

# ANALYSIS OF WORLD BIATHLON LEADERS' PARTICIPATION IN BIATHLON WORLD CUP (ON EXAMPLE OF WOMEN'S BIATHLON)

Zubrilov R.A.<sup>1</sup>, Pidgrushna O.M.<sup>2</sup>

<sup>1</sup>State Autonomous Institution of the Tyumen Region «Centre of Sports Training and Sports Events»

<sup>2</sup>Lviv State University of Physical Culture

**Abstract.** *Purpose:* optimization of elite female biathlons' training, considering modern structure of international competitions. *Material:* we analyzed materials of three recent IBU Congresses and more than 3300 protocols of competitions of World cup stages, world championships, winter Olympic Games (women, sport seasons from 2005 to 2015). *Results:* it was found that, when preparing for winter Olympic Games 63.9% of sportsmen – prize winners missed 13.6% of stages of World Cup, when preparing for world championships 47.2% of prize-winners missed 9.5% of stages. Before the main start of the season in Europe prize winners missed in conditions of plain: 42.1% - 7.9% of World Cup stages; in midlands conditions 61.9% - 13.9%; in competitions with preliminary trans-meridian travel 54.2% of prize-winners missed 13.1% of stages. *Conclusions:* most of medals are won at world championships and Olympic Games by sportswomen, who are in top-10 of World Cup. The World Cup calendar of events forces sportsmen to miss some stages of World Cup, when they prepare to main start of season. Attitude of world biathlon leaders to missing of World Cup stages before main start of season depends on main character of main start of season. With it main condition for taking decision about missing of World Cup stages is rank of competitions and geographical characteristics of places of competitions.

**Key words:** biathlon, World Cup, individual, competition, calendar of events.

## Introduction

Recent time there have been observed quick rise of biathlon popularity. Including of short-distance, spectacular races in competitions, well organized informational provisioning increased spectator audience (both on stadiums and before TV sets). It resulted in formation of international calendar of events' structure with a system of quotas and admittances [1, 2]. Rigid, multi-level structure of calendar of events was formed, which excluded weakly trained sportsmen's admittance to international competitions. Recent years commercial starts and different shows have been being admitted to international calendar of events. Leading biathlons have been started to be invited to such competitions. It resulted in significant expansion of calendar of events. In its turn it resulted in increasing of competition system's influence on strategy of biathlons' training. At modern stage such trend exists also in other kinds of sports [3, 4, 5].

At present, participation in competitions is used as effective mean of perfection of fitness's different sides. It is connected with the fact that many tasks can not be solved in ordinary trainings [6, 7, 8, 9]. It should also be added that in theory of sports it is not recommended to abuse competition practice. Besides, it is recommended to use competitions only in the scope, suitable for ensuring sportsmen's maximal readiness to main starts of season (MSS). On the other hand, there is another trend – insufficient sportsmen's adaptation to competitions factors. It results in unsuccessful performances owing to insufficient competition practice [10, 11, 12, 13, 14]. It is considered that distinctive feature of modern sports (biathlon inclusive) is trend to wider usage of competition practice. With every year commercialization embraces wider rages of modern sports. In this connection in biathlon there appeared specialists (coaches and sportsmen), who tray to combine solution of two main tasks: realization of maximal results at MSS (world championships, winter Olympic Games) and earning of maximally possible amount of prize money at commercial starts.

In opinion of sports' theoreticians it is possible in kinds of sports with low competitiveness among sportsmen. If so, biathlon, with its tight calendar of events, is exclusion [3]. In this case there is an interference of factor, which is usually omitted by sportsmen and coaches: weakening of sport form. It results in significant overloads and reduction of organism's adaptation potentials on the eve of MSS [11, 13, 14, 15]. Therefore, as on to day a question about rational quantity of starts for receiving optimal competition practice before MSS has become very topical. In scientific-research literature on biathlon [7, 8, 9, 16, 17, 18, 19] we could not fine recommendation on this question.

Winter Olympic Games (WOG) are the highest rank of competition structure in biathlon as well as every year world championships (WC). Their competition program is coordinated and structuralized in compliance with World Cup (WP) calendar of events on biathlon [2]. World Cup and Kyбok IBU Cup on biathlon are considered commercial starts in Ukraine. Just at them quotas and admittances to world championships and winter Olympic Games are earned [1, 2].

Sport seasons of two recent Olympic cycles in biathlon (2006-2010 and 2010-2014) had 25-26 starts. These starts were included in general normative of WC (3-4 individual races, 10 sprinter races, 6-8 pursuits, 5 mass starts). From them 18-21 starts are included in national normative [20]. In total 33-34 starts in the frames of World Cup are fulfilled by the strongest sportsmen (they run in relay races and mixed relay races most often). It makes mean density of one start for 3.3

– 3.5 days during competition period [20]. Besides, sportsmen participate in national championships and Cups, World Universiade, open championship of Europe, world championships for military officers and different shows. It significantly increases competition density in season. The conducted by us in previous work analysis of World Cup calendar of events [20] shows that construction of its blocks (trimesters) does not consider amount of days for organism's adaptation to heights' differences, to time zones. In this case constant starts take place in abnormally wasteful phase of organism's adaptation to mountain or time conditions. It significantly reduces sportsmen's functional potentials and results in weakening of sport form. It is especially inadmissible on the eve of MSS. Thus, successful performance at MSS is impossible without missing of certain WC stages [20].

#### **Purpose, tasks of the work, material and methods**

*The purpose of the research* was optimization of elite female biathlons' training, considering modern structure of international competitions.

*The tasks of the research:*

1. Analysis of scientific-methodic literature for studying of competitions rules' and structure's influence on results of performances in main start of season.
2. Analysis of world biathlon leaders' participation in competition program of World Cup on biathlon.
3. To determine influence of World Cup calendar of events on results of sportsmen's performances at MSS (world championships, Olympic Games), depending on main characteristic of MSS.

Analysis was carried out basing on materials of recent three IBU Congresses (2010, 2012, and 2014); more than 3300 protocols of World Cup stages' competitions among women, world championships and winter Olympic Games from 2005/2006 to 2014/2015).

#### **Results of the researches**

Analysis of changes in competition rules for biathlon (by materials of IBU congresses) clearly shows that at present situation in general and national standings in World Cup on biathlon significantly influence on application quotas, formation of applications by groups and receiving of more favorable start numbers at MSS. In this connection we analyzed the character of medals' distribution among leaders of world biathlon (women) at MSS. We analyzed individual kinds of competition program before and after MSS depending on rating in World Cup (see table 1). We also analyzed participation of general WC prize winners and all MSS champions and prize winners in individual kinds of competition program for women. We were interested in quantity of missed starts and stages of World Cup before MSS, general regularities of the missed stages depending on quantity of stages before MSS, rank of competitions, main geographic characteristics (height above sea level, latitude and longitude of stadium's location) (see tables 2, 3, 4).

#### **Discussion**

Analysis of sportswomen's performances in individual kinds of sports at WOG (Salt Lake City) and in season 2000-2001 and 2001-2002 on biathlon [3] permitted to say that most of WC 2002 leaders and winners could not win gold medals or become prize-winners at WOG 2002. Sportsmen, who were not leaders in their kinds of sports, became Olympic champions. These sportsmen participated in Cup competitions fragmentary, in "training" purposes and took part only in separate stages. In opinion of F.P. Suslov [3], one must not strive to achieve two purposes: to win WOG and WC.

We do not agree fully with him. In our opinion as on to day situation in biathlon has cardinally changed. The most quantity of medals at WOG 30И-2006, 2010 and 2014, in individual kinds of program were won by sportswomen, who were on the top of biathlon WC rating. From 8-10 medal-winners at WOG 33,3 – 62,5% were in rating WC before MSS in first ten; 66,7 – 75% were in first fifteen sportswomen (see table 1).

Practically all WOG medal-winners stood on the podium at WC stages. Exclusion was only Helena Khrustaliyova, who won medal at WOG 2010 года медаль. On one of WC stages she earned only 23<sup>rd</sup> place. But before WOG the sportswoman did not miss any start at WC stages. It can be assumed that this sportswoman performed at WC with training purposes, but evidently not "fragmentary" and she did not restrict her participation in WC.

Sportswomen with the highest quantity of medals, won at WOG, won in the same season general standings in WC (Kati Wilhelm, 2006; Magdalena Neuner, 2010). From 9 winners and prize-winners of WC in three recent Olympic seasons only two sportswomen were without medals at WOG. It was Helena Jonsson – 10<sup>th</sup> best place at WOG (2010). Also Kaisa Makarainen, who won World Cup of season 2013-2014 (at WOG 2014 she could earn only sixth place).

Season 2013-2014 differs by counting of WC scores from other sport seasons by the fact that MSS was not set off as WC (though at three previous Olympic Games scores of Olympic disciplines were taken in account when counting WC scores). If to re-count WC 2013-2014 considering starts at WOG 2014, then WC in season 2013-2014 should have been won by Darya Domracheva (1005 scores) (three gold medals at WOG 2014), the second - Tora Berger (993), and the third - Kaisa Makarainen (973).

**Table 1.** Medals' distribution among world biathlon leaders at main starts of season in individual kinds of competition program

No	Year	Quantity of sportswomen n-medal winners	% of medals, won by sportswomen, who took position in top-10	Before MSS	In WC final	Top - 6	Top - 10	Top -15	Top - 6	Top - 10	Top - 15	Quantity of sportswomen, who won medals, and entered "top" of final of general WC standings (in brackets % from general quantity of medal winners)
1.	2006	8	66,7	75,0	4 (66,6)	5 (62,5)	6 (75,0)	5 (83,3)	6 (75,0)	6 (75,0)	6 (75,0)	6 (75,0)
2.	2010	9	41,7	58,3	2 (33,3)	3 (33,3)	6 (66,7)	3 (50,0)	3 (50,0)	5 (55,6)	5 (55,6)	6 (66,7)
3.	2014	10	58,3	66,7	3 (50,0)	5 (50,0)	7 (70,0)	5 (83,3)	5 (83,3)	6 (60,0)	6 (60,0)	8 (80,0)
4.	2007	8	91,7	91,7	5 (83,3)	7 (87,5)	7 (87,5)	6 (100)	6 (100)	7 (87,5)	7 (87,5)	7 (87,5)
5.	2008	7	66,7	66,7	3 (50,0)	5 (71,4)	5 (71,4)	4 (66,7)	4 (66,7)	5 (71,4)	5 (71,4)	5 (71,4)
6.	2009	7	50,0	83,3	3 (50,0)	3 (42,9)	4 (57,1)	4 (66,7)	4 (66,7)	5 (71,4)	5 (71,4)	5 (71,4)
7.	2011	8	75,0	83,3	5 (83,3)	5 (62,5)	6 (75,0)	5 (83,3)	5 (83,3)	6 (75,0)	6 (75,0)	7 (87,5)
8.	2012	8	75,0	83,3	5 (83,3)	6 (75,0)	7 (87,5)	5 (83,3)	5 (83,3)	6 (75,0)	6 (75,0)	8 (100)
9.	2013	8	66,7	75,0	3 (50,0)	4 (50,0)	6 (75,0)	3 (50,0)	3 (50,0)	5 (62,5)	5 (62,5)	6 (75,0)
10.	2015	9	41,7	50,0	2 (33,3)	4 (44,4)	7 (77,8)	3 (50,0)	3 (50,0)	5 (55,6)	5 (55,6)	8 (88,9)

**Table 2.** Statistic of missed by leaders of women world biathlon leaders World Cup stages before MSS (champions and prize-winners of WCh, WOG in individual disciplines of competition program in sport seasons from 2006 to 2015)

No	Main start of season (WC stages to MSS)	Missed stages of World Cup								Total man\stages	Analyzed sample (persons)	% of participati on in missing of WC stages	% of missed stages from total quantity
		1	2	3	4	5	6	7	8				
1	Before WOG 2006 Cesana San Sicario ( 6 )	1	1	1	2	1	2	2	7	8	75,0	14,6	
2	Before WCh 2007 Anterselva ( 6 )			1	2	2	3	3	6	8	50,0	12,5	
3	Before WCh 2008 Östersund ( 6 )			1	1	1	3	7	3	7	50,0	7,1	
4	Before WCh 2009 Pyeong Chang ( 6 )	1	3	2	1	1	7	7	7	7	71,4	16,7	
5	Before WOG 2010 Vancouver ( 6 )	1	1	3	1	2	8	9	8	9	55,6	14,8	
6	Before WCh 2011 Khanty-Mansiysk ( 8 )	1	1	2	2	6	6	8	6	8	37,5	9,4	
7	Before WCh 2012 Ruhpolding ( 8 )			1	1	4	1	8	1	8	12,5	1,6	
8	Before WCh 2013 Nové Mesto ( 6 )		1	2	1	4	4	8	4	8	50,0	8,3	
9	Before WOG 2014 Sochi ( 6 )	2	2	1	3	7	7	10	7	10	60,0	11,7	
10	Before WCh 2015 Kontiolahti ( 8 )	2	2	2	2	9	9	9	9	9	62,5	12,5	
11	In total before MSS from 2006 to 2015	8	3	10	13	6	58	82	58	82	62,5	12,5	

Notes: character of missed WC stage see in table 3 (more specifically – in article of Ye.M. Pidgrushna ) [20];

- missing of WC stages by three sportswomen (Albina Akhatova (2008), Anastasiya Kuzmina (2009), Ekaterina Yurlova (2015)) was not taken in account because it was connected with sportswomen's entering team or winning quotas but not with solution of strategic tasks of

**Table 3.** Geographic conditions of WCh and WOG on biathlon in 2006 – 2015 sport seasons [20]

No	Place of MSS	Years of MSS	Height above sea level, m (difference of ski distances' heights)	UTC	North latitude (N)	East longitude (E), west longitude (W)
1.	Cesana San Sicario Torino (ITA)	2006	1680	+1	44°57'29" N	6°48'22" E
2.	Anterselva (ITA)	2007	1634 (1626-1673)	+1	46°47'0" N	12°3'0" E
3.	Östersund (SWE)	2008	355 (350-392)	+1	63°11'0" N	14°40'0" E
4.	Pyeongchang (KOR)	2009	850 (830-900)	+9	37°22'0" N	28°24'0" E
5.	Vancouver (CAN) (парк Whistler)	2010	860 (850-910)	-8	50°7'15" N	122°57'16" W
6.	Khanty-Mansiysk (RUS)	2011	83 (63-114)	+6	60°59'2" N	69°1'34" E
7.	Ruhpolding (GER)	2012	710 (701-733)	+1	47°42'52" N	12°38'51" E
8.	Nové Město (CZE)	2013	625 (620-665)	+1	49°33'51" N	16°4'35" E
9.	Sochi (RUS)	2014	1441 (1414-1471)	+4	43°40'43" N	40°12'19" E
10.	Kontiolahti (FIN)	2015	120 (88-128)	+2	62°46'0" N	29°51'0" E

**Table 4.** Summary table of characteristics of missed by leaders of women world biathlon World Cup stages before MSS (champions and prize-winners of WCh, WOG in individual disciplines of competition program in sport seasons from 2006 to 2015)

No	Main characteristic	Missed stages of World Cup World Cup stages								Total man\stages	Analyzed sample (persons)	% of participation in missing of WC stages	Quantity of characteristi c's repetitions	% of missed stages from total quantity
		1	2	3	4	5	6	7	8					
1.	Before WOG	4	-	3	8	2	5	22	29	63,0	3	13,6		
2.	Before WCh	4	3	7	5	4	5	36	56	47,2	7	9,5		
3.	Before WCh after 6 WC	1	1	7	3	4	4	20	30	55,2	4	11,1		
4.	Before WCh after 8 WC	3	2	-	2	-	1	16	26	37,5	3	8,0		
5.	Before MSS on plains	3	3	3	3	1	2	23	41	42,1	5	7,9		
6.	Before MSS in mountains	5	-	7	10	5	8	35	44	61,9	5	13,9		
7.	Before trans-meridian MSS	3	-	4	5	2	3	21	26	54,2	3	13,1		

The same situation is in not Olympic seasons. Sportswomen with gold medals, won at WCh, won in the same season WC: Andrea Henkel (2007), Magdalena Neuner (2008), Helena Jonsson (2009), Kaisa Makarainen (2011), Magdalena Neuner (2012), Tora Berger (2013). Only in season 2014-2015 WC winner Darya Domracheva remained without medals at WCh -2015. It can be regarded as accident but not as logical result.

The highest quantity of medals at WCh 2007-2015 was won by sportswomen, who were on top of WC biathlon rating. On seven WCh of 2007 – 2015 period leaders were distributed in the following way: three sportswomen (from 21 for the passed period) could not win medals in individual disciplines: Sandrine Bailly (WCh 2008) with two 5<sup>th</sup> places; Andrea Henkel (WCh 2011) with fourth place; Darya Domracheva (WCh 2015) with 4<sup>th</sup> and 7<sup>th</sup> places. The places, taken by these sportswomen, are not unsuccessful. In average from 7-8 medal-winners of WCh only 1-2 sportswomen can not enter the ten of the strongest WC before MSS.

Analysis of biathlon world leading sportswomen's participation in main starts of season and four years' period as well as in WC permitted to highlight two starting points in competition structure. The first is sportswomen's rating in WC before MSS. It was noted in our previous works: position in rating influences significantly on application in best start group and on getting in race from mass start [1, 2, 21]. The second is struggle for "Crystal globe", which implies final results of WC at the end of sport season. Recent years there appear a trend that leaders stopped "fear" to loose score in struggle for "Crystal globe". They began to miss stages of WC before MSS (see tables 2 and 4). In characters of missed WC stages there is no unified pattern. Sportswomen miss WC stage on plain and WC stages in mountains. Probably it is connected with different models of training ("mountain" and "plain"). Though the made by us analysis showed that "mountain" stages are missed most frequent. For example, from 58 analyzed by us cases of WC stages' missing by leading sportswomen – 35 relate to "mountain" stages. It makes 60,34% of all cases (see tables 2 and 4).

Depending on main characteristic of MSS (rank of competitions – WOG or WCh; geographical conditions and time zone; position of MSS in calendar of WC events) attitude of world biathlon leaders to missing of WC stages before MSS is different (see table 4). The minimum quantity of missing before WCh in Europe (plain conditions): only 42,1% of prize-winners miss 7,9% of stages with density 4,6 man/stages of competitions. In Ruhpolding (GER) it was 12,5% sportsmen with 1,6% of missed stages; in Östersund (SWE) – 50,0% with 7,1; Nové Mesto (CZE) – 50,0% with 8,3%. By geographical characteristics all these places are optimal for both: sportswomen from Europe and sportswomen from Ukraine/ Unexpectedly many sportsman/stages were missed before "plain" Kontiolahti (FIN) – 62,5% with 12,5%. However this percentage was ensured only by two sportswomen, who missed 3 stages each.

We observed more responsible attitude to WOG (63,0% of sportswomen with missing 13,6% of WC stages) than to WCh (47,2% with 9,5%). However, the highest quantity of WC stages' missing was observed before MSS in unfavorable conditions; in "mountain" conditions 61,9% with 13,9; in trans-meridian conditions 54,2% with 13,1%. Worsening of WCh and WOG prize-winners' rating after MSS was noticed only in those sportswomen, who stop perform in WC after MSS. As a rule this is the way of behavior of sportswomen of post-soviet space. They do not pretend to get in top-10. Sportswomen from west perform at WC stages after MSS without missing.

### Conclusions:

1. As on to day it is not true that in biathlon Olympic champions become: not leaders of WC; sportsmen, who participated in Cup competitions fragmentary, with "training" purposes and restricted by participation in separate stages [3]. Most of medals at WCh and WOG in individual kinds of program is won by sportswomen, members of top-10 WC. The rest win from 12,5 до 28,6% of medals.
2. Innovations in competitions' rules force leading biathlons of the world to strive to get in top-10 and top-15 of current WC before MSS. It is conditioned by solution of strategic tasks at MSS.
3. Leaders stopped "fear" to loose score in struggle for "Crystal globe". They began to miss stages of WC before MSS. In average they miss one WC stage with three starts. But there are examples of missing of 2-6 starts (Andrea Henkel, 2007; Magdalena Neuner, 2010).
4. Attitude of world biathlon leaders to missing of WC stages before MSS is different. It depends on main characteristic of MSS. Less of all missing were before WCh, conducted in Europe in conditions of "plain". When preparing to WOG there is much more missing of WC stages (13,6%), than when preparing for WCh (9,5%). However, main condition for taking decision about missing of WC stages before MSS is rank of competitions and geographical characteristics of places of competitions. For example, before MSS in "mountain" conditions 13,9% of sportsmen miss. 13,1% of sportsmen miss starts, requiring preliminary trans-meridian travels.

5. Sportswomen (with rare exclusion) do not miss WC stages before MCC in places, which, by their geographical characteristics, are optima for sportsmen of Central Europe and Ukraine. (Ruhpolding, GER; Nové Mesto, CZE).

6. Worsening of WCh and WOG prize-winners' rating in WC after MSS concerns only those sportswomen, who can not pretend on high rating in WC final and stop performing in WC. As a rule this is the way of behavior of sportswomen of post-soviet space. Sportswomen from west perform at WC stages after MSS without missing.

*The prospects of further researches* in this direction we see in creation of optimal individual calendar of events for effective preparation for main start of season (WCh, WOG).

#### **Acknowledgment**

The authors express gratitude to creators and system administrators of site of International union of biathlons (<http://biathlonworld.com>), from which all technical information (calendar and protocols of competitions) was taken.

The research was conducted on the authors' own, without any financing. The direction of the work corresponds to scientific topic "Perfection of training process in winter kinds of sports" by specialty "24.00.01. – Olympic and professional sports" of combined plan of scientific-research works in sphere of physical culture and sports for 2011-2015 of Ministry of youth and sports of Ukraine.

#### **Conflict of interests**

The authors declare that there is no conflict of interests.

#### **Reference**

1. Zubrilov RA. *Strelkovaia podgotovka biatlonista* [Firearms training of biathlon sportsman], Kiev: Olympic Literature; 2010 (in Russian)
2. Pidgrushna EM, Zubrilov RA. Osobennosti sistemy mezhdunarodnykh sorevnovanij po biatlonu na sovremennom etape [Peculiarities of biathlon international competitions system at present stage]. *II Vserossijskaia nauchnaia konferenciia «Sovremennaia sistema sportivnoj podgotovki v biatlone»*. Omsk, 29–30 apreliia 2012 g. [II All Russian scientific conference "Modern system of sport training in biathlon". Omsk. April 29–30, 2012], Omsk; 2012. p. 127–131. (in Russian)
3. Suslov FP. O strategii sorevnovatel'noj praktiki v individual'nykh vidakh v olimpijskie gody [ On strategy of competition practice in individual kinds in Olympic years]. *Teoriia i praktika fizicheskoi kul'tury*, 2002;11:30–33. (in Russian)
4. Samoylenko ST. Individual'nyj opyt postroeniia trenirovochnogo processa na etapakh neposredstvennoj podgotovki k glavnym sorevnovaniiam v bege na srednie distancii [Individual experience of construction of training process at stages of direct preparation for main competitions in run for average distances]. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2011;7:71–76. (in Russian)
5. Kozlova OK. Napriami doslidzhennia problemi pidgotovki sportsmeniv visokoi kvalifikacii v umovakh profesionalizacii [Directions of research of problem of elite sportsmen's training in conditions of professionalization]. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2011;12:42–45. (in Ukrainian)
6. Zubrilov RA. *Stanovlenie, razvitie i sovershenstvovanie tekhniki strel'by v biatlone* [Formation, development and perfection of shooting technique in biathlon], Moscow: Soviet sport, 2013 (in Russian)
7. Kinl VA. *Biatlon* [Biathlon], Kiev: Health; 1987 (in Russian)
8. Mulik VV. *Mnogoletniaia podgotovka v biatlone* [Many-years' training in biathlon], Kharkov: KhGIPhK; 1999 (in Russian)
9. Klaus Nietzsche. *Biathlon: Power - Training – Competition*. Wiesbaden: Limpert; 1998 (in German)
10. Keller VS. Sorevnovatel'naia deiatel'nost' v sisteme sportivnoj podgotovki [Competition functioning in system of sport training]. *Sovremennaia sistema sportivnoj podgotovki* [Modern system of sport training], Moscow: SAAM; 1995 (in Russian)
11. Matveyev LP. *Osnovy obshchej teorii sporta i sistemy podgotovki sportsmenov* [Principles of general theory of sports and system of sportsmen's training], Kiev: Olympic Literature; 1999 (in Russian)
12. Platonov VN. *Sistema podgotovki sportsmenov v Olimpijskom sporte* [System of sportsmen's training in Olympic sports], Kiev: Olympic Literature; 2004. (in Russian)
13. Suslov FP, Sych VL, Shustin BN. *Sovremennaia sistema sportivnoj podgotovki* [Modern system of sport training], Moscow: SAAM; 1995 (in Russian)
14. Platonov VN. *Teoriia sporta* [Theory of sports], Kiev: High School; 1987 (in Russian)

15. Meyerson FZ. *Obshchij mekhanizm adaptacii i profilaktiki* [General mechanism of adaptation and prophylaxis], Moscow: Medicine; 1973 (in Russian)
16. Gibadullin IG. *Upravlenie trenirovochnym processom v sisteme mnogoletnej podgotovki biatlonistov. Doct. Diss.* [Control of training process in system of many years' biathlons' training. Doct. Diss.], Izhevsk; 2005 (in Russian)
17. Dunayev KS. *Tekhnologiya celevoj fizicheskoy podgotovki vysokokvalificirovannykh biatlonistov* [Technology of targeted physical training of elite biathlons], Sankt Petersburg: Olimp St-P; 2007 (in Russian)
18. Karintsev IA. *Podgotovka kvalificirovannykh biatlonistok* [Training of qualified female biathlons], Chaykovsky, GIPhK; 2006 (in Russian)
19. Chumakov VN. *Modelirovanie sorevnovatel'noj deiatel'nosti kvalificirovannykh biatlonistok. Cand. Diss.* [Simulation of competition functioning of qualified female biathlons]. Cand. Diss.], Sankt-Peterburg; 1993 (in Russian)
20. Pidgrushna O. Analiz sportivnogo kalendara Kubka svitu z biatlonu [Analysis of calendar of events of biathlon World Cup]. *Sportivna nauka Ukraini*, 2015;1(65):26–35 (in Ukrainian)
21. Pidgrushna EM, Zubrilov RA. Vliianie startovogo nomera na sportivnyj rezul'tat v biatlone [Influence of start number on sport result in biathlon]. *II All Russian scientific conference "Modern system of sport training in biathlon"*. Omsk. April 29–30, 2012]. Omsk; 2012. p. 132–139. (in Russian)

**Information about the authors:**

**Zubrilov R.A.;** <http://orcid.org/0000-0001-9884-9958>;  
zubrilov.roman@mail.ru; State Autonomous Institution of the  
Tyumen Region «Centre of Sports Training and Sports  
Events»; Lunacharsky st., 12. CST-72, Tyumen, 625001,  
Russia.

**Pidhrushna O.M.:** <http://orcid.org/0000-0003-1514-013X>;  
pidhrushna87@gmail.com; Lvov State University of Physical  
Culture; Kostyushko str. 11, Lvov, 79007, Ukraine.

**Cite this article as:** Zubrilov R.A., Pidgrushna O.M. Analysis  
of world biathlon leaders' participation in biathlon World Cup  
(on example of women's biathlon). *Pedagogics, psychology,  
medical-biological problems of physical training and sports*,  
2015;11:39–46.

<http://dx.doi.org/10.15561/18189172.2015.1106>

The electronic version of this article is the complete one and can be  
found online at: <http://www.sportpedagogy.org.ua/html/arhive-e.html>

This is an Open Access article distributed under the terms of the  
Creative Commons Attribution License, which permits unrestricted  
use, distribution, and reproduction in any medium, provided the  
original work is properly cited  
(<http://creativecommons.org/licenses/by/4.0/deed.en>).

Received: 16.07.2015

Accepted: 19.08.2015; Published: 02.09.2015