

A STUDY ON THE PERCENTAGE OF VARIED TERRAIN RUNNING FOR IMPROVING EFFORT CAPACITY IN JUNIOR FEMALE MIDDLE AND LONG DISTANCE RUNNERS

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Abstract: *The study addresses Romania’s best female middle-long distance and hurdles runners from the competition year 2010-2011. We analyzed the percentage of varied terrain running in terms of aerobic and anaerobic mixed effort over one annual preparation cycle. By examining the daily records we ascertained a higher percentage of varied terrain running in female middle- long distance and hurdles runners during winter preparation periods, in terms of mixed and aerobic effort. For the case of anaerobic effort, the athletes didn’t use the means of varied terrain running. In order to assure a training program devised for promoting junior athletes to senior level, we assume that within the total amount of running workout, the percentage of varied terrain running for the development of the aerobic and mixed effort capacity should increase up to 80-85% during winter preparation periods and to 65-70% during competition periods. The development of anaerobic effort capacity may require the introduction of varied terrain running means, up to 20-25% in preparation periods and 10-15% in competition periods.*

Keywords: *varied terrain running, aerobic mixed and anaerobic effort, middle-long distance and hurdles.*

1. INTRODUCTION

The lack of value results in Romanian female middle and long distance runners and the improper use of preparation means for the development of effort capacity, the inappropriate way of participating in the scheduled competitions are arguments in support of the **topicality** of this issue. As research **hypothesis**, we assumed that better results of female middle and long distance runners can be obtained by increasing the percentage of varied terrain running in order to develop specific effort capacity. The **aim** of the study is the continuous analysis and control of workout content by using varied terrain running as the main preparation means in all forms.

Preparing middle and long distance runners includes all workout factors: physical, technical, psychological and theoretical. The workout factors are mutually inter-conditioned and by analyzing their percentage within the overall preparation, it was found that the physical factor has the highest percentage and significantly

influences athletic performance (Bompa, 2001). An inadequate level of physical preparation, as a consequence of insufficient workout periods, inadequately managed means of preparation, accidents, diseases or fatigue may have a negative influence on athletic performance. Physical preparation is an important component of the athlete’s preparation being the foundation of the other components (Harre, 1973). Physical preparation includes a series of measures that ensure a high functional capacity of the human organism through optimal development of basic and specific motrical functions and optimum values of the functional indicators (Alexandrescu & Rugină, 1971). Physical preparation is employed with different percentages over the annual cycle, depending on the period and stage of the athlete, and his level of preparation (Matveev, 1988).

The imminence of the competition period and stages leads to a decreased percentage of overall physical preparation in favor of its specific counterpart. An important component of

the preparation includes participation in sports contests, which, depending on the stage and level of preparation, can be devised for achieving either victory or a certain result or for performance assessment (Homenkov, 1977). Avoiding participation in competitions, encountering poorly ranked opponents are circumstances that may lead to a fitness condition which is inadequate for objective competitions. In order to achieve optimal performance in objective competitions, the coach must devise a strategy depending on the athlete's individual characteristics, preparation conditions, and the athlete's motivation (Dragnea, 1993).

2. SUBJECTS AND METHOD

The research was conducted on Romania's best female middle-long distance and hurdles runners of 2011 (L.D.E. – 2000 m in 6.32 hurdles, F.M.M. – 5000 m in 16.36, B.M.A. 3000 m in 9.25).

Based on the athletic performance records, we analyzed the percentage of the workout means in terms of effort zones, the percentage of varied terrain running, from the overall monthly amount, as well as the strategy during participation in contests.

Table 1 Workout effort (km%)

L.D.E	Contests	Aerobic	Mixed	Anaerobic	Overall
October	1	140 km 121 km 86,4%	218,3 km 142,3 km 65,1%	-	358,3 km 263,3 km 73,4%
November	-	195,5 km 158 km 80,8%	297,3 km 173 km 58,9%	6,6 km 1,4%	499,4 km 331 km 66,2%
December	1	153 km 110 km 71,8%	265 km 186 km 58,1%	12,4 km 3%	430,4 km 296 km 68,7%
January	2	140 km 98 km 70%	179,3 km 97,5 km 54,3%	17,4 km 5,3%	336,7 km 195,5 km 58%
February	4	128,5 km 84 km 65,3%	154,8 km 56 km 36,1%	12,1 km 4,1%	295,4 km 140 km 47,3%
March	4	103,5 km 72 km 69,5%	108,2 km 61,2 km 56,5%	4,4 km 2,2%	216,1 km 133,2 km 61,6%
April	-	161 km 113 km 70,1%	220,4 km 184,6 km 83,7%	9 km 2,4%	390,4 km 297,6 km 76,2%
May	1	169 km 99 km 58,5%	191 km 98,6 km 51,6%	15,6 km 4,3%	375,6 km 197,6 km 52,6%
June	3	128 km 78 km 60,9%	192,8 km 129 km 66,9%	16 km 4,8%	336,8 km 207 km 61,4%
July	1	134 km 75 km 55,9%	186 km 128 km 68,8%	16,2 km 4,9%	336,2 km 203 km 60,3%
August	1	162 km 85 km 52,4%	155 km 121,4 km 78,3%	10,4 km 3,3%	327,4 km 206,4 km 63%
Overall	19	1614,5 km 1093 km 44,2%	2168,1 km 1377,6 km 55,7%	120,1 km 3,2%	3902,7 km 2470,6 km 63,3%

Table 2 Aerobic effort

	X	XI	XII	I	II	III	IV	V	VI	VII	VIII
Km	140	195,5	153	140	128,5	103,5	161	169	128	134	162
t.v	121	158	110	98	84	72	113	99	78	75	85
%	86,4	80,8	71,8	70	65,3	69,5	70,1	58,5	60,9	55,9	52,4

Table 3 Mixed effort

Month	X	XI	XII	I	II	III	IV	V	VI	VII	VIII
Km	218,3	297,3	265	179,3	154,8	108,2	220,4	191	192,8	186	155
t.v	142,3	173	186	97,5	56	61,2	184,6	98,6	129	128	121,4
%	65,1	58,9	58,1	54,3	36,1	56,5	83,7	51,6	66,9	68,8	78,3

Table 4 Anaerobic effort

Month	X	XI	XII	I	II	III	IV	V	VI	VII	VIII
Km	0	6,6	12,4	17,4	12,1	4,4	9	15,6	16	16,2	10,4
%	0	1,4	3	5,3	4,1	2,2	2,4	4,3	4,8	4,9	3,3

By analyzing L.D.E.'s preparation (Table 1 and 2) it can be seen that the percentage of varied terrain running from the aerobic amount increases during the winter period, to 70-80% and constantly decreases during competition period, to 65-70%. During the 2nd macro cycle it can be seen that the percentage of varied terrain running is greater, 69.5-70.15% during preparation, while it decreases to 58.5 - 60.95 - 55.9% in the competition period.

The percentage of varied terrain running from the mixed effort (Table 1 and 3) is relatively constant over the preparation period of the first preparation macrocycle (65,1-58,9-58,1-54,3%), and then decreases to 36,1% over the winter competition period. During the summer competition period, the percentage of

varied terrain running within the mixed effort is greater in contrast to the winter period because the athlete has engaged longer events, as well.

With regard to the percentage of varied terrain running within the anaerobic effort, it can be noticed that this is completely absent since the development of anaerobic effort capacity was achieved on using only flat terrain means of preparation (Table 1 and 4).

Contest participation was achieved for a number of 19 starts engaging cross-country, intra and extramural events, while the objective competition was the Junior II World Championship, Lille, 10.07.2011, with a 6.40 performance, and 12th position ranking.

Table 5 Workout effort (km%)

L.D.E	Contests	Aerobic	Mixed	Anaerobic	Overall
October	3	128 km 111 km 86,7%	203 km 167,5 km 82,5%	-	331 km 278,5 km 84,1%
November	-	185 km 155 km 83,7%	284,4 km 202,8 km 71,3%	9,6 km 2,1%	479 km 357,8 km 74,6%
December	1	111 km 72 km 64,8%	189,8 km 150 km 79%	9,2 km 3%	310 km 222 km 71,6%
January	-	133,5 km 85 km 63,6%	223,6 km 143 km 63,9%	16,8 km 4,5%	373,9 km 236 km 63,1%

February	1	117,5 km 75 km 63,8%	194,3 km 113,9 km 58,6%	15 km 4,7%	326,8 km 188,9 km 57,8%
March	3	102 km 75 km 73,5%	134,2 km 94 km 70%	4,4 km 2%	240,6 km 169 km 70,2%
April	-	116 km 92 km 79,3%	166,5 km 124,7 km 74,8%	5,8 km 2,1%	288,3 km 216,7 km 75,1%
May	4	149 km 97 km 65,1%	201,8 km 133,5 km 66,1%	15,8 km 4,4%	366,6 km 230,5 km 62,8%
June	3	156,5 km 103 km 65,8%	205,2 km 135 km 65,7%	17,8 km 4,8%	379,5 km 238 km 62,7%
July	1	136 km 89 km 65,4%	195,3 km 125,9 km 64,4%	16,6 km 4,9%	347,9 km 214,9 km 61,7%
August	1	162 km 108 km 66,6%	160 km 103 km 64,3%	10,2 km 3,2%	332,2 km 211 km 63,5%
Overall	17	1496,5 km 1070 km 41,7%	2158,1 km 1493,3 km 58,2%	121,2 km 3,7%	3775,8 km 2563,3 km 67,8%

Table 6 Aerobic effort

	X	XI	XII	I	II	III	IV	V	VI	VII	VIII
Km	128	185	111	133,5	117,5	102	116	149	156,5	136	162
t.v	111	155	72	85	75	75	92	97	103	89	108
%	86,7	83,7	64,8	63,6	63,8	73,5	79,3	65,1	65,8	65,4	66,6

Table 7 Mixed effort

Month	X	XI	XII	I	II	III	IV	V	VI	VII	VIII
Km	203	284,4	189,8	223,6	194,3	134,2	166,5	201,8	205,2	195,3	160
t.v	167,5	202,8	150	143	113,9	94	124,7	133,5	135	125,9	103
%	82,5	71,3	79	63,9	58,6	70	74,8	66,1	65,7	64,4	64,3

Table 8 Anaerobic effort

Month	X	XI	XII	I	II	III	IV	V	VI	VII	VIII
Km	0	9,6	9,2	16,8	15	4,4	5,8	15,8	17,8	16,6	10,2
%	0	2,1	3	4,5	4,7	2	2,1	4,4	4,8	4,9	3,2

Table 9 Workout effort (km%)

L.D.E	Contests	Aerobic	Mixed	Anaerobic	Overall
October	1	184 km 176 km 95,6%	280 km 215,4 km 76,9%	-	464 km 391,4 km 84,3%
November	-	160 km 148 km 92,5%	284 km 212,3 km 74,7%	9,6 km 2,2%	453,6 km 360,3 km 79,4%
December	-	141 km 115 km 81,5%	245,6 km 184 km 74,9%	15,4 km 4%	402 km 299 km 74,3%

January	1	142 km 104 km 73,2%	232,1 km 153,6 km 66,1%	17,2 km 4,3%	391,3 km 257,6 km 65,8%
February	4	115 km 72 km 62,6%	189,7 km 114 km 60%	15,8 km 5,1%	320,5 km 186 km 58%
March	2	107 km 80 km 74,7%	183,8 km 124,2 km 67,5%	8,4 km 2,9%	299,2 km 204,2 km 68,2%
April	-	191 km 164 km 85,8%	298,4 km 206,5 km 69,2%	9,6 km 2%	499 km 370,5 km 74,2%
May	3	194 km 144 km 74,2%	316,9 km 214,3 km 67,6%	20,4 km 3,9%	531,3 km 358,3 km 67,4%
June	2	143 km 110 km 76,9%	230 km 153,7 km 66,8%	14,9 km 4%	387,9 km 263,7 km 67,9%
July	3	170 km 120 km 71,4%	248,8 km 155,4 km 62,4%	13,6 km 3,2%	432,4 km 275,4 km 63,6%
August	-	174 km 122 km 70,1%	216,1 km 168,4 km 77,9%	7,5 km 2%	397,6 km 290,4 km 73%
Overall	16	1721 km 1355 km 41,6%	2725,4 km 1901,8 km 58,3%	132,4 km 3%	4578,8 km 3256,8 km 71,1%

The athlete B.A.M. employs varied terrain running for aerobic effort capacity development during the preparation period of the first macrocycle 86,7-83,7-64,8% and 63,6-63,8% in intramural competition, and about 65% in the extramural competition period (Table 5 and 6).

The percentage of varied terrain running within the mixed effort (Table 7) is about 71,3-82,5% during the preparation period of the first macrocycle, while during the preparation period of the second macrocycle,

the percentage is 70-74,8%, during the summer competition period the varied terrain running percentage is 64-65% (Table 5 and 7).

The preparation means for developing the anaerobic effort capacity were applied entirely on flat terrain (Table 5 and 8).

Contest participation was achieved for a number of 17 starts, with the objective competition the Junior II World Championship, Lille/France, 6-10.07.2011 – 8th position – 3000m, 9:25:11.

Table 10 Aerobic effort

	X	XI	XII	I	II	III	IV	V	VI	VII	VIII
Km	184	160	141	142	115	107	191	194	143	170	174
t.v	176	148	115	104	72	80	164	144	110	120	122
%	95,6	92,5	80,9	73,2	62,6	74,7	85,8	74,2	76,9	71,4	70,1

Table 11 Mixed effort

Month	X	XI	XII	I	II	III	IV	V	VI	VII	VIII
Km	280	284	245,6	232,1	189,7	183,8	298,4	316,9	230	248,8	216,1
t.v	215,4	212,3	184	153,6	114	124,2	206,5	214,3	153,7	155,4	168,4
%	76,9	74,7	74,9	66,1	60	67,5	69,2	67,6	66,8	62,4	77,9

Table 12 Anaerobic effort

Month	X	XI	XII	I	II	III	IV	V	VI	VII	VIII
Km	0	9,6	15,4	17,2	15,8	8,4	9,6	20,4	14,9	13,6	7,5
%	0	2,2	4	4,3	5,1	2,9	2	3,9	4	3,2	2

To develop her aerobic effort capacity F.M.M. employs an increased proportion of varied terrain running during the winter preparation period (95,6-92,5-80,9 Table 9 and 10), which then decreases during intramural contests of the winter preparation period (Table 9 and 10). The percentage of varied terrain running increases again during the spring preparation period (74,2-85,7-74,2) and continues so (76,9-71,4-70,1) during the extramural competition period. The percentage of varied terrain running the mixed amount has high values (76,9-74,7-74,9%) during the winter preparation period and almost constant values over the year's duration (Table 9 and 11). The percentage within the anaerobic volume effort is absent since the preparation means includes only flat terrain running variants (Table 9 and 11). The objective competition was the J1 European Championship, Tallin/Estonia, 21-24.07.2011, 6th place – 5000m, 16:44:38 personal record.

3. CONCLUSIONS

By analyzing the degree of preparedness of Romania's best junior female middle-long distance runners, it results that varied terrain running represents the main means of preparation (L.D.E 2470.6 km , 63,3%, from the overall amount, Table 5; B.M.A 2563.3 km, 67,8% of the overall amount, Table 10; F.M.M 3256.8 km , 71,1% of the overall amount, Table 15) with a high percentage of aerobic effort (LDE 1614.5 km, 41,3% of overall amount, Table 5; B.A.M 1496.5 km, 38,4% of overall amount, Table 10; F.M.M 1721 km, 37,5% of overall amount, Table 15) and mixed (L.D.E 2168.1 km, 55,5% of overall amount, Table 5; B.A.M 2158.1 km, 57,9% of overall amount, Table 10; F.M.M 2725.4 km, 59,5% of overall amount, Table 15). The importance of employing varied terrain running as the main means for preparation is given by the proportion of this

form being included in the athlete's preparation programme, this emphasizing the top performances achieved. The percentage of varied terrain running as a means of preparation is higher during the autumn/winter and spring preparation periods.

4. RECOMMENDATIONS

The planning and programming of activities should be based on data obtained by analyzing the previous achievements of each individual athlete, both in terms of the main effort indicators as well as the amount of preparation means and methods employed. There should be concern about the workout in the mixed and aerobic zone by using varied terrain running up to 80-85% of the total amount. Assessing the level of physical preparation will be done several times using the control events. Recovery after training and contest is a mandatory component of the preparation activity due to the fact that the percentage of large and moderate efforts is increasing at this level..

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