



50km race walk women: history, analysis and evolution of a race

April 8, 2020

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GOAL

- To research the difference in performance between male and female athletes
- Analysis of the evolution of performance in women's 50km races
- Analysis of the pacing strategy of the major international competitions
- Modification of programming and training methodology



HISTORY OF 50KM RACE WALK

- Race walk was born between XVII and XVIII century, and became known in XIX century with the name of *pedestrianism*
- For the first time at the Olympic Games in 1904 inside the All Around. In 1906 first time as a single race
- First 50 km to the Olympic Games in 1932 in Los Angeles
- Never run official women's races on 50 km distance before 2016
- In Scanzorosciate (BG) since 1999 women already took part in the 50 km race
- The first officially recognized women's race over the 50 km distance was in Rome in 2016 during the World Race Walking Team Championships



ENDURANCE PHYSIOLOGY: DIFFERENCES BETWEEN THE SEXES

Three determining factors:

- VO₂max
- ANAEROBIC THRESHOLD
- EFFICIENCY OF THE MOVEMENT

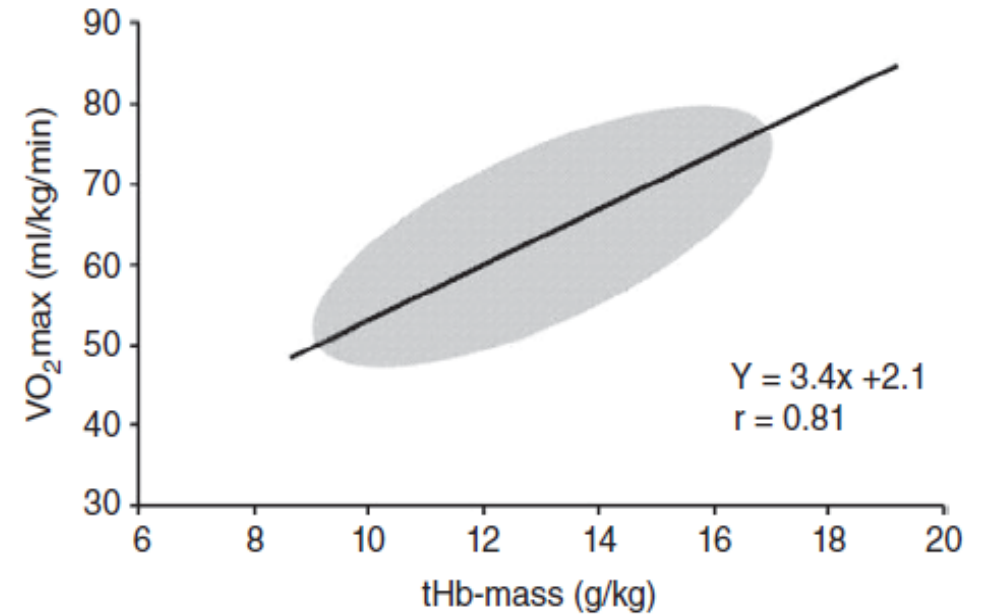
SCIENTIFIC LITERATURE SUGGESTS US THAT THE DIFFERENCES BETWEEN THE SEXES IN THE ENDURANCE PERFORMANCE ARE ABOUT 12%

(Hunter SK et al., 2011)



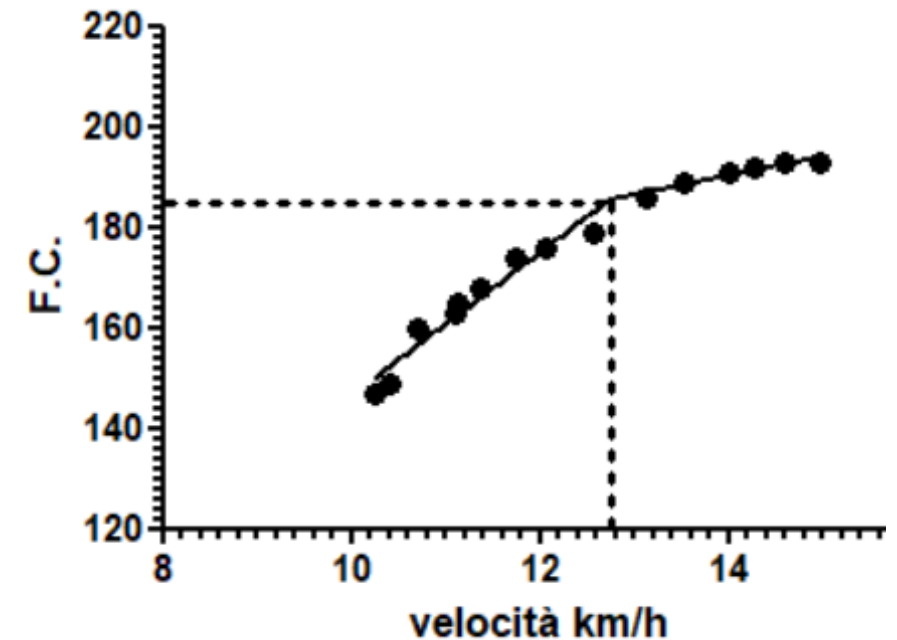
VO₂max

- Directly proportional to total hemoglobin and the Stroke Volume
- In women: $67,1 \pm 4,2 \text{ ml kg}^{-1} \text{ min}^{-1}$ (*Pate RR et O'Neill JR., 2007*)
- Values recorded in women about 10% lower
- Increased heart mass and SV following less training in women than men (*Howden EJ et al., 2015*)



ANAEROBIC THRESHOLD

- Exercise intensity associated with marked increase in blood lactate
- Related to the Critical Power (*Poole DC et al., 2016*)
- Training produces two adaptations: increase in mitochondrial density and increase in capillary density
- No obvious differences in the adaptation processes in the two sexes



EFFICIENCY OF THE MOVEMENT

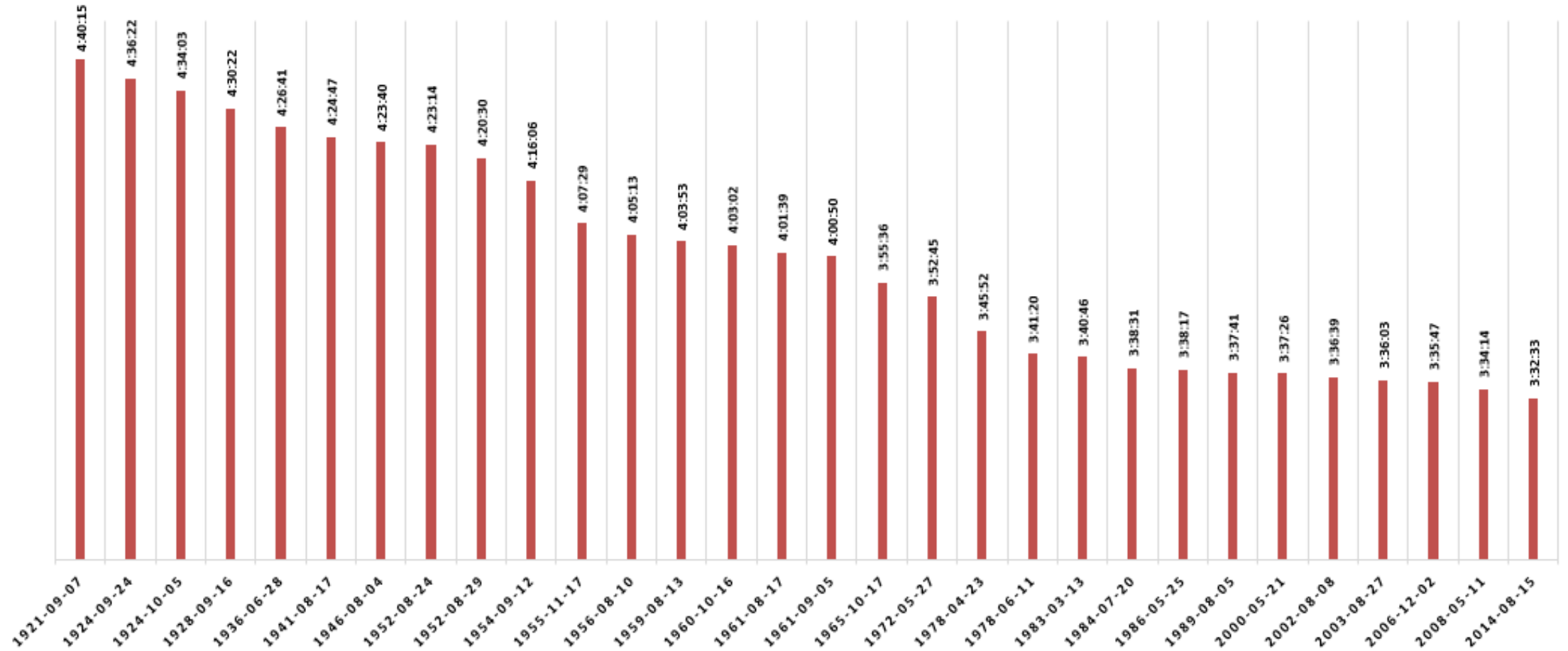
- Intensity differences of 15 - 20% for the same VO_2max value defined by the efficiency of the movement (*Joyner MJ, 1991*)
- Trainable especially in female athletes during late adolescence (*Moore IS, 2016*)
- In race walking it becomes fundamental as a technical discipline



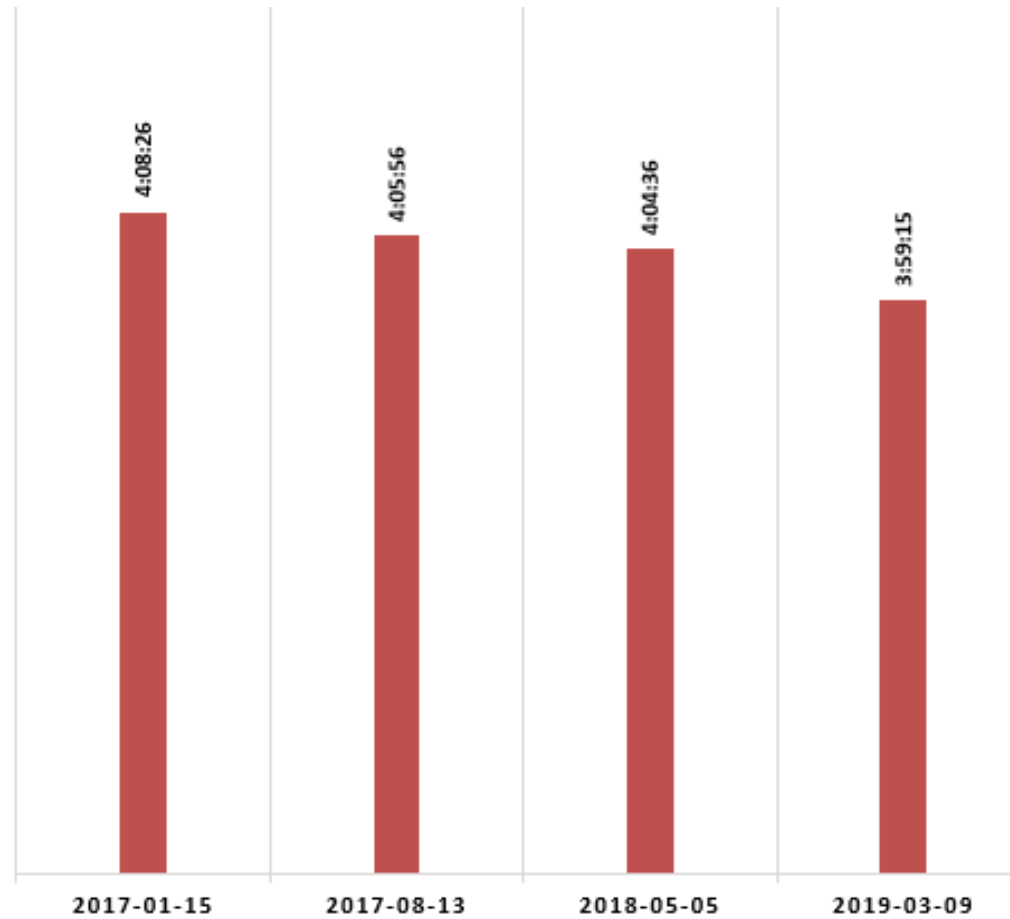


STATISTICAL ANALYSIS OF THE 50KM RACE WALKS

PROGRESSION OF THE MALE WORLD RECORD



PROGRESSION OF THE FEMALE WORLD RECORD



	WR male	WR female	Δ WRm/WRf	%Δ WRm/WRf
Tempo	3:32:33	3:59:15	26:42	12,60%
Average speed (km/h)	14,11	12,54	1,57	---
Average speed (min/km)	4:15	4:47	32"	---
Δ 25th athlete	2,70%	6,80%	---	---

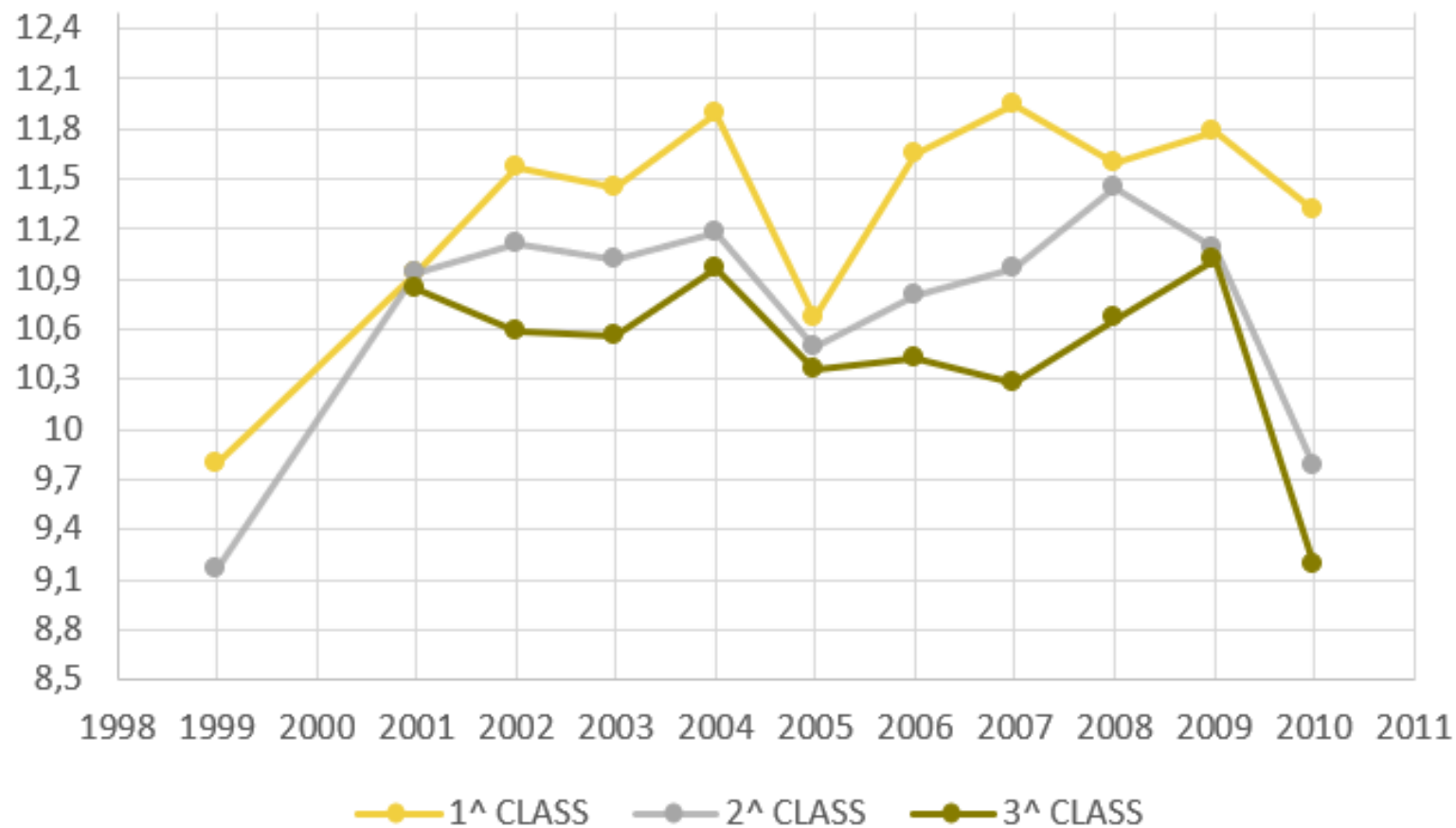
- Difference between the two world records is 12,6%
- UgSame as the difference between the world records in Marathon
- Differences that attest to the criteria of the scientific literature
- Greater than the difference between the world records in 20km walk (10,4%)
- Less time for the development of performance in the women's race
- Difference between WR and 25th best athlete in males is 2,7% while in women it is 6,8%





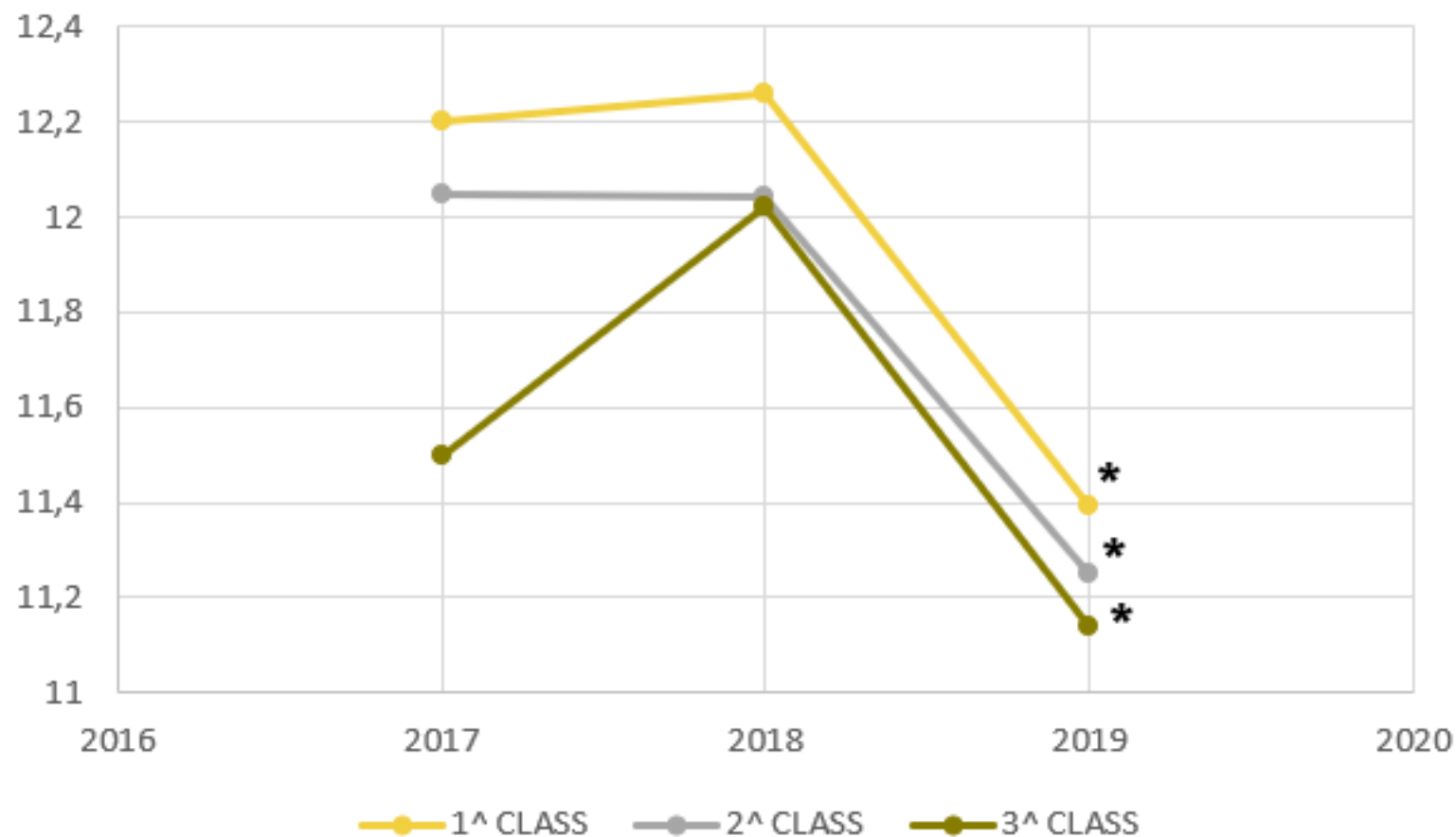
ANALYSIS OF THE PACING STRATEGY OF FEMALE RACES

AVERAGE SPEED FIRST THREE CLASSIFIED



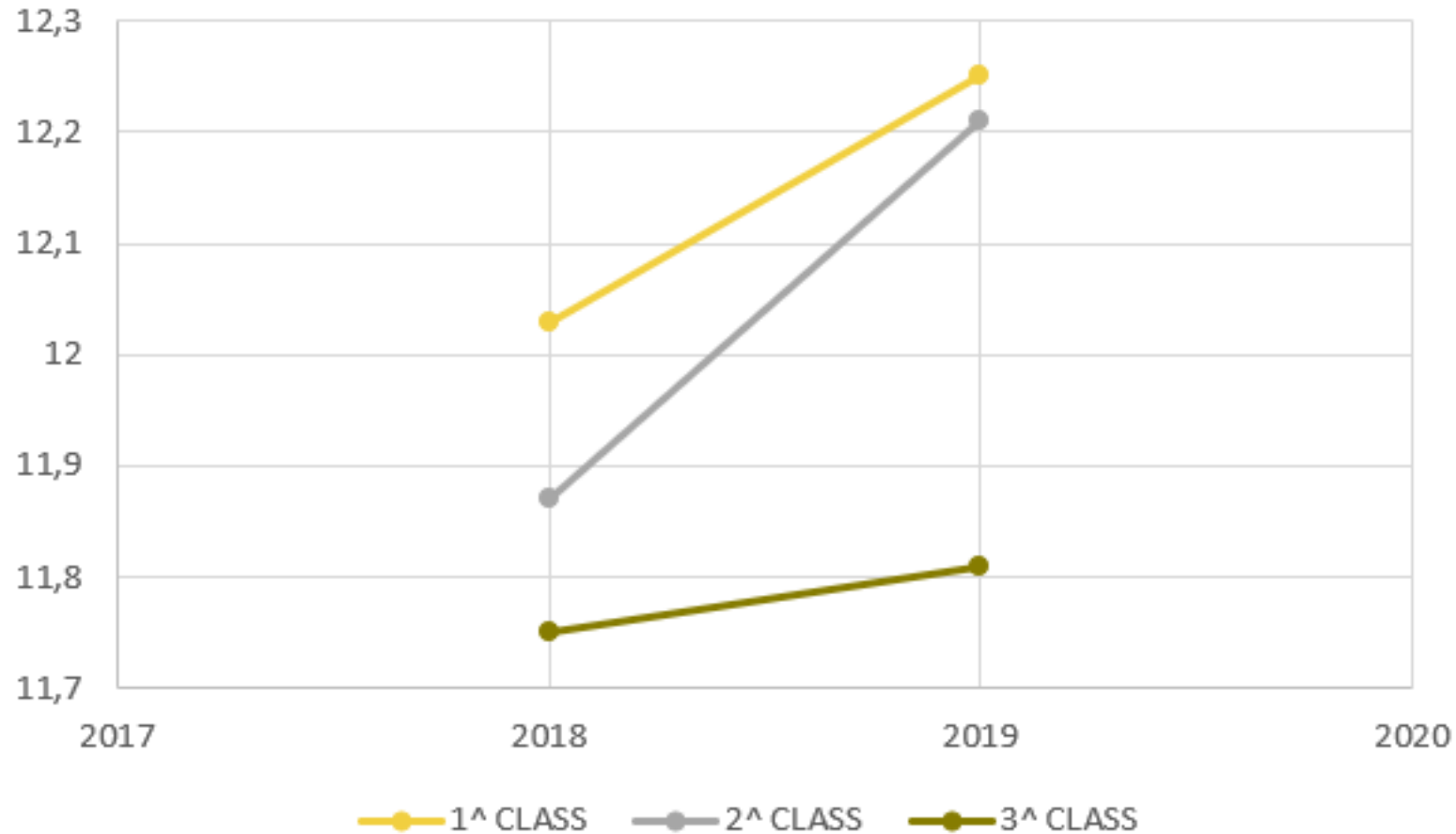
Scanzorosciate (BG), 1999 - 2010

AVERAGE SPEED FIRST THREE CLASSIFIED



World Athletics Championships 2017, 2019
World Race Walking Team Championships 2018

AVERAGE SPEED FIRST THREE CLASSIFIED

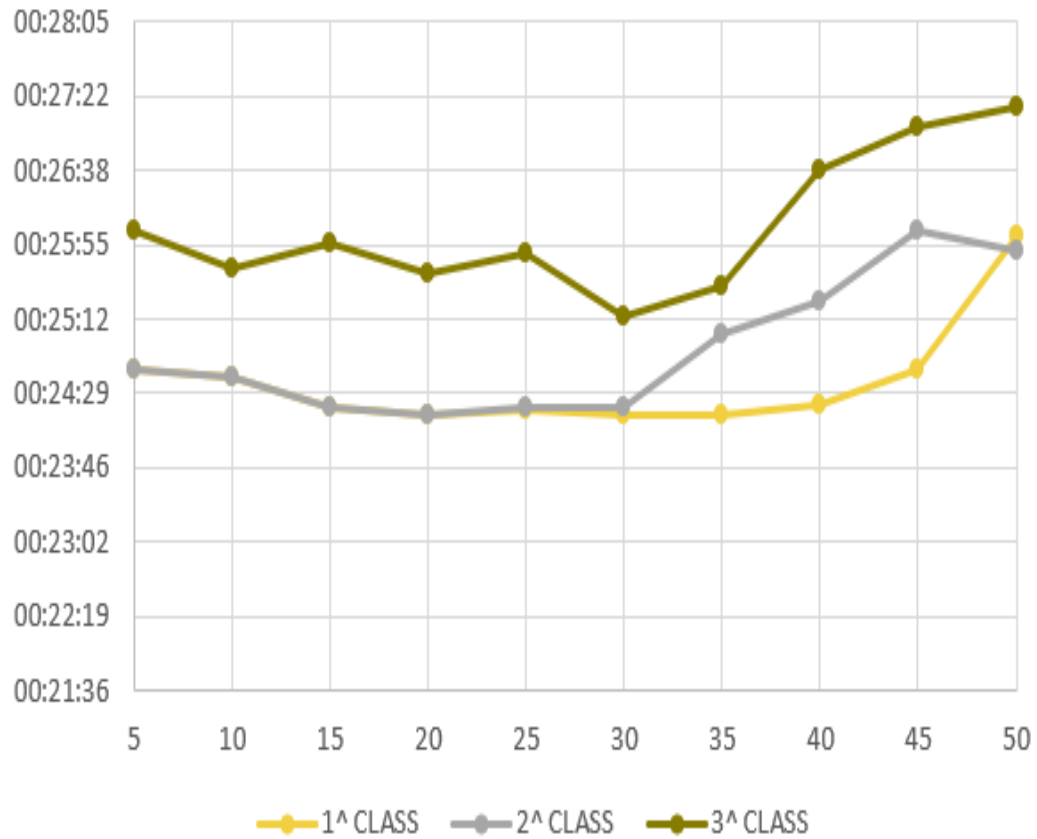


European Athletics Championships 2018
European Race Walking Cup 2019

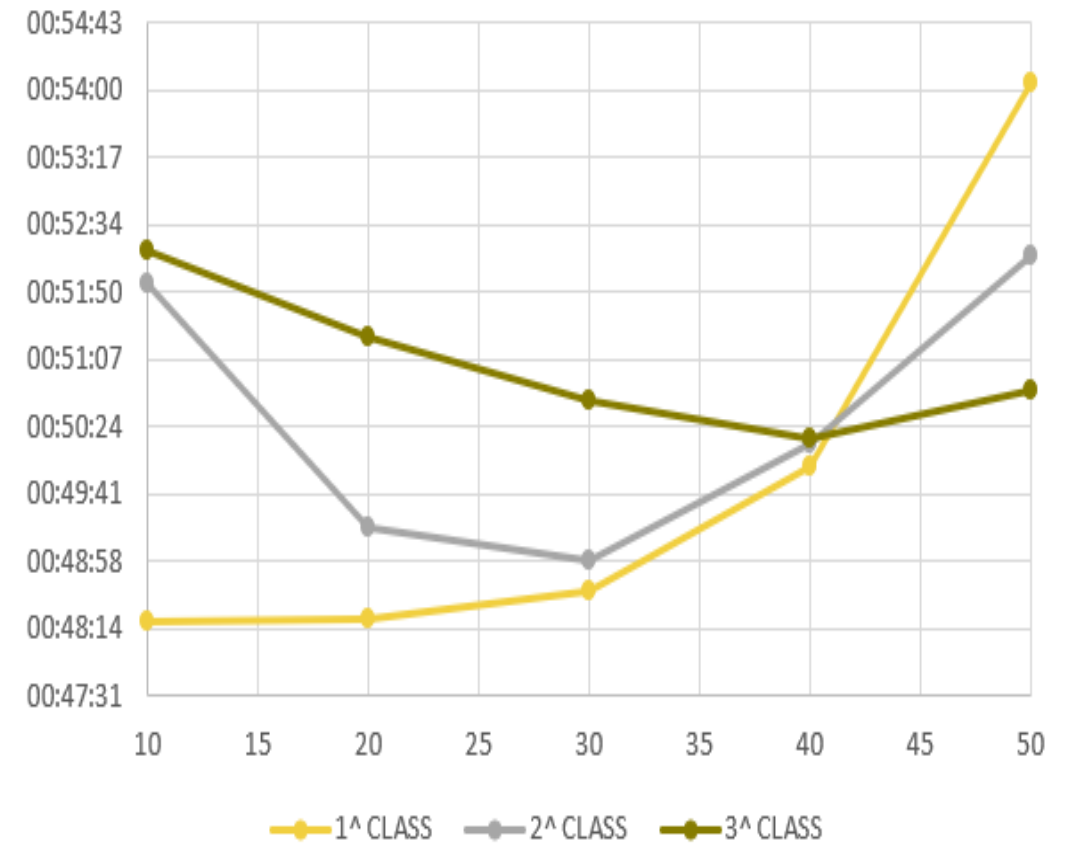
- The travelling time of the first classified has clearly improved over the years
- The average speed of the winners of the last international events is 7% better than that of the winners of the Scanzorosciate races
- The officialisation of the race allowed a performance development due to an improvement in the training methodology
- The 2019 World Athletics Championships race was conditioned by particularly adverse weather conditions (performance drop of 6.6%)



PACING STRATEGY

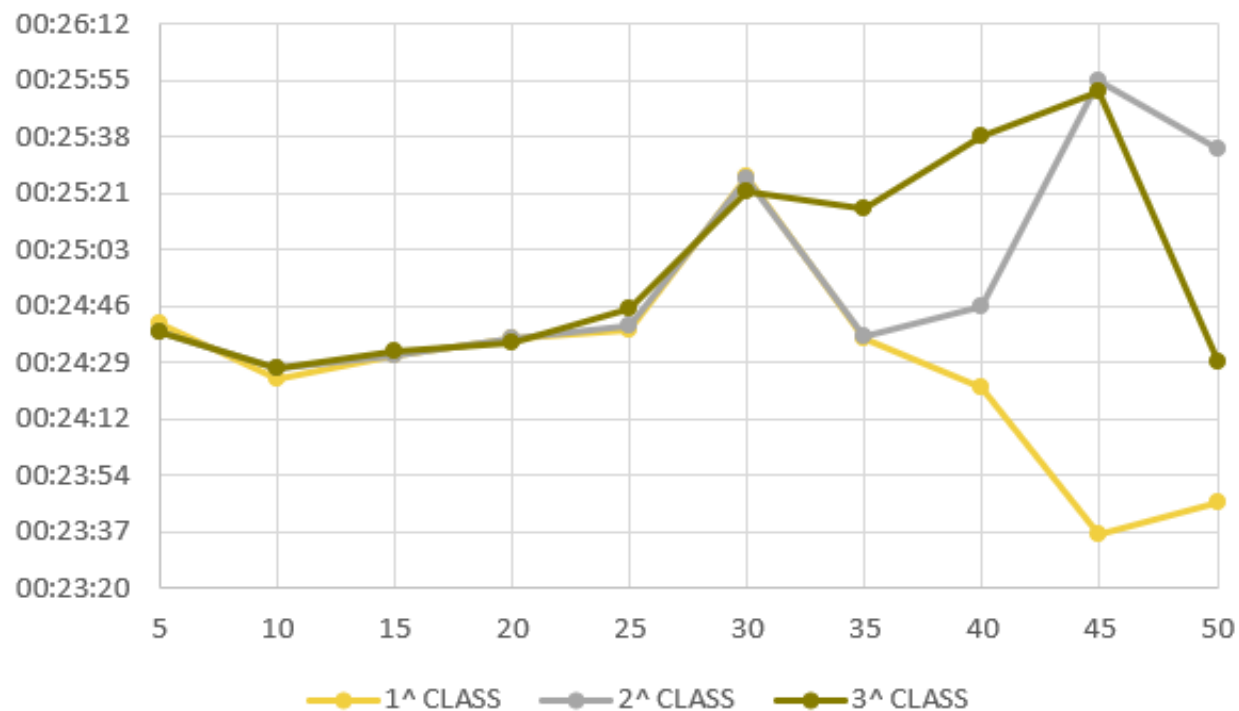


World Athletics Championships 2017

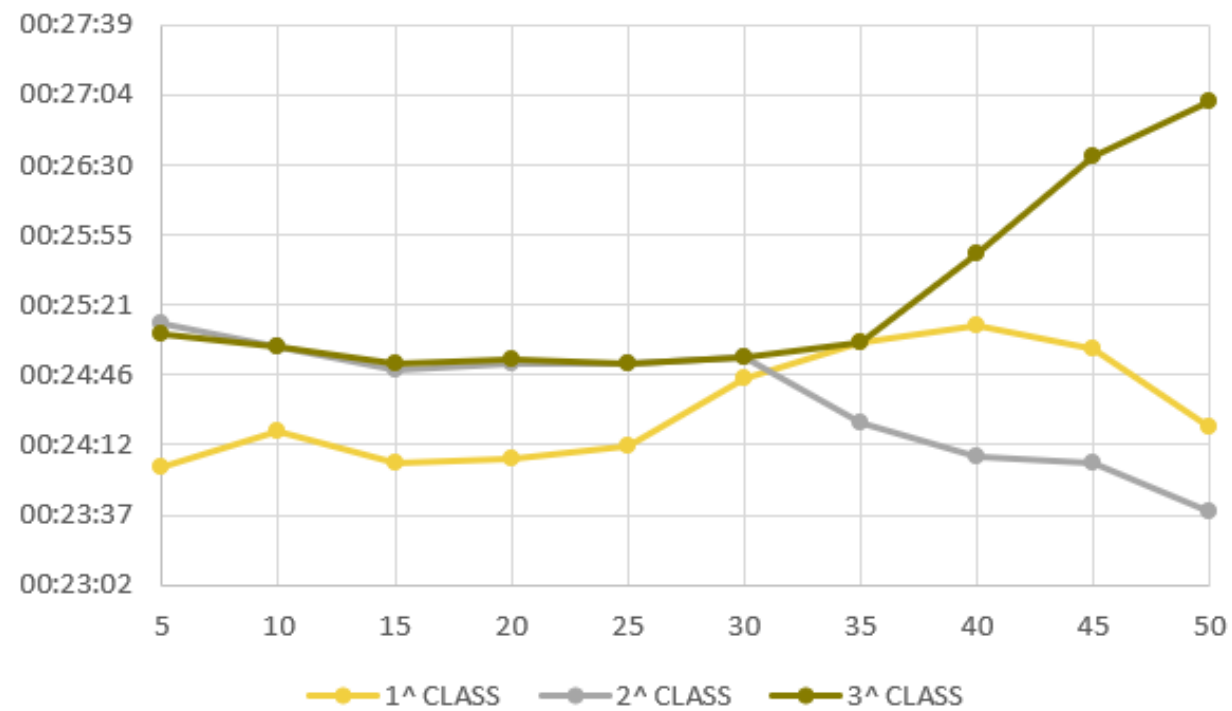


European Athletics Championships 2018

PACING STRATEGY

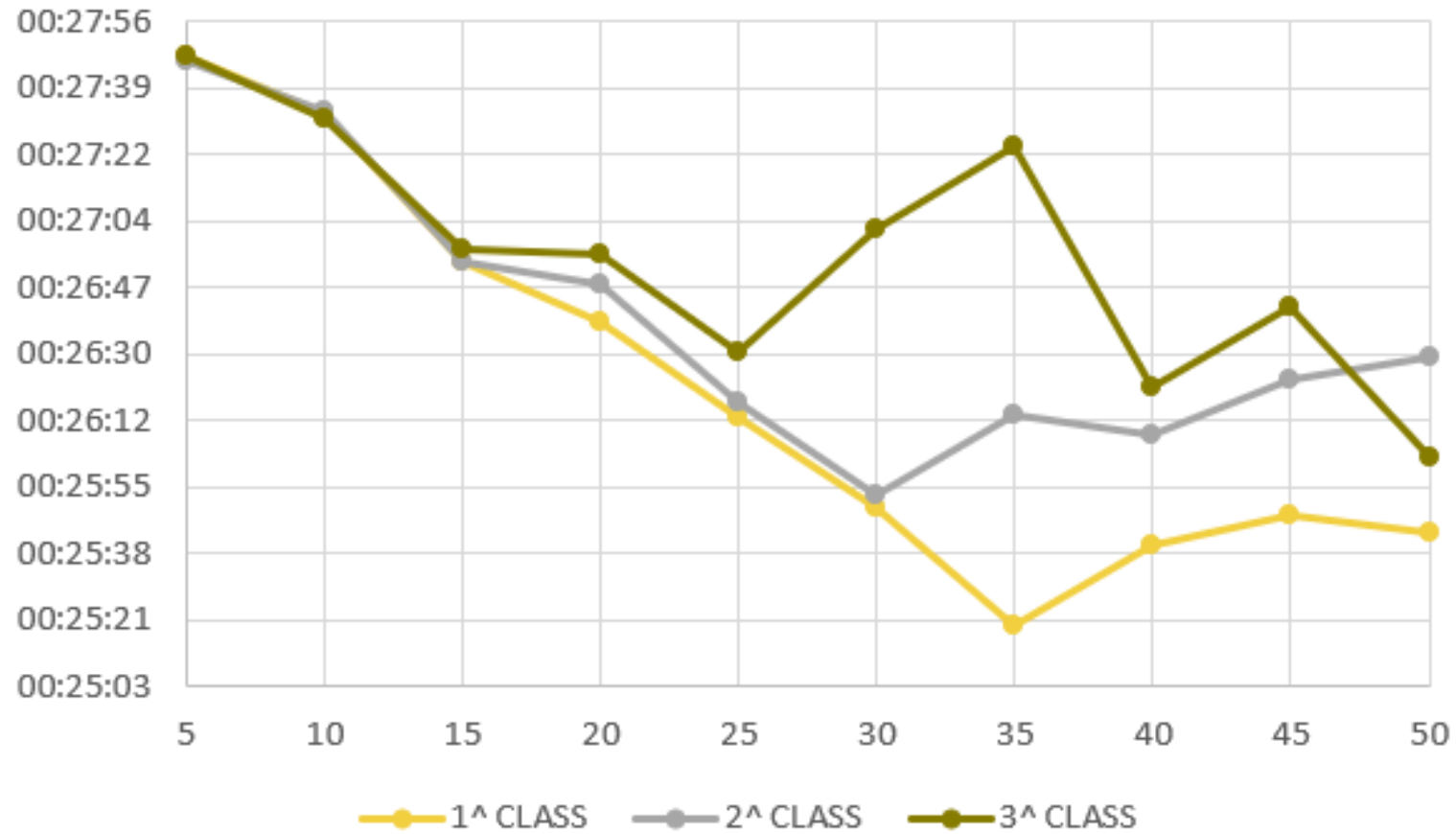


World Race Walking Team Championships 2018



European Race Walking Cup 2019

PACING STRATEGY



World Athletics Championships 2019

- In all the performances we note how the race varies a lot once completed 25 km (i.e. half the race)
- It is essential to maintain high intensity after the 30 km race
- Two possible routes: maintain medium-high intensity throughout the race or make a progression of the pace in the last 20 km
- It becomes extremely important to get the athletes used to producing considerable intensity even in conditions of great fatigue





EVOLUTION OF THE PREPARATION FOR THE 50 KM RACE, A CASE STUDY

- **Athlete:** Nicole Colombi, 29/12/1995
- **Performance in 50km walk:** 4:27:38 (27/01/1995)
- **Data collection:** tests carried out in the years 2016, 2018 and 2019
- **Goals:** to analyze the change in training in the shift from the 20km race to the 50km race

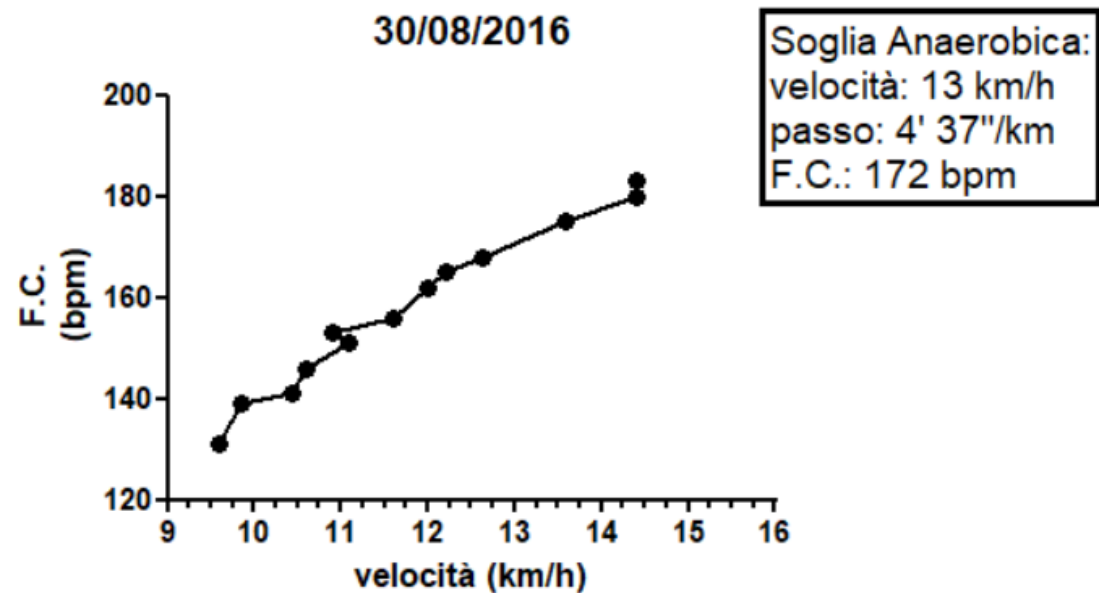
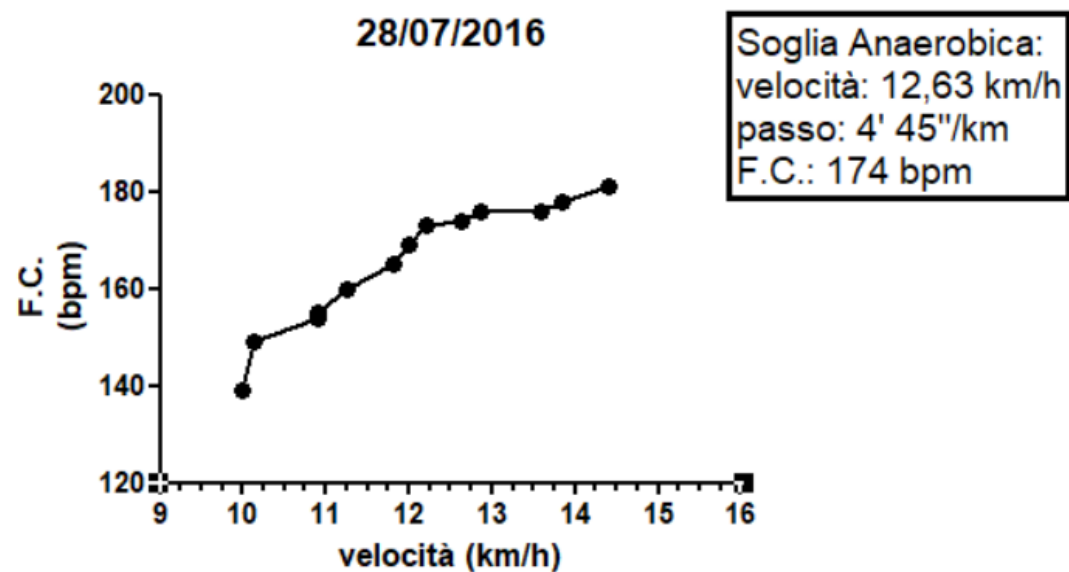


THE TEST

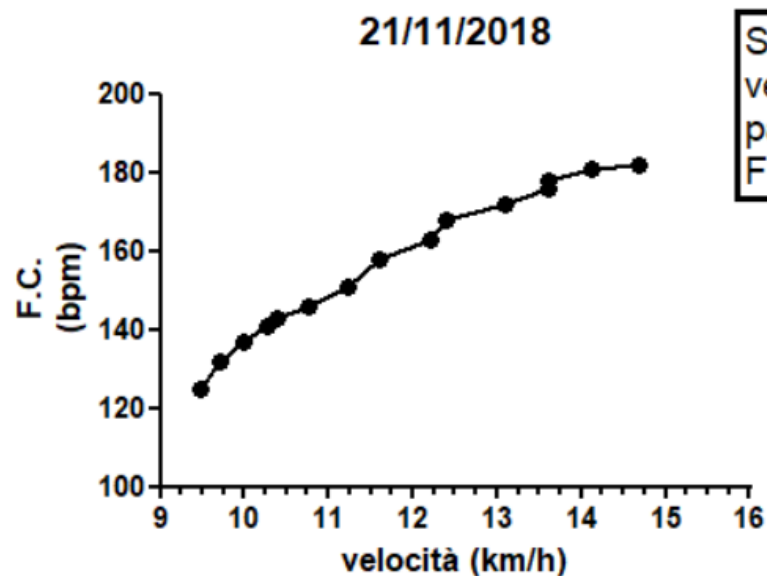
- It was decided to carry out the Conconi Test
- Evaluation of the Anaerobic Threshold
- Field test, non-invasive and well known by the athlete



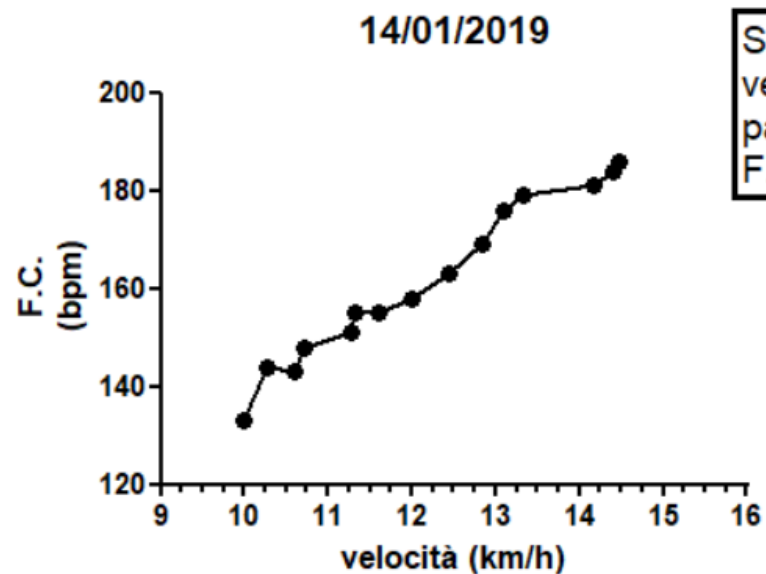
DATA COLLECTION



DATA COLLECTION

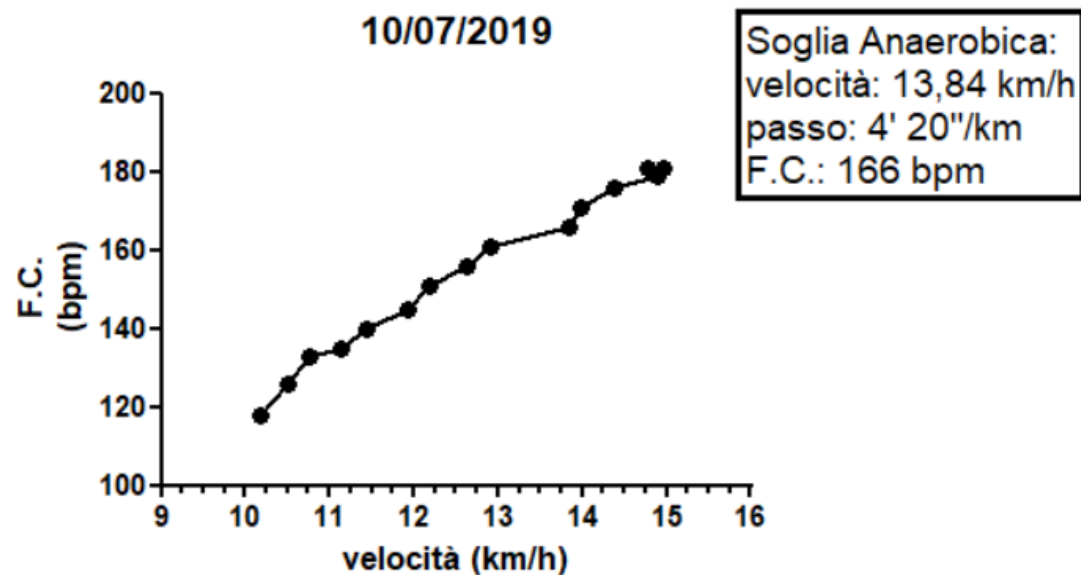
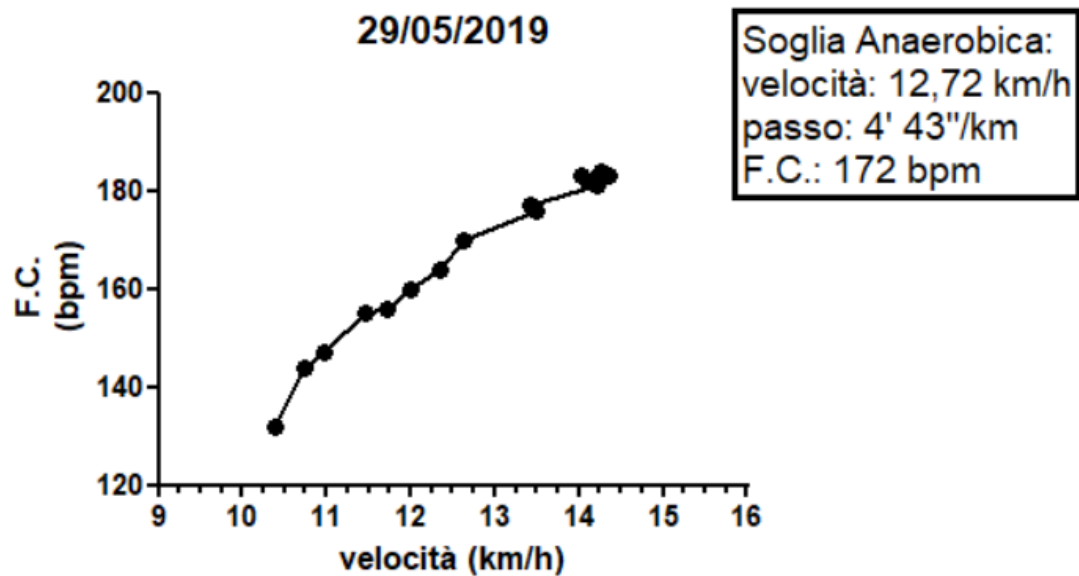


Soglia Anaerobica:
velocità: 12,76 km/h
passo: 4' 42"/km
F.C.: 169 bpm

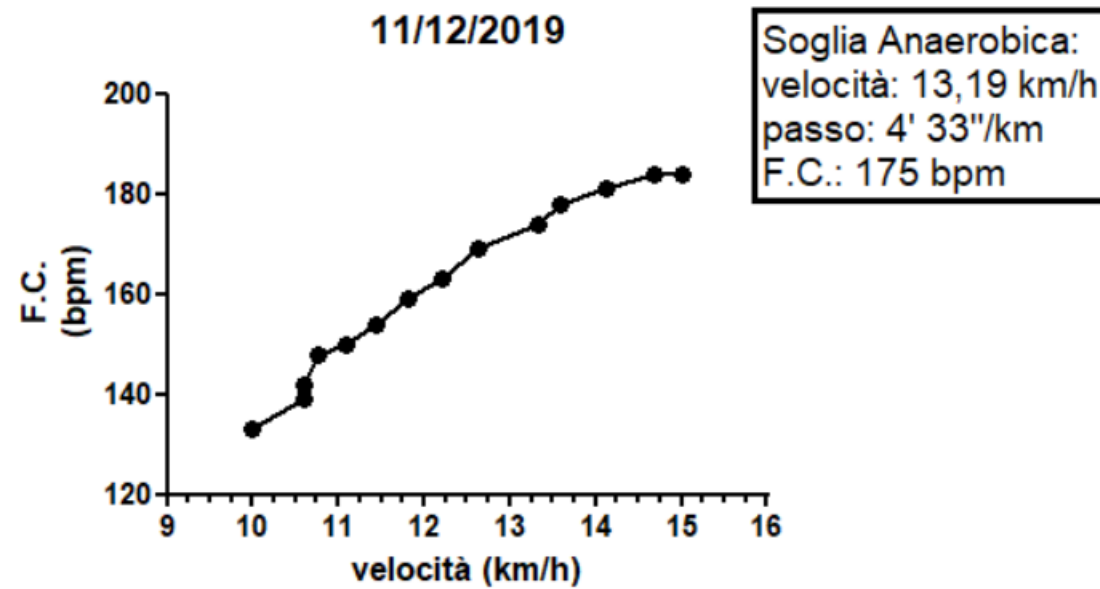


Soglia Anaerobica:
velocità: 13,28 km/h
passo: 4' 31"/km
F.C.: 176 bpm

DATA COLLECTION

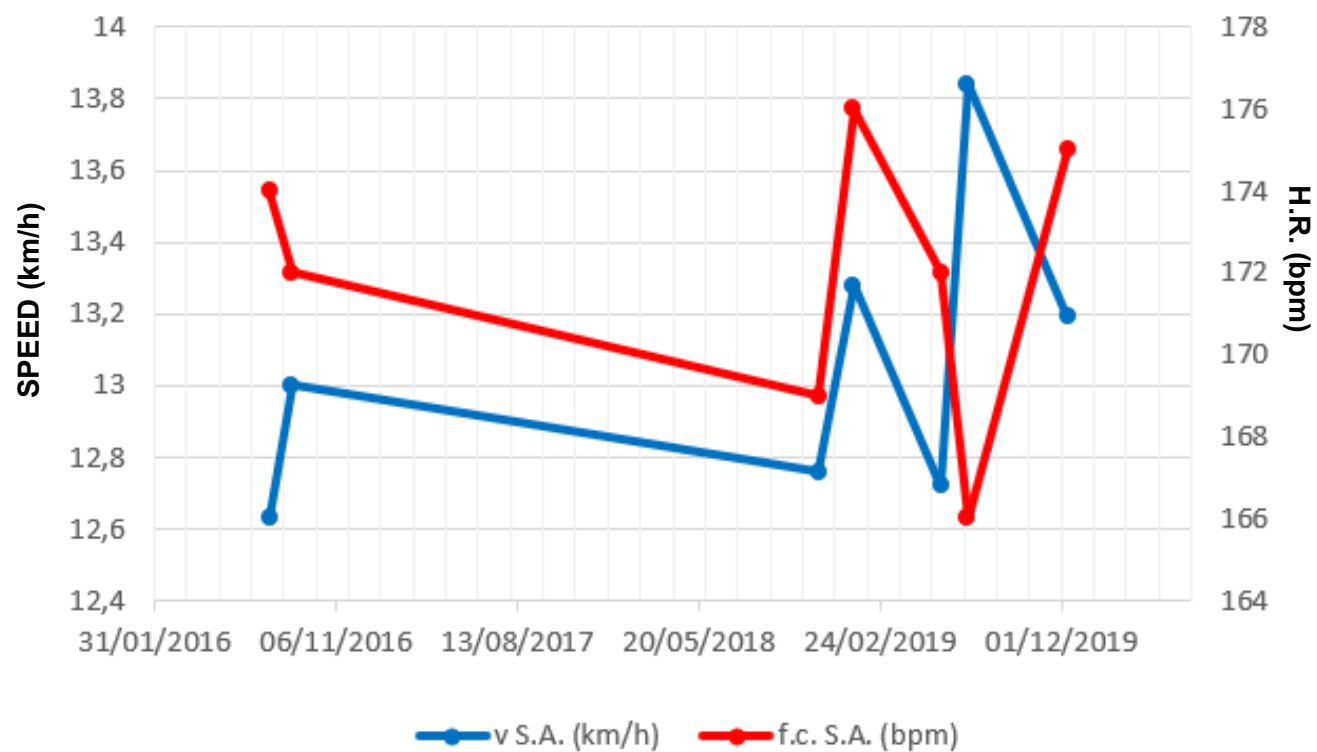


DATA COLLECTION



DATA COLLECTION

DATE	v A.T. (km/h)	H.R. A.T. (bpm)
28/07/2016	12,63	174
30/08/2016	13	172
21/11/2018	12,76	169
14/01/2019	13,28	176
29/05/2019	12,72	172
10/07/2019	13,84	166
11/12/2019	13,19	175



- Growth in the year 2019 compared to 2016
- Since 2018 the average of speed at the Anaerobic Threshold has been 13.16 km/h
- We noted a difference between the threshold intensities compared to the period of the competitive season
- Last test performed indicates a better initial condition of the athlete



- Two training criteria: volumetric increase and increase in aerobic power
- Use of various training means: long distance, medium distance, continuous distance with varied pacing
- A volumetric increase was then sought, then aerobic power growth and finally the condition of coexistence of both criteria was created.



CONCLUSIONS

- Women's 50km walk is a relatively "young" race
- The differences between the sexes could approach those found on the 20km race
- Training must be aimed at creating good aerobic power and the ability to perform pacing changes in conditions of fatigue
- The improvement of pacing economy is also very important
- There are two training criteria to look for: volumetric increase and aerobic power increase





THANKS FOR THE
ATTENTION