

COMPARATIVE ANALYSIS OF FEMALE ELITE BIATHLETES' SPORTS RESULTS IN WORLD CUP COMPETITIONS BEFORE THE WORLD CHAMPIONSHIP AND DURING THE WORLD CHAMPIONSHIP IN THE SEASON OF 2010–2011

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ABSTRACT

Research background and hypothesis. Modern training trend for biathletes is the increasing intensity of the training process in competition activities. Competition activities of elite biathletes while preparing for the main competition of the season have received little attention by researchers. Research hypotheses: The number of starts and sports results in the competitions before the main competition of the season for elite biathletes are related to sports results in the main competition of the season.

Research aim was to analyse the interaction of biathletes' sports results and the number of starts, and to establish the relation of this interaction between the results achieved in World Cup competitions and World Biathlon Championship.

Research methods. The data have been retrieved from the documents of the International Biathlon Union (IBU): protocols of the World Biathlon Championship of 2011 and World Biathlon Cup competition. We analysed the sports results of female biathletes who took the 1st–10th places in the World Biathlon Championship in individual events.

Research results. World elite biathletes participated in E.ON and IBU category competitions 16.2 ± 3.74 times before the World Biathlon Championship. The number of starts correlates with the places taken by biathletes in the general account of the World Biathlon Cup before the world championship ($r = -0.83$). In the individual races in the World Championship, all medals were won by eight skiers, and five of them were among the first ten skiers in the general standing of World Cup competitions before the world championship.

Discussion and conclusion. The preparation of elite biathletes for the most important competition of the season – World Biathlon Championship is grounded on the repeated participation in the World Biathlon Cup competitions. Biathletes, taking the 1st–10th places in the general account of the World Biathlon Cup, are real applicants for medals in the World Biathlon Championship.

Keywords: number of starts, taken places, correlation, sprint, pursuit, mass start, individual start.

INTRODUCTION

In the period of competitions, participation in competitions and the loads of competitive activities improve the body adaptation to competitive activities (Pustovrh et al., 1995; Suslovas, 1999; Платонов, 2004). For some elite athletes in cyclic branches of sport competitive loads become the loads of special athletic training in the period of competitions. During the last 10–15

years athletes' results have been rapidly improving due to the increase in the number of competitions in the competition calendar in that branch of sports, but because of frequent participation in the competitions, the leaders of the season cannot achieve the results which were planned for them in the main competitions (Olympic Games, World Championships) (Суслов, 2002; Платонов, 2009).

In biathlon skiing races, predictions are confirmed only in 20–25% of cases (Платонов, 2009). The competition result in biathlon depends on the time to cover the skiing distance and on accurate shooting. During the competition, biathletes are affected by external factors (competition environment, competitors, spectators, weather conditions, and the terrain of the ski slopes) and internal factors (tension, anxiety, joy, fear). Those irritants cause psychological reactions which improve or worsen the final outcomes (Schmolinsky, 2000). It is very difficult to evaluate the influence of athletes' athletic fitness component on their results in the competitions (Cholewa et al., 2005).

Modern training trend for biathletes is the increasing intensity of the training process in competition activities, individual optimization of competition activities according to individual training plan for the most important competition of the season – World championship (Cholewa et al., 2005; Преображенцев, 2007). Competition activities of elite biathletes while preparing for the main competition of the season have received little attention by researchers.

Research aim was to analyse the interaction of biathletes' sports results and the number of starts, and to establish the relation of this interaction between the results achieved in World Cup competitions and World Biathlon Championship. **Research object** – indices of competition activities of biathletes who took the 1st–10th places in the World Biathlon Championship of 2011.

RESEARCH METHODS

The data have been retrieved from the documents of the International Biathlon Union (IBU): biathletes' results in the competition of E.ON IBU category, protocols of the World Biathlon Championship of 2011 and World Biathlon Cup competition (Biathlon¹⁻⁴, <http://www.biathlonworld3.de.html>). We analysed the sports results of female biathletes who took the 1st–10th places in the World Biathlon Championship in individual events. The research sample included 20 high-capacity world biathletes. The data were processed applying *Microsoft Excel 2003* programme and special statistical programme *SPSS 12.0 for Windows*. We calculated arithmetic means, standard deviations (SD), coefficients of correlation (r). Regression analysis of the data was performed.

RESEARCH RESULTS

In the season of 2010–2011 there were 19 individual biathlon races in the women's programme in the World Biathlon Cup competition before the beginning of the World Biathlon Championship: 11 of them were middle and long distance races (pursuit – 10 km, individual start – 15 km, mass start – 12.5 km) and eight sprint competitions – 7.5 km. The first biathlete in the general account of the World Biathlon Cup competition was German biathlete H. A. She participated in competitions 19 times. In the World Biathlon Championship Biathlete H. A. did not win any medal in individual events, and her best result was only the fourth place in 10 km pursuit race. In other distances she took the 13th, 20th, and the 46th places (Table). In the World Biathlon Championship the best biathlete was M. K. who won two gold medals and one silver medal. Before the world championship she participated in competitions 17 times and in general she was in the fifth place. It is interesting to note that biathletes B. T. and S. V. won silver and bronze medals in the World Biathlon Championship, but in the general account of World Biathlon Cup competition they took only the 18th and the 19th places, and before that they had participated in competitions 19 and 14 times. World elite biathletes participated in E.ON and IBU category competitions 16.2 ± 3.74 times before the World Biathlon Championship. The number of starts correlates (Figures 1, 2 and 3) with the places taken by biathletes in the general standing of the World Biathlon Cup before the world championship ($r = -0.83$), the places taken in the general standing of pursuit races ($r = -0.75$), and sprint ($r = -0.57$). In the individual events in the World Biathlon Championship the medals were won by biathletes who had taken the 2nd, 3rd, 4th, 5th, 6th, 18th, and 19th places in the general standing of World Biathlon Cup. Research results suggest that the number of starts in different distances in the World Cup competitions is related to the places taken by biathletes in the classification standing of those distances. Correlations between biathletes' taken places in different distances in World Cup competitions before the World Biathlon Championship and the places taken in the World Biathlon Championship are given in Figures 4 and 5. The places taken by biathletes in the World Cup competitions (in all distances) correlate with the 1–10th places taken in the World Biathlon Championship: with the places in pursuit competitions $r = 0.70$, and with the places in sprint $r = 0.20$ (Figures 6 and 7).

Table. Places taken and number of points of biathletes in 1st–10th places during the World Biathlon Championship 2011 and the number of starts in E.ON IBU category competitions before the World Biathlon Championship

Initials, s. n.	Places taken in World Championship				Number of days since the last start E.ON Category IBU competitions before the start in World Championship	Final standing of the Biathlon World Cup competitions before the beginning of the World Biathlon Championship									
	7.5 km Sprint	10 km Pursuit	15 km Individual start	12.5 km Mass start		General standing according to the results in all competitions		Sprint		Pursuit		Individual start competitions		Mass start competitions	
						Place	Number of starts	Place	Number of starts	Place	Number of starts	Place	Number of starts	Place	Number of starts
N. M.	1	2	5	1	19	5	15	3	6	7	4	16	2	3	3
M. K.	2	1	28	4	19	2	19	1	8	1	5	4	3	15	3
K. A.	3	6	9	10	42	14	14	8	6	18	3	30	3	12	3
Z. O.	4	12	–	6	42	13	14	16	6	16	3	1	3	26	2
E. H.	5	3	1	7	19	3	19	4	8	3	5	6	3	5	3
J. E.	6	10	7	15	42	20	14	5	6	20	3	24	3	2	2
B. T.	7	5	10	3	19	4	17	17	7	4	4	9	3	23	3
D. M.	8	15	6	8	19	11	19	14	8	8	5	13	3	11	3
G. M.	9	7	–	14	19	15	19	9	8	10	5	60	3	19	3
S. V.	10	24	11	16	19	10	19	13	8	9	5	3	3	14	3
H. A.	20	4	46	13	19	1	19	2	8	2	5	5	3	1	3
G. J.	17	8	–	28	44	50	13	47	6	47	3	–	–	–	–
W. D.	28	9	–	21	48	74	4	61	3	67	1	–	–	–	–
B. M.	44	–	–	9	19	8	18	10	8	15	4	2	3	4	3
B. T.	–	–	2	12	23	18	19	19	8	17	5	20	3	20	3
S. Vit.	18	17	3	24	42	19	14	18	6	23	3	12	3	22	2
G. T.	14	18	30	5	19	9	19	7	8	11	5	10	3	8	3
D. D.	26	35	19	2	19	6	19	6	8	5	5	29	3	6	3
S. N.	16	16	4	17	19	29	17	27	8	25	5	28	3	39	1
V. V.	55	34	8	30	20	51	13	52	7	41	4	54	2	–	–
X ± SD					26.55 ± 11.38		16.2 ± 3.74		7.05 ± 1.32		4.1 ± 11.12		2.89 ± 0.32		2.71 ± 0.59

Note. E.ON IBU – World Cup competitions of the International Biathlon Federation.

Pursuit – pursuit races when the start is given according to the time of slippage from the athlete winning the sprint races.

Figure 1. Relationship between biathletes' places in the general standing in the Biathlon World Cup competitions before the World Biathlon Championship and the number of their starts in World Cup competitions

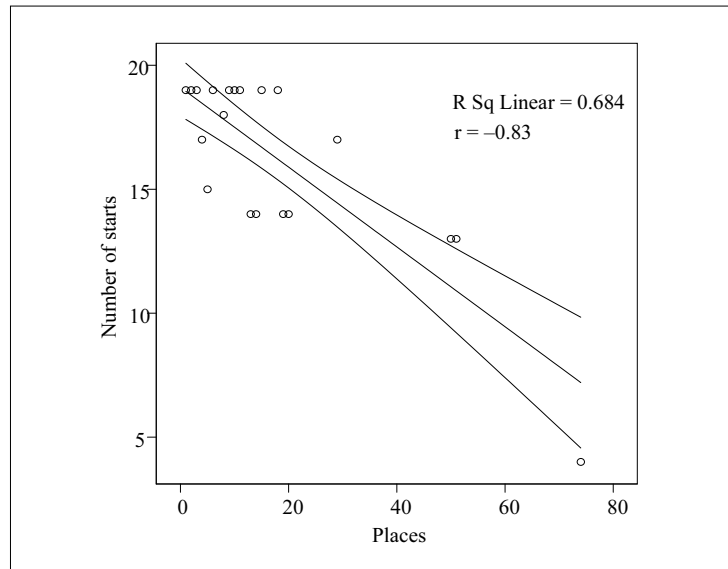


Figure 2. Relationship between biathletes' places in the general standing in the Biathlon World Cup pursuit races before the World Biathlon Championship and the number of their pursuit starts in World Cup competitions

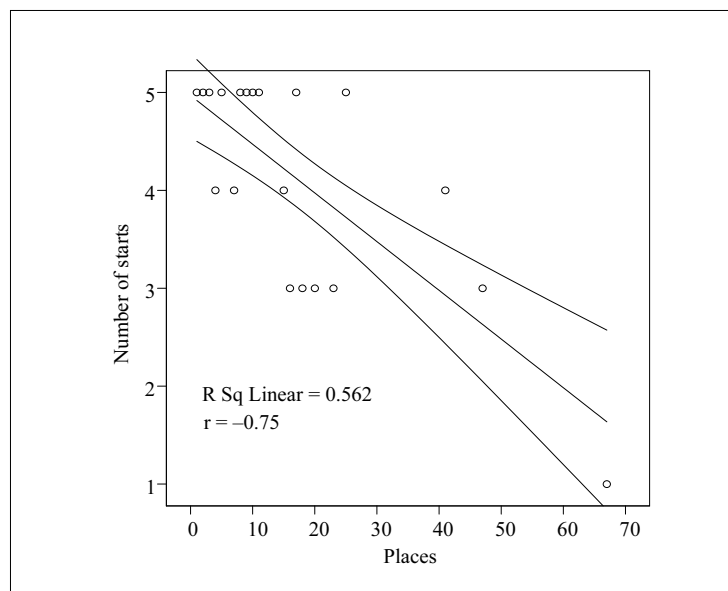
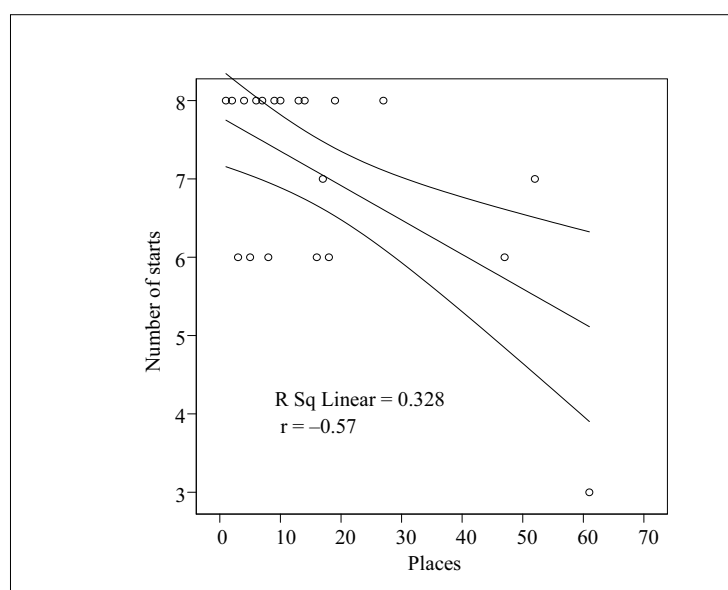


Figure 3. Relationship between biathletes' places in the general standing in the Biathlon World Cup sprint competitions before the World Biathlon Championship and the number of their sprint starts in World Cup competitions



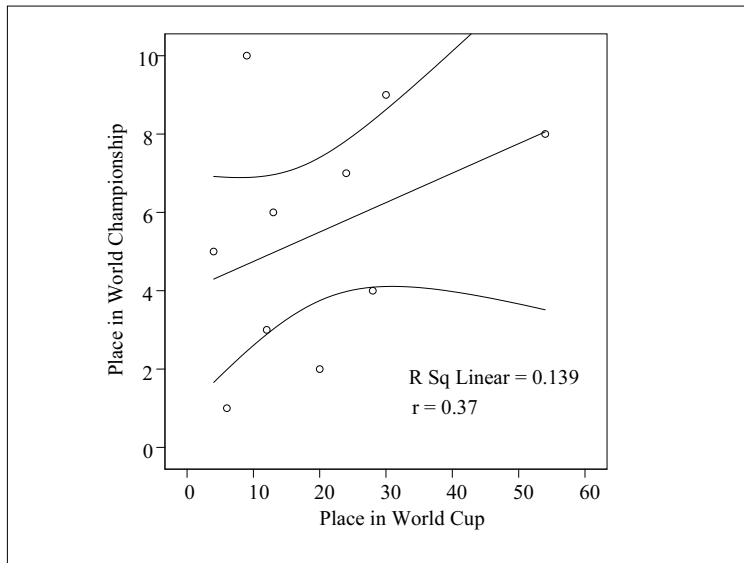


Figure 4. Relationship between biathletes' 1st–10th places in the individual start competitions in World Biathlon Championship and the places taken in the general standing in the Biathlon World Cup individual competitions before the World Biathlon Championship

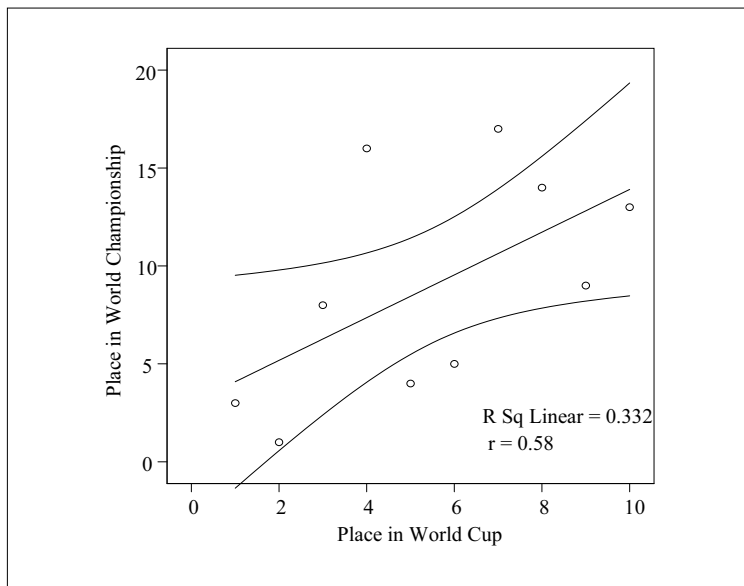


Figure 5. Relationship between biathletes' 1st–10th places in the general standing in the Biathlon World Cup sprint competitions before the World Biathlon Championship and the places taken in sprint in the World Biathlon Championship

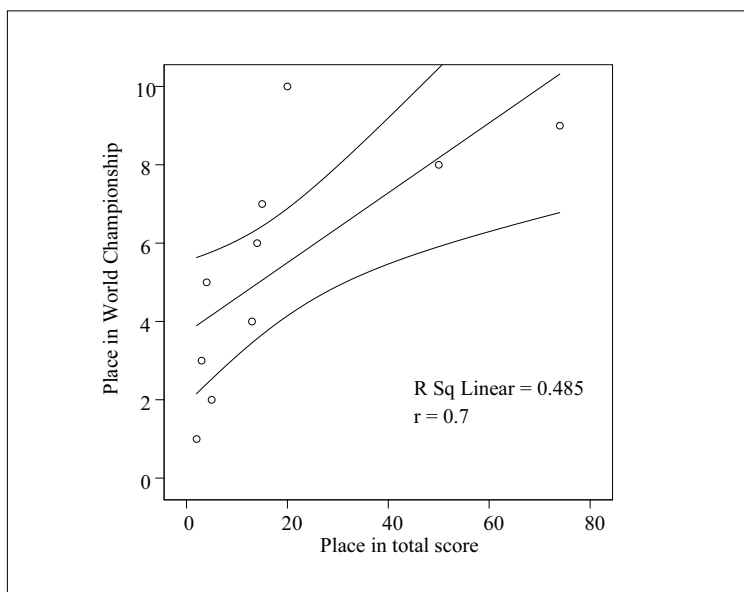
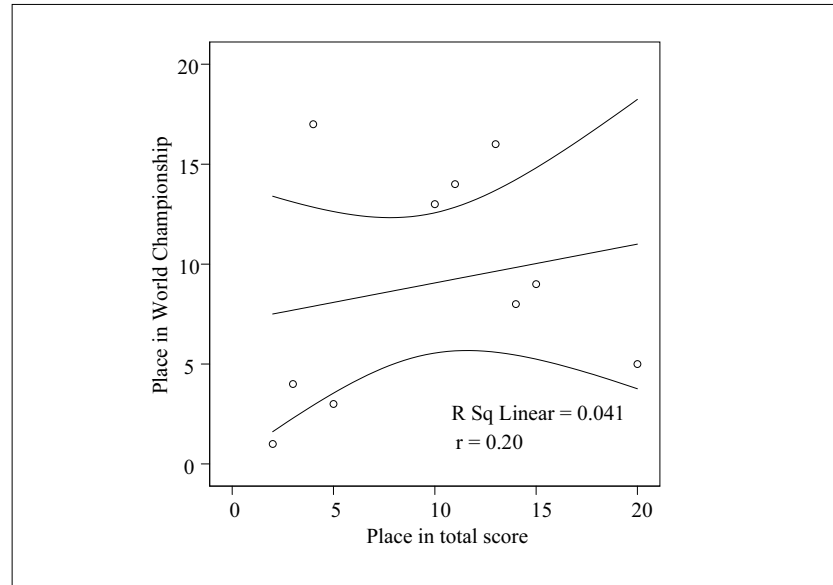


Figure 6. Relationship between biathletes' 1st–10th places in the pursuit competitions in the World Biathlon Championship and the places in the general standing in the Biathlon World Cup competitions in all distances before the World Biathlon Championship and the places taken in pursuit

Figure 7. Relationship between biathletes' places in the general standing in the Biathlon World Cup competitions in all distances before the World Biathlon Championship and places taken in sprint in the World Biathlon Championship



DISCUSSION

In biathlon the time of the run includes the time the biathlete spends on the course without the time spent for shooting. The most important factor influencing running time includes the level of physical fitness as well as technical and tactical preparation (Cholewa et al., 2005).

Because of the complexity of tasks in the biathlon, achieving a world class level by a talented athlete requires 8–12 years of systematic training aimed at developing a high level of physical and psychomotor fitness as well as great skiing and shooting skills (Rundel, Szmedre, 1998; Ryguła, 2002). It is evident that creating proper external conditions allows for the development of the internal potential of a particular athlete, which guarantees the achievement of world class results (Rundell, Bacharach, 1995).

Good sports shape of an athlete is related to the appropriately chosen number of starts and their distribution in the mesocycles of the competition period (Bompa, 1999; Suslovas, 1999; Платонов, 2009). Appropriately planned competitions considering the terms of relevant competitions help acquire the sports shape (Платонов, 2009).

Research results (Table) show that female biathletes who won medals in the World Biathlon Championship had participated 14–19 times in biathlon competitions before the championship. Biathlete N. M. having won two gold and one silver medals had 15 starts before the beginning of

the championship. Elite biathletes are universal, and they participate in sprint, individual start, mass start and pursuit races. The majority of elite biathletes did not participate in any competition 19 days before the beginning of the World Championship E.ON IBU category competitions (Table).

The strategy of biathletes' preparation for the world championship corresponds to the approach of sports training periodization (Платонов, 2009) stating that frequent participation in competitions before the main competition of the season requires a special preparation phase for the main starts. Before the beginning of the world championship, elite biathletes participated in the competitions of different distances: sprint – 7.05 ± 1.32 times, pursuit – 4.10 ± 1.12 times, individual start races – 2.89 ± 0.32 times, mass start races – 2.71 ± 0.59 times (Table).

The correlations between biathletes' places in the general standing in the Biathlon World Cup competitions in different distances before the World Biathlon Championship and the places taken in the same distances in the World Biathlon Championship are weak – in individual start competitions 0.37, in sprint they are higher – 0.58. We established that the 1st–10th places taken by biathletes in the general classification (in all distances) during the World Cup competitions before the championship strongly correlated

($r = 0.70$) with their places in pursuit competitions in the World Championship.

In the individual races in the World Championship, all medals were won by eight skiers, and five of them were among the first ten skiers in the general standing of World Cup competitions before the world championship. It is worth noting that in the 15 km individual start competition, the fourth place was taken by S. N. who was only 29th in the general classification before the World Championship. We suggest that biathletes who have taken the 1–10th places in the general standing in the Biathlon World Cup competitions are real applicants to win medals in the World Biathlon Championship.

CONCLUSION AND PERSPECTIVES

The preparation of elite biathletes for the most important competition of the season – World Biathlon Championship is grounded on the repeated participation in the World Biathlon Cup competitions. The places taken in the general standing of the World Biathlon Cup are the indices of biathletes' mastery and stability. Biathletes, taking the 1st–10th places in the general standing of the World Biathlon Cup, are real applicants for medals in the World Biathlon Championship.

Modern training trend of elite biathletes is the individual optimization of competition activities according to individual training plan for the most important competition of the season.

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ELITO BIATLONININKIŲ SPORTINIŲ REZULTATŲ PASAULIO TAURĖS VARŽYBOSE IKI PASAULIO ČEMPIONATO IR REZULTATŲ ČEMPIONATE LYGINAMOJI ANALIZĖ PER 2010–2011 M. SEZONĄ

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SANTRAUKA

Tyrimo pagrindimas ir hipotezė. Elito biatlonininkų šiuolaikinė treniravimo kryptis – treniravimo vyksmo intensyvinimas per varžybinę veiklą. Elito biatlonininkų varžybinė veikla rengiantis pagrindinėms sezono varžyboms dar mažai tirta. Tyrimu tikrinama hipotezė, kad elito biatlonininkų startų skaičius ir sportiniai rezultatai iki pagrindinių sezono varžybų turi sąveikos ryšių su sportiniais rezultatais pagrindinėse sezono varžybose.

Tikslas – išnagrinėti elito biatlonininkų sportinių rezultatų sąveiką su startų skaičiumi ir nustatyti sąveikos ryšį tarp rezultatų, pasiektų Pasaulio taurės varžybose iki pasaulio čempionato ir rezultatų pasaulio biatlono čempionate.

Metodai. Duomenys paimti iš Tarptautinės biatlono federacijos (IBU) dokumentų: 2011 m. pasaulio biatlono čempionato varžybų protokolų, Pasaulio biatlono taurės varžybų dokumentų. Analizavome sportinius rezultatus biatlonininkų, kurios pasaulio biatlono čempionate individualiose rungtyse užėmė 1–10 vietas.

Rezultatai. Pasaulio elito biatlonininkės iki pasaulio čempionato dalyvavo $16,2 \pm 3,74$ kartų E.ON bei IBU kategorijos varžybose.

Startų skaičius turi koreliacijos ryšių su biatlonininkų užimtomis vietomis Pasaulio taurės varžybų bendrojoje įskaitoje iki pasaulio čempionato pradžios ($r = -0,83$). Per pasaulio čempionatą individualios programos lenktynėse visus medalius laimėjo aštuonios biatlonininkės ir iš jų penkios Pasaulio taurės varžybų bendrojoje įskaitoje iki pasaulio čempionato pradžios buvo pirmajame dešimtuke.

Aptarimas ir išvados. Pasaulio elito biatlonininkų pasirengimas svarbiausiam sezono startui – pasaulio čempionatui pagrįstas dažnu dalyvavimu Pasaulio biatlono taurės varžybose. Biatlonininkės, Pasaulio biatlono taurės varžybų bendrojoje įskaitoje užimančios vietas pirmame dešimtuke, yra realios pretendentes laimėti medalius pasaulio čempionate.

Raktažodžiai: startų skaičius, užimtos vietos, koreliacija, sprintas, persekiojimo lenktynės, masinis startas, individualus startas.

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