

## WHY DO EAST AFRICANS DOMINATE DISTANCE RUNNING?

By Dr Philo Saunders

**T**HE East African dominance is particularly evident at the annual World Cross Country Championships, where each country is allowed six representatives. In 2006, the top 10 places in the long (12 km) and eight of the top 10 places in the short (4 km) cross country races were filled by runners from East Africa. A similar trend has been occurring in female distance running over the past few years, although not to the same extent as the males.

East Africa is a vast area encompassing the countries of Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, Sudan, Tanzania and Uganda, and the continual dominance by athletes from this region has led to much discussion as to why they are so good. There are a number of mechanisms that have been proposed to account for this dominance, including:

- Exposure to altitude all of their lives (as well as previous generations who have lived and trained at altitude).
- Genetic predisposition to better distance running performance.
- Increased physiological capacity due to running from an early age.
- Psychological advantages due to stereotyping.
- Cultural factors.

### Living at altitude

As mentioned in issues 3 and 4 of R4YL, the effect of altitude training on endurance performance has been researched extensively with a widespread belief that it can enhance athletic performance at sea-level. This improvement is due to an increase in red blood cells and/or local muscular adaptations such as an improved capacity to buffer lactic acid build up in the muscles, and improved exercise economy. It is also thought that athletes who have lived and trained at high altitudes (known as altitude natives) have made physiological adaptations to make them predisposed to superior endurance performance. It has been pro-

*During the last few decades men's distance running has been dominated by athletes from East African countries, with all but one of the current distance running world records held by an athlete of East African descent*

posed that long-term altitude exposure, along with endurance training, has a synergistic effect to increase red blood cells, and is one factor to account for the success of East African endurance athletes<sup>(1)</sup>. Much of East Africa is located at altitudes between 1600m and 3000m above sea level, with the Rift Valley in Kenya and Ethiopia, the two most dominant countries in distance running, situated at altitudes between 2000m and 4000m.

### Genetic endowment

A number of research studies have investigated the physiological differences between East African and Caucasian distance runners. A study investigating differences between elite Kenyan and Scandinavian distance runners demonstrated that the Kenyan runners had extremely high VO<sub>2</sub>max values and much better running economy than the Scandinavians, making them superior run-

ners<sup>(2)</sup>. Blood lactic acid was lower in the Kenyan than in the Scandinavian athletes, and the Kenyans also had extremely low ammonia accumulation (a waste product associated with fatigue) in the blood, even at very high exercise intensities, which may allow the Kenyans to achieve better performance<sup>(2)</sup>. Weston et al.<sup>(6)</sup> demonstrated that African runners had a higher resistance to fatigue when running at the same percentage of their peak treadmill velocity than the Caucasian runners. This study also showed that African runners had a 50% higher activity of key oxidative enzymes and a lower accumulation of lactic acid, indicating that the African runners were

able to work more aerobically than their Caucasian counterparts. This same research group demonstrated that a group of African runners with a significantly lower VO<sub>2</sub>max (61 ml/min/kg) than a group of Caucasian runners (70 ml/min/kg) were able to achieve the same performances over 10 km due to superior running economy and the ability to sustain a higher percentage of their VO<sub>2</sub>max throughout the event, or a combination of both<sup>(7)</sup>. Another genetic factor that makes East Africans such good distance runners is their body composition. It is evident just by looking at African distance runners that, in general, they are much lighter and leaner than distance runners of other countries. Low body fat has consistently been correlated with superior distance running performance. Another characteristic of East African runners is that they have very lean and small calf muscles that are higher up on the leg. This is important as it has been shown

### Current distance running World Records for Men:

Distance	Record Holder	Time	Country of Origin	Date of Record
800 m	Wilson Kipketer	1.41.11	Kenya	24-Aug-97
1500 m	Hicham El Guerrouj	3.26.00	Morocco	14-Jul-98
3000 m	Daniel Komen	7.20.67	Kenya	1-Sep-96
3000 m Steeple	Saif Saaeed Shaheen	7.53.63	Kenya	3-Sep-04
5000 m	Kenenisa Bekele	12.37.35	Ethiopia	31-May-04
10000 m	Kenenisa Bekele	26.17.53	Ethiopia	26-Aug-05
21.1 km	Haile Gebrselassie	58.55	Ethiopia	15-Jan-06
42.2 km	Paul Tergat	2.04.55	Kenya	28-Sep-03

Kenya's Daniel Komen, seen here training in Kenya, was a running phenomenon during the 1990's.  
Getty Images



Left: The dominance of East African countries is clearly illustrated at events such as the 2006 World Cross Country Championships. Getty Images

East African athletes. Some of the world's poorest nations are in East Africa, with poverty, famine and disease rampant. Becoming a successful distance runner provides athletes the opportunity to get out of poverty and attain a better life for themselves and their families. This motivation is not present to the same degree in western society and the desire to be the best in the world is not always the same as it is for the East Africans.

In summary, it appears that there are genetic and physiological factors that predispose athletes from East Africa to perform better at distance events than athletes from other countries. However, there have been non East African runners who have consistently been competitive against East African runners, suggesting that other factors, such as economic benefits and a perceived psychological advantage, may also play a role in the success of East Africans. **R4YL**

that carrying mass distally increases the aerobic demand of running to a greater extent than carrying weight closer to the centre of mass<sup>(3)</sup>.

### Running as children

Another factor that may offer an explanation to the East African dominance in distance running is the daily aerobic activity East African children undertake in commuting to school and in their leisure time. This is in stark contrast to the prevalence of childhood obesity in many western countries<sup>(4)</sup>. In a study by Saltin et al.<sup>(2)</sup>, Kenyan boys who walked and ran long distances to school but did

not formally train, had a 30% higher VO<sub>2</sub>max than those that did not. It was concluded that it is this daily physical activity during childhood, combined with intense training as teenagers, leads to the high VO<sub>2</sub>max values observed in Kenyan runners. It is this high aerobic capacity combined with good running economy that makes Kenyans superior runners. Similarly, Scott et al.<sup>(5)</sup> demonstrated that a high proportion of Ethiopian distance runners ran, rather than walked, and travelled greater distances to school each day than other Ethiopian track and field athletes and control subjects.

### Psychological advantage

Although there appears to be some explanations why the East African distance runners dominate international competition, there are still athletes from other origins who have equivalent performances to African runners. Craig Mottram and Benita Johnson of Australia, Paula Radcliffe of Great Britain, Dieter Baumann of Germany, Abel Anton and the group of 1500 m runners (Estevez, Cacho, Diaz) from Spain are all examples of athletes who have placed highly at major international

competitions and have consistently finished ahead of many of the top East African runners. It has been suggested that psychological factors may perpetuate the dominance of the East Africans by consistently attributing differences in these athletes that makes them believe that they are better runners, and similarly, that runners of other races believe that they cannot compete with the East Africans. Regardless of the existence of physiological advantages that the East African runners have, the belief that there are

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such differences creates a psychological atmosphere that can have significant consequences on performance for both the East African runners and runners of other countries<sup>(1)</sup>.

### Cultural factors

The opportunity to lift themselves and their families out of poverty by becoming successful runners may also be an important factor that drives



It is believed that cultural and psychological factors may contribute to the performances of Ethiopia's superstars competing at the Athens 2004 Olympics. Getty Images

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