

CHAPTER 29

"EAT WELL, LIVE WELL": NUTRITIONAL STATUS AND HEALTH OF FOREST POPULATIONS IN SOUTHERN CAMEROON

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INTRODUCTION

Food holds an important place in mental attitudes of most societies. Moreover, one can observe that the time dedicated to obtaining food is inversely proportional to the level of development: many hours a day in self-sufficient societies, 30 minutes "gathering" for a French housewife in a supermarket (and another 30 minutes a day cooking); in Europe, 30% of the income, i.e. 30% of time spent working, is spent on food. In southern Cameroon, this activity occupies, for men, 24% of the working day among fishermen, 25% among agriculturalists and 31% among hunters. For women, including time cooking, one observes figures of 67%, 68% and 52% respectively (Pasquet *et al.*, 1993, this volume). Thus, the whole society is centred on food. So it is understandable that, in this region, the popular expression, *vivre bien*, means above all, eating well and drinking well. Health status can be used as a criterion of successful adaptation to the surrounding environment; thus we are here examining the links between health status and diet of forest populations in the Campo district (South Cameroon).

The sample population, whose geographical location is described in Koppert *et al.* (1993, this volume), is made up of approximately 600 Yassa, 600 Mvae and 300 Bakola Pygmies. The food survey covered thirty families in each population. Anthropometric examinations, repeated seasonally, measured the child growth and body morphology of the adults (weight, height, body proportions, five skinfolds and three muscle circumference measurements). Blood tests for haematology, biochemistry and sero-epidemiology, as well as examinations of urine and stools, were carried out on a representative subgroup of the sample population.

BODY MORPHOLOGY, GROWTH AND NUTRITIONAL STATUS

There are practically no somatic differences between adult Yassa and Mvae but the Bakola Pygmies are generally much smaller (Table 29.1).

Table 29.1 Annual average body weight (kg \pm SEM, standard error of mean), height (cm \pm SEM), body mass index (BMI, or Quételet index) and % of the US norm at 18 years old (cumulative figures for three seasons)

Population	n	Weight \pm SEM	Height \pm SEM	BMI	% standard
<i>Men</i>					
Yassa	214	60.6 \pm 7.7	164.8 \pm 7.2	22.3	101.8
Mvae	243	60.1 \pm 9.0	165.1 \pm 6.2	22.0	100.5
Bakola	107	49.9 \pm 5.3	157.2 \pm 5.3	20.2	93.6
<i>Women</i>					
Yassa	256	52.6 \pm 9.2	155.1 \pm 5.7	21.9	103.8
Mvae	329	54.1 \pm 10.0	155.5 \pm 6.1	22.4	106.2
Bakola	124	43.3 \pm 5.8	148.7 \pm 4.8	19.6	92.9

The Yassa men have slightly more muscle and less fat than the Mvae men. The Yassa are more active, often rowing/paddling boats at sea. The Mvae are older (many young people have migrated to the towns) and less active. Among women, the reverse is true: the Mvae women are active in the fields whereas the Yassa women are less involved in cultivation. It is also the Mvae women who show the greatest seasonal variation in body weight (2.3 kg): the greatest weight loss occurs in March-April, at the peak period of agricultural work in the major dry season (Table 29.2).

Table 29.2 Seasonal variation of the body mass (kg \pm standard deviation) and results of Analysis of Variance (F test) on repeated measurements on the *same subjects*, which shows significant seasonal differences among the Mvae

	n	Minor dry season	Rainy season	Major dry season	ANOVA
Yassa men	20	61.2 \pm 6.1	61.2 \pm 6.5	61.1 \pm 6.4	ns
Yassa women	30	51.0 \pm 8.5	51.4 \pm 9.1	51.3 \pm 9.1	ns
Mvae men	31	61.5 \pm 6.3	60.6 \pm 6.3	60.3 \pm 6.5	p<0.001
Mvae women	27	55.0 \pm 8.7	54.9 \pm 9.1	52.7 \pm 8.8	p<0.0001

Generally speaking, however, these seasonal variations in nutritional status in forest dwellers are small by comparison with those in savanna populations. The variation is less connected with a shortage of available food than with variations in energy expenditure: manioc, which is the staple

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food of the three observed populations, can be harvested at any time and so does not include a lean period between harvests. As a comparison, Sudano-Sahelian populations of the Bec-de-Canard region (Massa and Moussey) show the same weight as the Bantu but are 8 cm taller and lose 4 to 5 kg during the lean period (Koppert *et al.*, 1991).

Moreover, it is known that the small size of Pygmies is not due to any malnutrition, but has a genetic origin (Merimee *et al.*, 1982). This reduction in body format, observed in all the African hunter-gatherer populations – Twa Pygmies, Khoi-San, Hadza – (Hiernaux, 1975), is probably advantageous, for example in reducing the energy needs of the community exposed, in the past, to the risks inherent in a semi-nomadic lifestyle. This question is debated more fully in Holmes (1993, this volume). The current nutritional status of the Bakola men is reasonably satisfactory, but it is less satisfactory among the women, who are very active physically (adiposity of only 19% as against 25% among village women; the body weight of the Pygmy women is 20% lower than that of the Bantu women, but their cutaneous folds are 35% lower). This makes the Bakola women's health a little precarious, especially during pregnancy and breast-feeding when their energy reserves are reduced. The Mvae are the only group in the region to practise "maternity leave" (ayâbânê ndzêŋ) during which the recently delivered mother rests with her mother or another female relative and allows her energy reserves to recover a little. However, among the Mvae, this practice does not reach anywhere near the proportions of the "maternity leave" described by Pagezy (1983) among the Ntomba of Zaire.

The growth pattern of Yassa and Mvae children is identical; it is difficult to compare it with that of the Bakola Pygmy children whose age cannot be determined accurately. Chronic malnutrition, defined as ratio height/age <90% of the standard and expressed as stunting (not wasting), affects about 20% of children between 1 and 10 years. There is a net delay in puberty, reflected in abnormally short stature between 10 and 16 years by comparison with international standards, but the adult size is normal (Figure 29.1).

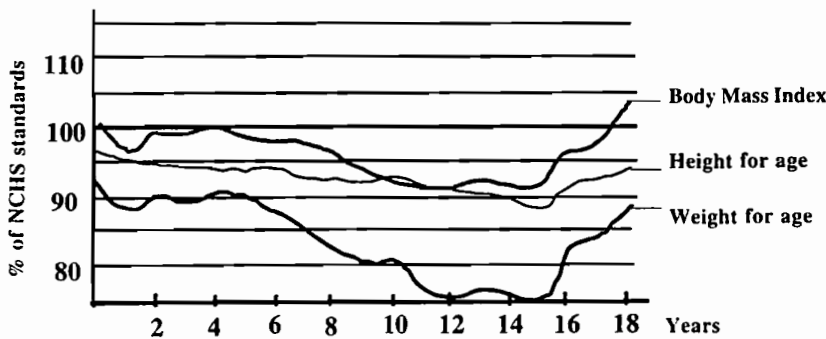


Figure 29.1 Nutritional status and growth of Yassa and Mvae children of both sexes

SERUM BIOCHEMISTRY AND DIET

Although all three populations have a diet based on animal products and manioc, they show marked differences. We pass from the Yassa, whose animal products are almost solely marine fish, to a half-meat/half-fish diet among the coastal Mvae and game/freshwater fish among the forest Mvae, and on to an almost exclusively game meat diet among the Bakola (see Koppert *et al.*, 1993, this volume).

The monotony of the Yassa diet (cassava and fish) contrasts with the very varied diet of the coastal Mvae (fish, meat, oily seeds and leaves). The diet of the Bakola Pygmies, as one would imagine, is the richest in animal products, with more than 200 g of game eaten *per capita* day⁻¹. To this are added reasonable quantities of oily seeds and fresh leaves. Apart from the coastal Mvae, the populations have similar energy consumption levels – 1 800 to 1 900 kcal. The Mvae diet is the most varied: meat stews, fish and vegetables (especially manioc leaves) contribute protein, accompanied with starches from manioc, macabo (*Xanthosoma* sp.) and whenever possible, plantains. An important fat contribution is made by palm nuts (*Elaeis guineensis*), which have a pericarp rich in oil and Vitamin A. Seeds of Cucurbitaceae and peanuts are appreciated, but are eaten only seasonally. Mushrooms and wild mango (*Irvingia gabonensis*) kernels are among the most important gathered plant foods, but they make little difference to the quality of the diet overall.

The Bakola consume the most animal products, almost exclusively game. As staples, they regularly eat sweet manioc from their own fields and wild yams, but the principal staple is manioc flour bought or obtained by barter. The Bakola living at Nazareth village, near Ipono (a place where shops are open for sawmill workers), regularly use manufactured products such as rice, bread, sugar and tins of sardines. Their total cholesterol level is remarkably low (Table 29.3).

Table 29.3 Analysis of variance of blood components (mean \pm SEM) for adults over 20 (urea, creatinine and uric acid in mg l⁻¹; albumin, cholesterol and triglycerides in g l⁻¹)

	n	Urea	Creatinine	Albumin	Uric acid	Tot. cholesterol	Triglycerides
<i>Men</i>							
Yassa	34	259 \pm 19	12.7 \pm 0.6	31.7 \pm 0.9	61.9 \pm 2.3	1.49 \pm 0.05	0.677 \pm 0.034
Mvae	25	322 \pm 17	9.8 \pm 0.5	30.8 \pm 0.1	49.6 \pm 2.7	1.37 \pm 0.05	0.732 \pm 0.051
Bakola	36	212 \pm 17	10.2 \pm 0.5	32.3 \pm 0.9	57.9 \pm 2.3	1.27 \pm 0.06	0.841 \pm 0.048
p	-	0.0003***	0.0002***	n.s.	0.004 **	0.017 *	0.032 *
<i>Women</i>							
Yassa	66	290 \pm 34	10.1 \pm 0.4	33.6 \pm 0.1	52.8 \pm 1.8	1.67 \pm 0.05	0.763 \pm 0.03
Mvae	52	299 \pm 11	8.9 \pm 0.3	32.3 \pm 0.9	48.0 \pm 1.8	1.59 \pm 0.06	0.997 \pm 0.079
Bakola	46	248 \pm 15	9.0 \pm 0.4	31.1 \pm 0.9	47.2 \pm 1.9	1.35 \pm 0.04	0.836 \pm 0.04
p	-	n.s.	0.046 *	n.s.	0.059 *	0.0001***	0.005 **

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Several biochemical blood components were analyzed. The results in Table 29.3 can be related to the data concerning consumption of groups of foods and nutrients (Tables 24.3 and 24.4 in Koppert *et al.*, 1993, this volume). The Yassa are distinguished by high levels of creatinine, uric acid and total cholesterol. High cholesterol levels are usually caused by lipids of animal origin: while fish is generally reputed to be leaner than meat, game has a much lower lipid content than meat from town butchers (10% in game, often over 20% in butchers' meat). The Mvae diet is certainly much fattier than the diets of the other populations (more than 40 g fat day⁻¹ as opposed to 20 g day⁻¹) but these are vegetable fats which are neutral from the point of view of cholesterol and triglycerides.

It might appear surprising that, in spite of the diet rich in meat and/or fish of the three populations, anaemia is not rare (Table 29.4).

Table 29.4 Mean values of blood haemoglobin (g per 100 ml) and haematocrit (%) for Yassa, Mvae and Bakola adults over 19 years

	Men			Women		
	n	Haemoglobin	Haematocrit	n	Haemoglobin	Haematocrit
Yassa	40	12.5 ± 2.1	42.8 ± 6.2	78	10.6 ± 1.8	37.7 ± 4.2
Mvae	28	12.8 ± 1.9	41.9 ± 4.9	52	11.4 ± 1.4	37.9 ± 4.0
Bakola	27	12.4 ± 1.8	39.0 ± 5.0	34	11.5 ± 1.5	37.0 ± 4.1
p	-	n.s.	0.026 *	-	0.010 *	n.s.

HEALTH STATUS

The percentage of children showing enlarged spleens is two or three times higher among the Bakola Pygmies than among the villagers; the frequency of the sickle-cell anaemia gene is, conversely, two times lower, a characteristic shared by all the Pygmy populations (Cavalli-Sforza, 1972, 1986).

This observation can be interpreted as a lack of resistance to malaria: malaria only attacked these populations at a relatively recent date in terms of biological evolution, i.e. in the last few centuries, *Anopheles* mosquito habitats having multiplied following clearings made by Bantu agriculturalists. The Pygmy populations, formerly little exposed, would not have had the time to develop the high frequency of protection which sickle-cell anaemia provides. Moreover, Pygmies have poorer access to medical assistance than do sedentary populations.

In the past, arterial hypertension was rare in many rural African societies, and the average tension did not increase with age (Huizinga, 1972). This is not the case for populations around the Campo district, which, Pygmies included, are noticeably affected by arterial hypertension (15% of adults) (Figure 29.2). High salt consumption, alcohol and tobacco are obviously related to this change.

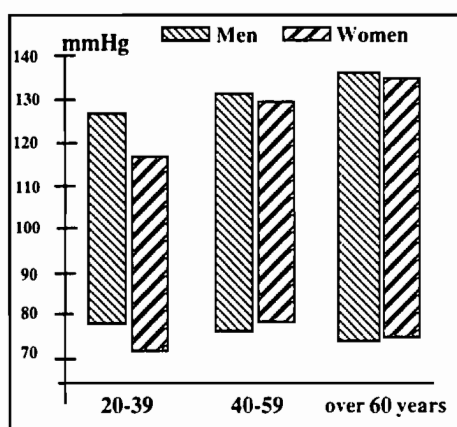


Figure 29.2 Average maxima and minima figures for blood pressure among Yassa and Mvae (pooled) by sex, age and class.

Intestinal helminth infestations are more widespread the more faecally polluted is the surrounding environment. In this respect, the relatively high mobility of the Bakola Pygmies protects them from high rates of infection (Figure 29.3 left).

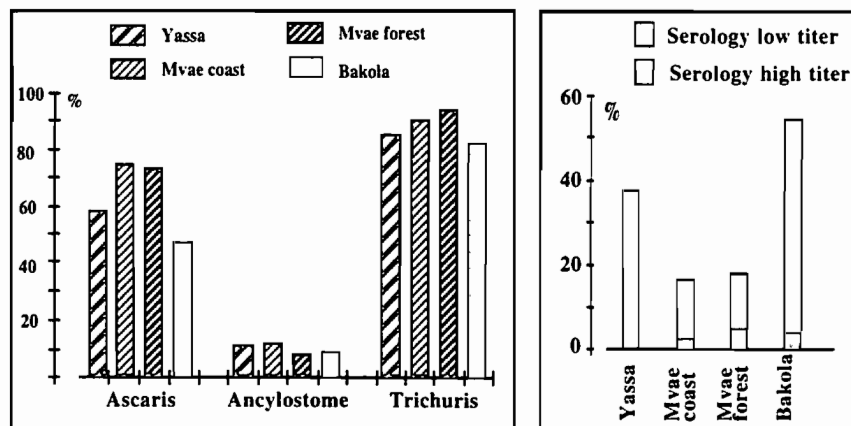


Figure 29.3 Intestinal parasite infestation (left) and syphilis/yaws serologies (right) among forest populations in southern Cameroon

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In contrast, yaws is more common among Pygmies (55% of subjects seropositive compared with 37% among the villagers, the biological test being unable to distinguish yaws and syphilis) but shows no clinical expression, meaning that the risk of complications is low. The differences between Yassa, Mvae and Bakola are significant, and reveal high levels of yaws infection among the Pygmies (Figure 29.3 right). The numerous attacks by cumulative forest infections explains the high gamma globulin levels found in the Bakola's blood, particularly among children.

The HIV1 AIDS virus, though supposedly of forest origin, was not detected in any of the 600 people examined; four subjects, however, had antibodies against one or several viruses of the same family.

Trypanosomiasis is present: there is a small centre of infection at Campo, known since the 1930s – when Dr. Jamot led the fight against the disease – but (except among migrants from Equatorial Guinea) no subjects tested positive.

Schistosomiasis is not widespread: 6% seropositive (at very low levels); there are no vector molluscs near the villages surveyed.

CONCLUSION

Having quantitatively described the food and dietary system and energy expenditure of the three populations, together with their seasonal variation, we have shown that among children, whose activity levels were not measured, consumption is 10 to 15% lower than recommended levels. Among adults, total intake covers needs and, by comparison with the almost vegetarian societies of northern Cameroon, the quantity of animal proteins in the diet (meat or fish) is large. However, the nutritional status of the three populations is far from excellent, particularly among children. This is explained by the heavy burden of disease in this hot and humid environment: particularly holoendemic malaria, intestinal helminth infestation, bacterial and viral diarrhoeas, which are the prime cause of infant mortality.

Mortality as a whole seems to be higher among the Bakola Pygmies (it is premature to put forward a figure because of the small sizes of the populations) and their life expectancy lower; their health and nutritional status is clearly lower than that of the villagers, even though their diet is comparable and rich in meat.

It can be concluded that in the forest zone and in societies with almost no cash crop, improving the diet would have little positive impact on health. The diet is already rich in calories from manioc, complemented with animal protein and a variety of vitamins. On the other hand, the environment should be made healthier by the use of latrines, antimalarial prophylaxis, oral rehydration and vaccination. This is all the more necessary as the regrouping

of formerly scattered populations along roads gives epidemic outbreaks a better hold and increases exposure to biting insects by comparison with demographic dispersion within the forest.

Our study has shown that while the diet of the populations living in the forest is generally good in quality and quantity, the societies in transition (such as Pygmies moving towards a sedentary lifestyle, or Mvae migrating to the coast) show signs of nutritional deficiencies. The introduction of new techniques of resource management could give these rural populations a greater control over the exploitation of the potential the forest offers them and contribute to an improved health status.

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