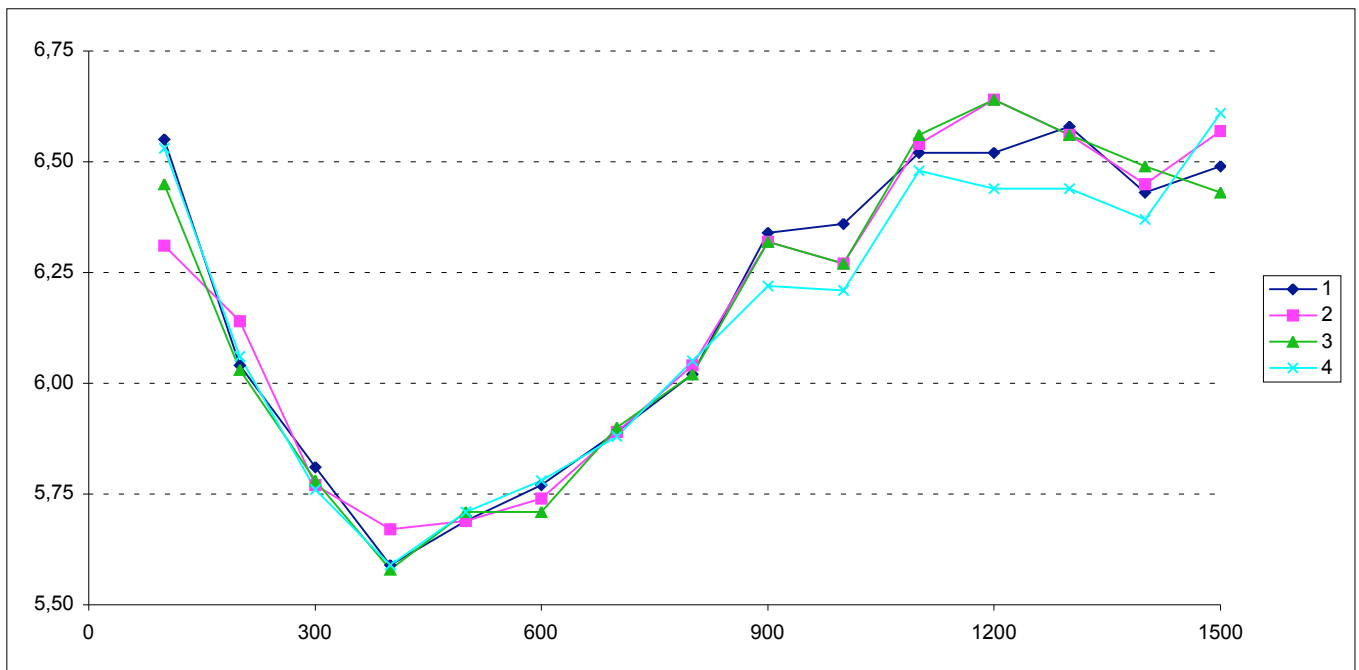
Race analysis 1500m women

Berlin, 23.08.2009

- | | | | |
|------------------------|-------|-------------|----------|
| 1. Jamal, Maryam Yusuf | (BRN) | 4:03,74 min | 6,15 m/s |
| 2. Dobriskey, Lisa | (GBR) | 4:03,75 min | 6,15 m/s |
| 3. Rowbury, Shannon | (USA) | 4:04,18 min | 6,14 m/s |
| 4. Fernández, Nuria | (ESP) | 4:04,91 min | 6,12 m/s |

[m]	time	tdiff	v	time	tdiff	v	time	tdiff	v	time	tdiff	v
	[s]	[s]	[m/s]		[s]	[m/s]		[s]	[m/s]		[s]	[m/s]
100	15,26	15,26	6,55	15,85	15,85	6,31	15,50	15,50	6,45	15,31	15,31	6,53
200	31,81	16,55	6,04	32,14	16,29	6,14	32,08	16,58	6,03	31,80	16,49	6,06
300	49,02	17,21	5,81	49,46	17,32	5,77	49,39	17,31	5,78	49,15	17,35	5,76
400	1:06,92	17,90	5,59	1:07,09	17,63	5,67	1:07,30	17,91	5,58	1:07,05	17,90	5,59
500	1:24,48	17,56	5,69	1:24,68	17,59	5,69	1:24,80	17,50	5,71	1:24,56	17,51	5,71
600	1:41,82	17,34	5,77	1:42,10	17,42	5,74	1:42,32	17,52	5,71	1:41,87	17,31	5,78
700	1:58,81	16,99	5,89	1:59,07	16,97	5,89	1:59,26	16,94	5,90	1:58,88	17,01	5,88
800	2:15,42	16,61	6,02	2:15,63	16,56	6,04	2:15,88	16,62	6,02	2:15,41	16,53	6,05
900	2:31,19	15,77	6,34	2:31,46	15,83	6,32	2:31,71	15,83	6,32	2:31,50	16,09	6,22
1000	2:46,92	15,73	6,36	2:47,42	15,96	6,27	2:47,65	15,94	6,27	2:47,61	16,11	6,21
1100	3:02,25	15,33	6,52	3:02,71	15,29	6,54	3:02,90	15,25	6,56	3:03,04	15,43	6,48
1200	3:17,59	15,34	6,52	3:17,78	15,07	6,64	3:17,97	15,07	6,64	3:18,56	15,52	6,44
1300	3:32,78	15,19	6,58	3:33,02	15,24	6,56	3:33,22	15,25	6,56	3:34,10	15,54	6,44
1400	3:48,34	15,56	6,43	3:48,52	15,50	6,45	3:48,62	15,40	6,49	3:49,79	15,69	6,37
1500	4:03,74	15,40	6,49	4:03,75	15,23	6,57	4:04,18	15,56	6,43	4:04,91	15,12	6,61

	1. 400 m	2. 400 m	3. 400 m	last 300 m	last 100 m
1)	1:06,92	1:08,50	1:02,17	46,15	15,40
2)	1:07,09	1:08,54	1:02,15	45,97	15,23
3)	1:07,30	1:08,58	1:02,09	46,21	15,56
4)	1:07,05	1:08,36	1:03,15	46,35	15,12





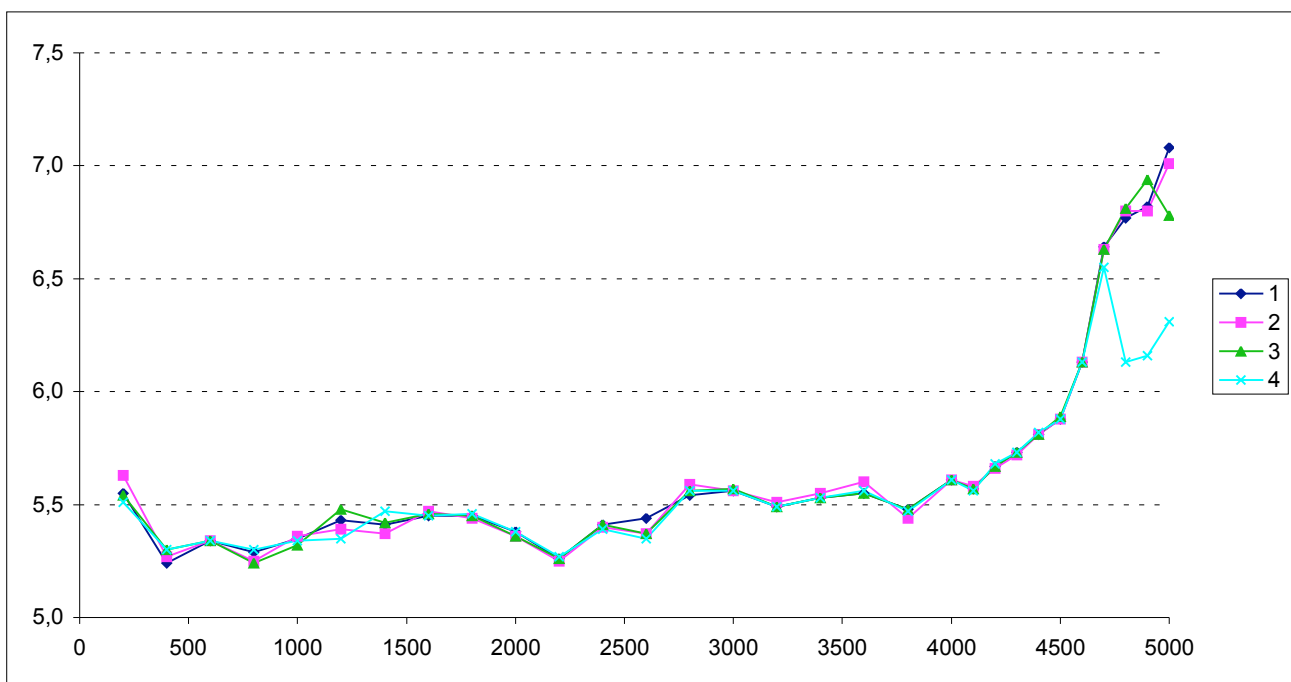
Race analysis 5000m women

Berlin, 22.08.2009

- 1. Cheruiyot, Vivian (KEN) 14:57,97 min 5,57 m/s
- 2. Kibet, Sylvia Jebiwott (KEN) 14:58,33 min 5,57 m/s
- 3. Defar, Meseret (ETH) 14:58,41 min 5,57 m/s
- 4. Ejigu, Sentayehu (ETH) 15:03,38 min 5,53 m/s

[m]	time	tdiff	v	time	tdiff	v	time	tdiff	v	time	tdiff	v
[m]	[s]	[s]	[m/s]	[s]	[s]	[m/s]	[s]	[s]	[m/s]	[s]	[s]	[m/s]
200	36,03	36,03	5,55	35,50	35,50	5,63	36,12	36,12	5,54	36,31	36,31	5,51
400	1:14,21	38,18	5,24	1:13,46	37,96	5,27	1:13,83	37,71	5,30	1:14,05	37,74	5,30
600	1:51,65	37,44	5,34	1:50,91	37,45	5,34	1:51,29	37,46	5,34	1:51,47	37,42	5,34
800	2:29,47	37,82	5,29	2:29,00	38,09	5,25	2:29,45	38,16	5,24	2:29,22	37,75	5,30
1000	3:06,87	37,40	5,35	3:06,32	37,32	5,36	3:07,06	37,61	5,32	3:06,67	37,45	5,34
1200	3:43,73	36,86	5,43	3:43,43	37,11	5,39	3:43,57	36,51	5,48	3:44,02	37,35	5,35
1400	4:20,71	36,98	5,41	4:20,67	37,24	5,37	4:20,45	36,88	5,42	4:20,55	36,53	5,47
1600	4:57,40	36,69	5,45	4:57,23	36,56	5,47	4:57,06	36,61	5,46	4:57,23	36,68	5,45
1800	5:34,12	36,72	5,45	5:33,97	36,74	5,44	5:33,79	36,73	5,45	5:33,87	36,64	5,46
2000	6:11,27	37,15	5,38	6:11,29	37,32	5,36	6:11,12	37,33	5,36	6:11,04	37,17	5,38
2200	6:49,29	38,02	5,26	6:49,40	38,11	5,25	6:49,15	38,03	5,26	6:49,02	37,98	5,27
2400	7:26,27	36,98	5,41	7:26,44	37,04	5,40	7:26,12	36,97	5,41	7:26,13	37,11	5,39
2600	8:03,03	36,76	5,44	8:03,71	37,27	5,37	8:03,34	37,22	5,37	8:03,51	37,38	5,35
2800	8:39,11	36,08	5,54	8:39,47	35,76	5,59	8:39,30	35,96	5,56	8:39,49	35,98	5,56
3000	9:15,05	35,94	5,56	9:15,45	35,98	5,56	9:15,21	35,91	5,57	9:15,43	35,94	5,56
3200	9:51,46	36,41	5,49	9:51,76	36,31	5,51	9:51,65	36,44	5,49	9:51,84	36,41	5,49
3400	10:27,64	36,18	5,53	10:27,81	36,05	5,55	10:27,83	36,18	5,53	10:28,02	36,18	5,53
3600	11:03,66	36,02	5,55	11:03,53	35,72	5,60	11:03,85	36,02	5,55	11:03,99	35,97	5,56
3800	11:40,17	36,51	5,48	11:40,32	36,79	5,44	11:40,34	36,49	5,48	11:40,53	36,54	5,47
4000	12:15,79	35,62	5,61	12:15,95	35,63	5,61	12:15,97	35,63	5,61	12:16,17	35,64	5,61
4100	12:33,75	17,96	5,57	12:33,87	17,92	5,58	12:33,92	17,95	5,57	12:34,16	17,99	5,56
4200	12:51,39	17,64	5,67	12:51,55	17,68	5,66	12:51,55	17,63	5,67	12:51,78	17,62	5,68
4300	13:08,83	17,44	5,73	13:09,03	17,48	5,72	13:09,00	17,45	5,73	13:09,22	17,44	5,73
4400	13:26,03	17,20	5,81	13:26,25	17,22	5,81	13:26,20	17,20	5,81	13:26,41	17,19	5,82
4500	13:43,03	17,00	5,88	13:43,25	17,00	5,88	13:43,18	16,98	5,89	13:43,41	17,00	5,88
4600	13:59,35	16,32	6,13	13:59,57	16,32	6,13	13:59,50	16,32	6,13	13:59,71	16,30	6,13
4700	14:14,41	15,06	6,64	14:14,66	15,09	6,63	14:14,58	15,08	6,63	14:14,98	15,27	6,55
4800	14:29,18	14,77	6,77	14:29,36	14,70	6,80	14:29,26	14,68	6,81	14:31,29	16,31	6,13
4900	14:43,85	14,67	6,82	14:44,07	14,71	6,80	14:43,66	14,40	6,94	14:47,53	16,24	6,16
5000	14:57,97	14,12	7,08	14:58,33	14,26	7,01	14:58,41	14,75	6,78	15:03,38	15,85	6,31

	0-3000 m	4. 1000 m	letzte 1000 m	last 400 m	last 100 m
1)	9:15,05	3:00,74	2:42,18	58,62	14,12
2)	9:15,45	3:00,50	2:42,38	58,76	14,26
3)	9:15,21	3:00,76	2:42,44	58,91	14,75
4)	9:15,43	3:00,74	2:47,21	1:03,67	15,85



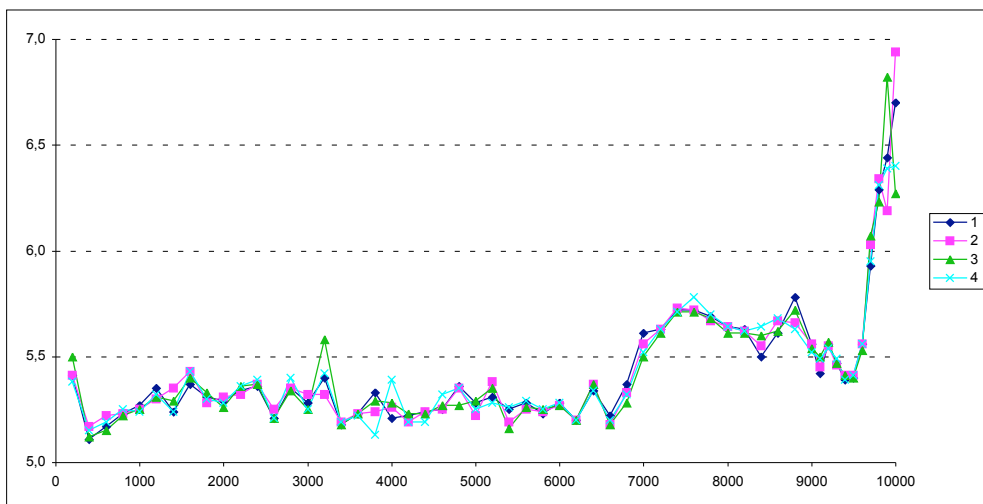
Race analysis 10000m women

Berlin, 15.08.2009

- | | | | |
|----------------------------|-------|--------------|----------|
| 1. Masai, Linet Chepkwemoi | (KEN) | 30:51,24 min | 5,40 m/s |
| 2. Melkamu, Meselech | (ETH) | 30:51,34 min | 5,40 m/s |
| 3. Ayalew, Wude | (ETH) | 30:51,95 min | 5,40 m/s |
| 4. Momanyi, Grace Kwamboka | (KEN) | 30:52,25 min | 5,40 m/s |

[m]	time	tdiff	v	time	tdiff	v	time	tdiff	v	time	tdiff	v
[m]	[s]	[s]	[m/s]	[s]	[s]	[m/s]	[s]	[s]	[m/s]	[s]	[s]	[m/s]
200	36,99	36,99	5,41	36,99	36,99	5,41	36,37	36,37	5,50	37,15	37,15	5,38
400	1:16,15	39,16	5,11	1:15,68	38,69	5,17	1:15,43	39,06	5,12	1:16,02	38,87	5,15
600	1:54,81	38,66	5,17	1:54,00	38,32	5,22	1:54,27	38,84	5,15	1:54,57	38,55	5,19
800	2:33,07	38,26	5,23	2:32,23	38,23	5,23	2:32,61	38,34	5,22	2:32,70	38,13	5,25
1000	3:11,00	37,93	5,27	3:10,29	38,06	5,25	3:10,67	38,06	5,25	3:10,85	38,15	5,24
1200	3:48,35	37,35	5,35	3:48,05	37,76	5,30	3:48,35	37,68	5,31	3:48,43	37,58	5,32
1400	4:26,54	38,19	5,24	4:25,41	37,36	5,35	4:26,14	37,79	5,29	4:26,57	38,14	5,24
1600	5:03,77	37,23	5,37	5:02,25	36,84	5,43	5:03,17	37,03	5,40	5:03,43	36,86	5,43
1800	5:41,44	37,67	5,31	5:40,12	37,87	5,28	5:40,68	37,51	5,33	5:41,20	37,77	5,30
2000	6:19,23	37,79	5,29	6:17,75	37,63	5,31	6:18,73	38,05	5,26	6:19,07	37,87	5,28
2200	6:56,69	37,46	5,34	6:55,37	37,62	5,32	6:56,03	37,30	5,36	6:56,40	37,33	5,36
2400	7:33,99	37,30	5,36	7:32,59	37,22	5,37	7:33,29	37,26	5,37	7:33,53	37,13	5,39
2600	8:12,38	38,39	5,21	8:10,69	38,10	5,25	8:11,71	38,42	5,21	8:11,95	38,42	5,21
2800	8:49,78	37,40	5,35	8:48,07	37,38	5,35	8:49,17	37,46	5,34	8:48,96	37,01	5,40
3000	9:27,67	37,89	5,28	9:25,69	37,62	5,32	9:27,30	38,13	5,25	9:27,07	38,11	5,25
3200	10:04,73	37,06	5,40	10:03,27	37,58	5,32	10:03,13	35,83	5,58	10:03,95	36,88	5,42
3400	10:43,36	38,63	5,18	10:41,82	38,55	5,19	10:41,77	38,64	5,18	10:42,52	38,57	5,19
3600	11:21,61	38,25	5,23	11:20,07	38,25	5,23	11:20,03	38,26	5,23	11:20,84	38,32	5,22
3800	11:59,11	37,50	5,33	11:58,22	38,15	5,24	11:57,86	37,83	5,29	11:59,82	38,98	5,13
4000	12:37,47	38,36	5,21	12:36,25	38,03	5,26	12:35,77	37,91	5,28	12:36,92	37,10	5,39
4200	13:15,80	38,33	5,22	13:14,79	38,54	5,19	13:14,02	38,25	5,23	13:15,47	38,55	5,19
4400	13:54,00	38,20	5,24	13:52,93	38,14	5,24	13:52,25	38,23	5,23	13:53,99	38,52	5,19
4600	14:32,09	38,09	5,25	14:31,00	38,07	5,25	14:30,17	37,92	5,27	14:31,59	37,60	5,32
4800	15:09,42	37,33	5,36	15:08,41	37,41	5,35	15:08,09	37,92	5,27	15:09,00	37,41	5,35
5000	15:47,31	37,89	5,28	15:46,70	38,29	5,22	15:45,89	37,80	5,29	15:47,11	38,11	5,25
5200	16:24,95	37,64	5,31	16:23,89	37,19	5,38	16:23,25	37,36	5,35	16:24,96	37,85	5,28
5400	17:03,01	38,06	5,25	17:02,39	38,50	5,19	17:02,00	38,75	5,16	17:02,99	38,03	5,26
5600	17:40,87	37,86	5,28	17:40,48	38,09	5,25	17:40,05	38,05	5,26	17:40,79	37,80	5,29
5800	18:19,09	38,22	5,23	18:18,65	38,17	5,24	18:18,18	38,13	5,25	18:18,90	38,11	5,25
6000	18:56,97	37,88	5,28	18:56,59	37,94	5,27	18:56,15	37,97	5,27	18:56,81	37,91	5,28
6200	19:35,45	38,48	5,20	19:35,02	38,43	5,20	19:34,58	38,43	5,20	19:35,29	38,48	5,20
6400	20:12,93	37,00	5,34	20:12,29	37,27	5,37	20:11,85	37,27	5,37	20:12,76	37,47	5,34
6600	20:51,27	38,34	5,22	20:50,93	38,64	5,18	20:50,47	38,62	5,18	20:51,25	38,49	5,20
6800	21:28,53	37,26	5,37	21:28,47	37,54	5,33	21:28,33	37,86	5,28	21:28,85	37,60	5,32
7000	22:04,20	35,67	5,61	22:04,43	35,96	5,56	22:04,71	36,38	5,50	22:05,10	36,25	5,52
7200	22:39,73	35,53	5,63	22:39,96	35,53	5,63	22:40,39	35,68	5,61	22:40,64	35,54	5,63
7400	23:14,67	34,94	5,72	23:14,89	34,93	5,73	23:15,43	35,04	5,71	23:15,65	35,01	5,71
7600	23:49,61	34,94	5,72	23:49,85	34,96	5,72	23:50,47	35,04	5,71	23:50,25	34,60	5,78
7800	24:24,73	35,12	5,69	24:25,15	35,30	5,67	24:25,71	35,24	5,68	24:25,34	35,09	5,70
8000	25:00,18	35,45	5,64	25:00,63	35,48	5,64	25:01,35	35,64	5,61	25:00,81	35,47	5,64
8200	25:35,71	35,53	5,63	25:36,21	35,58	5,62	25:36,97	35,62	5,61	25:36,37	35,56	5,62
8400	26:12,09	36,38	5,50	26:12,23	36,02	5,55	26:12,71	35,74	5,60	26:11,84	35,47	5,64
8600	26:47,75	35,66	5,61	26:47,48	35,25	5,67	26:48,29	35,58	5,62	26:47,05	35,21	5,68
8800	27:22,35	34,60	5,78	27:22,79	35,31	5,66	27:23,26	34,97	5,72	27:22,55	35,50	5,63
9000	27:58,29	35,94	5,56	27:58,79	36,00	5,56	27:59,35	36,09	5,54	27:58,77	36,22	5,52
9100	28:16,73	18,44	5,42	28:17,15	18,36	5,45	28:17,53	18,18	5,50	28:16,99	18,22	5,49
9200	28:34,70	17,97	5,56	28:35,17	18,02	5,55	28:35,49	17,96	5,57	28:35,03	18,04	5,54
9300	28:52,99	18,29	5,47	28:53,47	18,30	5,46	28:53,76	18,27	5,47	28:53,25	18,22	5,49
9400	29:11,56	18,57	5,39	29:11,95	18,48	5,41	29:12,23	18,47	5,41	29:11,82	18,57	5,39
9500	29:30,07	18,51	5,40	29:30,43	18,48	5,41	29:30,75	18,52	5,40	29:30,31	18,49	5,41
9600	29:48,04	17,97	5,56	29:48,42	17,99	5,56	29:48,83	18,08	5,53	29:48,31	18,00	5,56
9700	30:04,90	16,86	5,93	30:05,01	16,59	6,03	30:05,30	16,47	6,07	30:05,11	16,80	5,95
9800	30:20,79	15,89	6,29	30:20,79	15,78	6,34	30:21,34	16,04	6,23	30:20,97	15,86	6,31
9900	30:36,31	15,52	6,44	30:36,94	16,15	6,19	30:36,01	14,67	6,82	30:36,63	15,66	6,39
10000	30:51,24	14,93	6,70	30:51,34	14,40	6,94	30:51,95	15,94	6,27	30:52,25	15,62	6,40

0-3000 m	4. 1000 m	letzte 1000 m	last 400 m	last 100 m
1) 9:15,05	3:00,74	2:42,18	58,62	14,12
2) 9:15,45	3:00,50	2:42,38	58,76	14,26
3) 9:15,21	3:00,76	2:42,44	58,91	14,75
4) 9:15,43	3:00,74	2:47,21	1:03,67	15,85





DLV Scientific Research Project

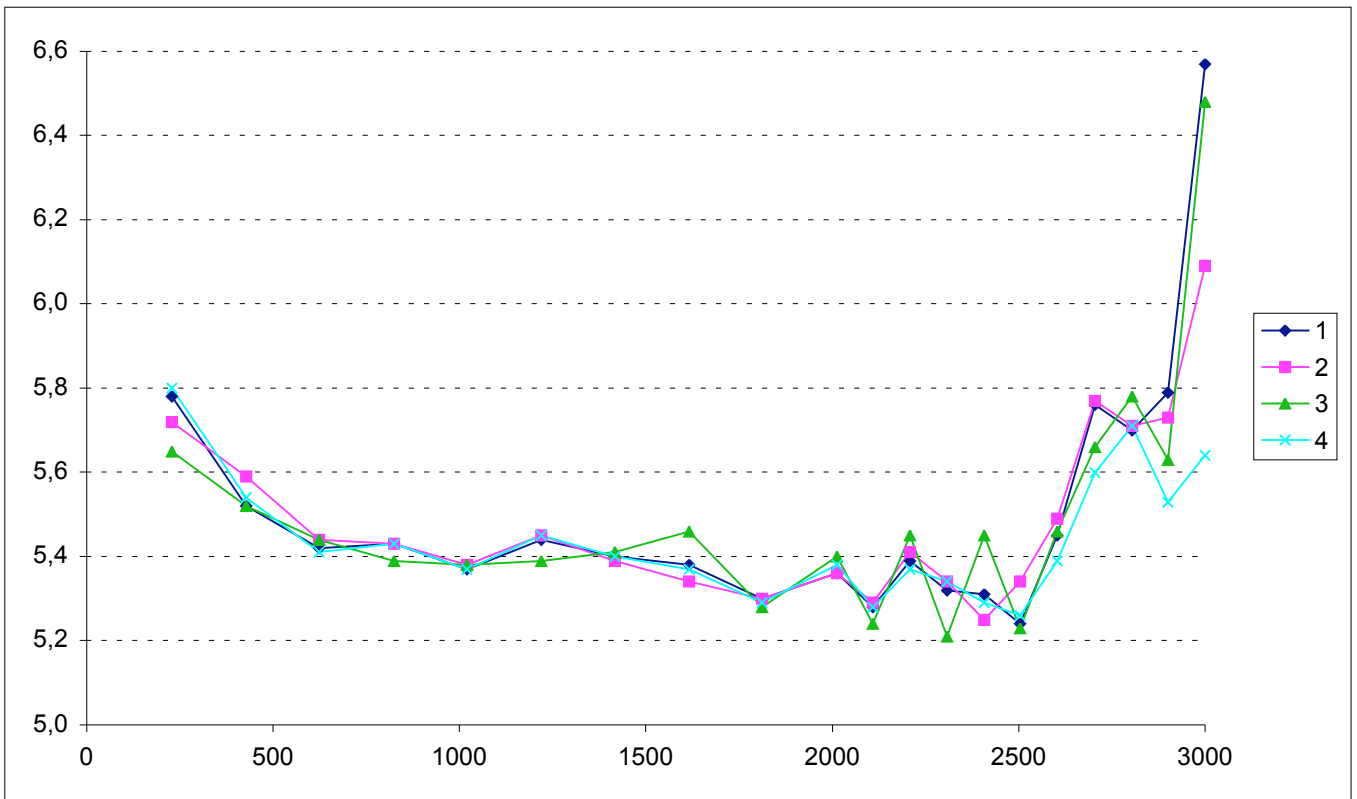


Race analysis 3000m steeplechase women

Berlin, 17.08.2009

- | | | | |
|--------------------------|-------|-------------|----------|
| 1. Domínguez, Marta | (ESP) | 9:07,32 min | 5,48 m/s |
| 2. Zarudneva, Yuliya | (RUS) | 9:08,39 min | 5,47 m/s |
| 3. Cheywa, Milcah Chemos | (KEN) | 9:08,57 min | 5,47 m/s |
| 4. Galkina, Gulnara | (RUS) | 9:11,09 min | 5,44 m/s |

[m]	time	tdiff	v	time	tdiff	v	time	tdiff	v	time	tdiff	v
[m]	[s]	[s]	[m/s]	[s]	[s]	[m/s]	[s]	[s]	[m/s]	[s]	[s]	[m/s]
228	39,48	39,48	5,78	39,86	39,86	5,72	40,32	40,32	5,65	39,30	39,30	5,80
428	1:15,68	36,20	5,52	1:15,67	35,81	5,59	1:16,52	36,20	5,52	1:15,37	36,07	5,54
624	1:51,85	36,17	5,42	1:51,67	36,00	5,44	1:52,56	36,04	5,44	1:51,57	36,20	5,41
824	2:28,68	36,83	5,43	2:28,51	36,84	5,43	2:29,64	37,08	5,39	2:28,42	36,85	5,43
1020	3:05,15	36,47	5,37	3:04,97	36,46	5,38	3:06,08	36,44	5,38	3:04,89	36,47	5,37
1220	3:41,91	36,76	5,44	3:41,68	36,71	5,45	3:43,22	37,14	5,39	3:41,59	36,70	5,45
1416	4:18,21	36,30	5,40	4:18,06	36,38	5,39	4:19,44	36,22	5,41	4:17,89	36,30	5,40
1616	4:55,36	37,15	5,38	4:55,51	37,45	5,34	4:56,07	36,63	5,46	4:55,13	37,24	5,37
1812	5:32,33	36,97	5,30	5:32,49	36,98	5,30	5:33,16	37,09	5,28	5:32,19	37,06	5,29
2012	6:09,62	37,29	5,36	6:09,79	37,30	5,36	6:10,23	37,07	5,40	6:09,39	37,20	5,38
2108	6:27,79	18,17	5,28	6:27,95	18,16	5,29	6:28,56	18,33	5,24	6:27,57	18,18	5,28
2208	6:46,35	18,56	5,39	6:46,45	18,50	5,41	6:46,90	18,34	5,45	6:46,19	18,62	5,37
2308	7:05,14	18,79	5,32	7:05,17	18,72	5,34	7:06,11	19,21	5,21	7:04,93	18,74	5,34
2408	7:23,97	18,83	5,31	7:24,20	19,03	5,25	7:24,46	18,35	5,45	7:23,85	18,92	5,29
2504	7:42,28	18,31	5,24	7:42,17	17,97	5,34	7:42,82	18,36	5,23	7:42,09	18,24	5,26
2604	8:00,62	18,34	5,45	8:00,40	18,23	5,49	8:01,12	18,30	5,46	8:00,64	18,55	5,39
2704	8:17,98	17,36	5,76	8:17,72	17,32	5,77	8:18,78	17,66	5,66	8:18,50	17,86	5,60
2804	8:35,52	17,54	5,70	8:35,24	17,52	5,71	8:36,08	17,30	5,78	8:36,00	17,50	5,71
2900	8:52,10	16,58	5,79	8:51,98	16,74	5,73	8:53,14	17,06	5,63	8:53,36	17,36	5,53
3000	9:07,32	15,22	6,57	9:08,39	16,41	6,09	9:08,57	15,43	6,48	9:11,09	17,73	5,64





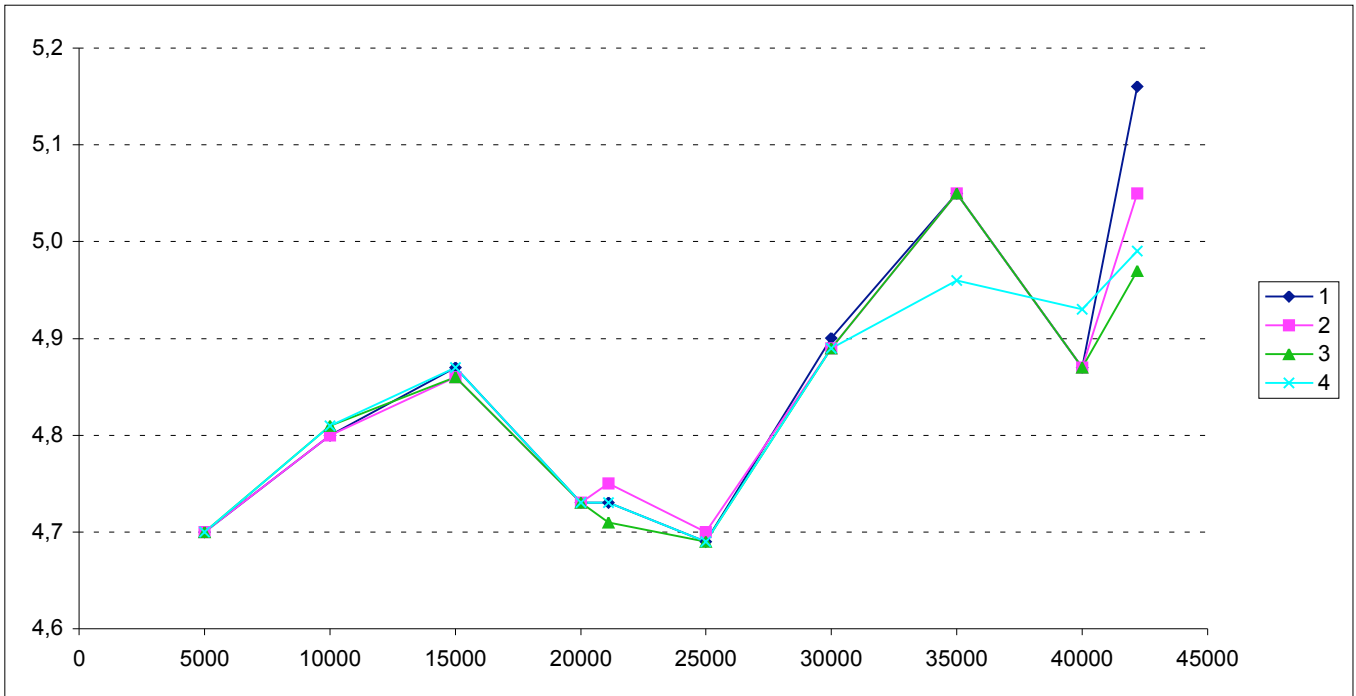
DLV Scientific Research Project



**Race analysis marathon women
Berlin, 23.08.2009**

- | | | | |
|----------------------|-------|-------------|----------|
| 1. Bai, Xue | (CHN) | 2:25:15 min | 4,84 m/s |
| 2. Ozaki, Yoshimi | (JAP) | 2:25:25 min | 4,84 m/s |
| 3. Mergia, Aselefech | (KEN) | 2:25:32 min | 4,83 m/s |
| 4. Zhou, Chunxia | (CHN) | 2:25:39 min | 4,83 m/s |

[m]	time	tdiff	v	time	tdiff	v	time	tdiff	v	time	tdiff	v
	[min]	[min]	[m/s]	[min]	[min]	[m/s]	[min]	[min]	[m/s]	[min]	[min]	[m/s]
5000	17:43	17:43	4,70	17:43	17:43	4,70	17:43	17:43	4,70	17:43	17:43	4,70
10000	35:04	17:21	4,80	35:04	17:21	4,80	35:03	17:20	4,81	35:03	17:20	4,81
15000	52:11	17:07	4,87	52:12	17:08	4,86	52:11	17:08	4,86	52:10	17:07	4,87
20000	1:09:48	17:37	4,73	1:09:49	17:37	4,73	1:09:47	17:36	4,73	1:09:48	17:38	4,73
21097	1:13:40	3:52	4,73	1:13:40	3:51	4,75	1:13:40	3:53	4,71	1:13:40	3:52	4,73
25000	1:27:32	13:52	4,69	1:27:31	13:51	4,70	1:27:32	13:52	4,69	1:27:32	13:52	4,69
30000	1:44:33	17:01	4,90	1:44:34	17:03	4,89	1:44:34	17:02	4,89	1:44:35	17:03	4,89
35000	2:01:04	16:31	5,05	2:01:04	16:30	5,05	2:01:04	16:30	5,05	2:01:24	16:49	4,96
40000	2:18:10	17:06	4,87	2:18:10	17:06	4,87	2:18:10	17:06	4,87	2:18:19	16:55	4,93
42195	2:25:15	7:05	5,16	2:25:25	7:15	5,05	2:25:32	7:22	4,97	2:25:39	7:20	4,99





DLV Scientific Research Project



Race analysis 20km race walk women

Berlin, 16.08.2009

- 1. Kaniskina, Olga (RUS) 1:28:09 min 3,78 m/s
- 2. Loughnane, Olive (IRL) 1:28:58 min 3,75 m/s
- 3. Liu, Hong (CHN) 1:29:10 min 3,74 m/s
- 4. Kirdyapkina, Anisya (RUS) 1:30:09 min 3,70 m/s

[m]	time	tdiff	v	time	tdiff	v	time	tdiff	v	time	tdiff	v
	[min]	[min]	[m/s]	[min]	[min]	[m/s]	[min]	[min]	[m/s]	[min]	[min]	[m/s]
2000	9:22	9:22	3,56	9:23	9:23	3,56	9:23	9:23	3,55	9:21	9:21	3,56
4000	18:42	9:19	3,58	18:42	9:19	3,58	18:42	9:19	3,58	18:41	9:20	3,57
5000	23:20	4:38	3,59	23:19	4:37	3,61	23:20	4:38	3,60	23:19	4:38	3,60
6000	27:48	4:28	3,73	27:50	4:31	3,69	27:50	4:30	3,70	27:49	4:30	3,71
8000	36:25	8:37	3,87	36:36	8:46	3,80	36:35	8:45	3,81	36:28	8:39	3,86
10000	44:58	8:33	3,90	45:30	8:54	3,74	45:31	8:56	3,73	45:24	8:56	3,73
12000	53:29	8:32	3,91	54:17	8:47	3,80	54:15	8:44	3,82	54:16	8:52	3,76
14000	1:02:08	8:38	3,86	1:02:56	8:40	3,85	1:02:56	8:41	3,84	1:03:07	8:51	3,76
15000	1:06:22	4:14	3,93	1:07:18	4:22	3,82	1:07:18	4:22	3,82	1:07:29	4:22	3,82
16000	1:10:41	4:19	3,86	1:11:41	4:23	3,80	1:11:42	4:24	3,79	1:11:55	4:26	3,77
18000	1:19:18	8:37	3,87	1:20:18	8:37	3,87	1:20:18	8:37	3,87	1:20:47	8:53	3,75
20000	1:28:09	8:51	3,77	1:28:58	8:40	3,85	1:29:10	8:52	3,76	1:30:09	9:22	3,56

