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KODAVAS OF KODAGU DISTRICT, KARNATAKA: THEIR DEMOGRAPHIC PROFILE

Kodagu, the smallest district in Karnataka State is the home of many tribal and non-tribal populations. Kodavas, an endogamous group is one among the many castes of Kodagu, with a total population of 66,000. Their primary occupation is cultivation and coffee plantation. Kodavas are non-vegetarians and take alcoholic drinks. They belong to one of the martial communities of India. According to Risley's [1915] classification Kodavas are classified as Indo-Scythians. They speak Kodagi dialect which belongs to a Dravidian language [Srinivas, 1952]. The results of the study on demography are presented in this paper.

MATERIAL AND METHOD

Demographic information has been collected from 132 households of Kodavas through schedules and large pedigrees. Each schedule comprises information on household census and couple information covering name, age, sex, relationship, birth place and residence of the siblings, parents and grandparents. A detailed pedigree from each household with full information on pregnancy history, morbidity and mortality of the offspring including the reproductive wastage have been collected. The sample represents all the three *taluks* of Kodagu. Ages were recorded from the elder persons of the family and also from birth certificates, wherever possible. In some cases ages were estimated by recalling important events and happenings in the area through the village headman. Information on age is reliable as in Kodavas the literacy rate is quite high.

The data are arbitrarily divided into three age groups — above 50 years, 31 to 49 yrs, and 30 yrs. and below, to study fertility and mortality differences, marital distance, consanguinity and admixture rate in each age group and between the age groups to find out temporal trends.

The analysis of demographic data was conducted in accord with demographic techniques of Pollard et al. [1974], Roberts [1956], Basu [1969] and Salzano [1971]. Fertility and mortality components and selection intensity index were calculated following Crow [1958]. Admixture rate, breeding size, effective population size, random genetic drift, coefficient of breeding isolation and inbreeding coefficients were calculated according to Lasker [1952], Li [1963] and Wright [1939]. Consanguinity and its effects on fertility and mortality were examined in terms of rates. Possible socio-economic factors were also examined. Biometrical and other statistical parameters were calculated using standard formulae. The data and results were compared with other available data on Indian and world populations.

ANALYSIS AND DISCUSSION

Age structure of Kodavas shows the highest frequency (50%) in the 15 - 39 age group, both among males and females. The sex ratio in 0 - 14 age group is 119.64 males per 100.00 females. In the 15 - 39 age group the sex ratio shows a considerably declining trend. The average marriageable age in either sex is above 20 years. Unmarried individuals are observed more often in the 20 - 29 age group. Nearly 60 percent of males and females are found to be unmarried in procreative age group, this affects fertility rate. The child: woman ratio is 12.22 in Kodavas for women between 15 and 49 years of age. The fertility ratio shows extremely low values in comparison to other Indian and world populations.

The population pyramid (fig. 1) displays a narrow base, abruptly broadens in the middle — this reflecting a transition in population dynamics of growth or a decreasing trend in the population expansion of the Kodavas [Yaseen Saheb 1978]. The net reproductive rate is 2.05. About 2.29% of Kodava women are found to be never pregnant. The highest frequency of woman's offspring (sibship size) occurs at 4 in this population. Mean number of live births in completed families is 4.54. Mean number of surviving offspring per mother is 4.20. Hence subadult mortality is very low in the population, lower than that in other Indian populations.

A high percentage (21.15%) of surviving sibship size of 2 has been observed for mothers of 50 and over age group. The mean number of surviving offspring in this group is 3.89 whereas the mean number of surviving offspring in 31 - 49 age group is significantly higher. However, in the 30 years and below age group the mean number is comparatively lower than in other age groups. When the data for all three groups

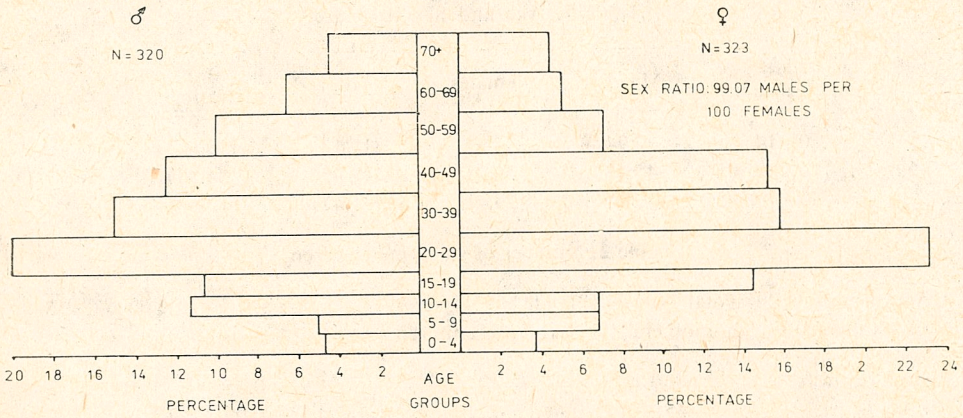

Fig. 1. Kodava population pyramid

are pooled, mean number of surviving children per woman ever married is 3.00. The frequency of women never pregnant in the group 30 years and below is higher than in the two older age groups. This fact is due to inclusion into the first group of women who though married have at the time of enquiry not completed even one year of conjugal life. Sterile women constitute about 2.2% of postreproductive females.

The number of liveborn children per mother aged 40 and over is found to be 4.54, with variance of 4.93. In terms of frequency the subadult mortality is 8.00%. Therefore the fertility component of Crow's index is 0.24 whereas the mortality component is 0.09. The population shows higher fertility component than the mortality one indicating more opportunity for selection through differential fertility than mortality. The same trend has been also observed in 30 world populations (including 8 Indian ones) out of 42 populations for which results are known to us. The selection potential, or the index of opportunity for selection is 0.35 in the present study. This is a low value indicating that in the population in question selection is not operating with much vigour.

The admixture rate is 0.782 with a higher value occuring in the 31 - 49 age group. The breeding size is 2575 while the effective population size varies from 1645.05 to 2574.67 according to different formulae. The coefficient of breeding isolation varies from 12.86% to 20.13%. The variance due to drift varies from 0.00010 to 0.00015 which is quite low in comparison with other populations.

The distance between birthplaces of spouses (marital distance) was obtained for 1082 married individuals. Frequency of village endogamy in all the three age groups is comparatively low and a decreasing trend has been observed from older to younger age groups in the population.

Table 1. Age and Sex structure

Age groups	Males	Females	Total	Sex ratio
0 - 14	20.94	17.34	19.13	119.643
15 - 39	45.63	53.25	49.45	84.884
40 - 70+	33.43	29.41	31.42	112.631

Table 2. Number of surviving children

Age groups of mothers	Total No. of mothers	Total No. of surviving children	M ± S.E	S.D	V
30 and below	640	1224	1.91 ± 0.05	1.21	1.47
31 - 49	535	2210	4.13 ± 0.09	2.19	4.79
50 and above	104	405	3.39 ± 0.20	2.02	4.08
Pooled	1279	3839	3.00 ± 0.09	2.06	4.26

Table 3. Average number of surviving and liveborn children per mother. Average number of dead children per mother aged 40 and above

No. of mothers	No. of surviving children		Total	Av. No. of surviving children per mother	No. of live born children		Total
	M	F			M	F	
592	1270	1215	2485	4.20	1384	1305	2689

Av. No. of live born children per mother	No. of children dead		Total	Av. No. of dead children per mother
	M	F		
4.54	114	90	204	0.34

Table 4. Selection Intensity

P_d	P_s	I_m (P_d/P_s)	I_f	I_f/P_s	I
0.08	0.92	0.09	0.24	0.26	0.35

Table 5. Admixture rate

Age group	Total No. of marriages	Both parents from the same group	One parent from other group/sub-population	Both parents from other population	Admixture rate
30 and below	640	632	8	–	0.0625
31 - 49	535	524	11	–	1.028
50 and above	104	103	1	–	0.962
total	1279	1259	20	–	0.782

Table 6. Breeding size and effective population size

Breeding size				Effective population size	
			I	II	III
Nm	Nf	N	$N_e=\frac{4Nf\cdot Nm}{Nf+Nm}$	$N_e=\frac{N}{1+F}$	$N_e=\frac{4N-2}{\sigma K^2+2}$
1273	1302	2575	2574.67	2572.43	1645.05

Table 7. Coefficient of breeding isolation and random genetic drift

Coefficient of breeding isolation ($N_e\cdot m$)			Random genetic drift		
I	II	III	I	II	III
20.13	20.11	12.86	0.00010	0.00010	0.00015

Table 8. Statistical constants of matrimonial distance (miles)

Age group	Mean ± S.E.	S.D.	V
50 and above	11.32 ± 0.73	10.71	114.79
31 - 49	14.97 ± 0.60	13.13	172.32
30 and below	19.21 ± 1.27	18.85	355.35
Pooled	15.14 ± 0.48	14.50	210.19

Table 9. Inbreeding frequency and coefficient

No. of marriages	Consanguineous marriages		F
	n	%	
1279	23	1.798	0.00103

Table 10. χ^2 values between consanguineous and non-consanguineous groups for different parameters

Parameter	Rate		χ^2 value	Probability
	Consanguineous	Non-consanguineous		
Pregnancies	3.652	3.197	0.3133	$0.70>P>0.50$
Live births	3.261	3.69	0.0115	$0.90>P>0.80$
Surviving children	2.96	3.00	0.0068	$0.95>P>0.90$
Offspring mortality	0.304	0.175	0.4096	$0.70>P>0.50$
Reproductive wastage	0.3913	0.023	75.1100	$P<0.001$**
Total mortality	0.696	0.198	16.152	$P<0.001$**

d.f=1 for all parameters, ** Highly sign ificant

Frequency distribution of marital distance in the population is leptokurtic and positively skewed (fig. 2). The bimodal distribution observed in age groups below 49 years of age can be explained by socio-cultural norms regulating choice of mate and geographical dispersal of the population.

The average marital distance in 50 years and over age group is 11.32 miles, whereas in the 31 - 49 age group the mean is 14.97 miles. In the 30 years and below group it is observed to be 19.97 miles. The mean marital distance for each age group shows that in older people

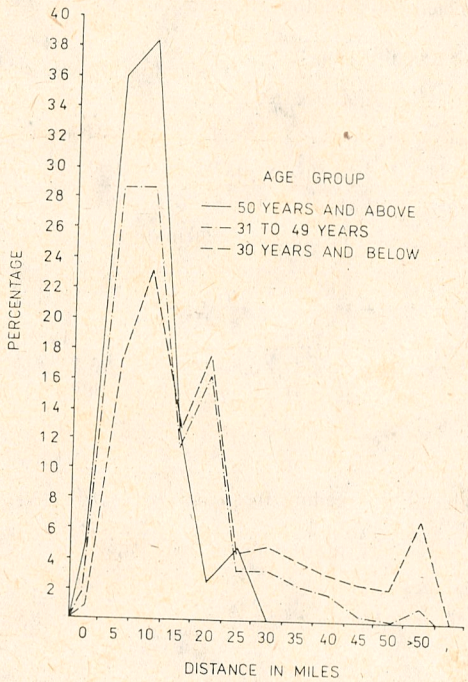

Fig. 2. Matrimonial distance in Kodavas

marital distance is smaller than that among the younger ones. Only a few marriages were contracted over the 50 miles range in all age groups. The mean marital distance indicates that people selected their mates mostly within the 20 miles range. The mean marital distance in Kodava population agrees with the three of earlier findings in South Indian populations except a few tribal and non-tribal populations of Andhra Pradesh.

The coefficient of inbreeding for autosomal loci observed in the present study is very much lower than in the majority of the South Indian populations studied earlier. The frequency of consanguinity is found to be significantly different in comparison to the other South Indian populations. Even the neighbouring populations like the Vokkaligas, Lingayats, Kurubas, Adikarnatakas and Canarese brahmins show coeffi-

cient of inbreeding higher than the Kodava population [Reddy 1974]. The low values of inbreeding coefficient for autosomal loci observed in the Kodava population are due to non-preference of consanguineous marriages. It is not out of place to point out that the occupational mobility and breakdown of joint families in the population have considerably reduced frequency of consanguineous couples during recent years.

The present study does not reveal any significant effect of consanguinity on fertility in all the three groups of age of Kodavas measured in terms of conception, live birth and survival rate in consanguineous women. This agrees with observations of Rao et al. [1974 & 1977] and Reddy [1974]. On the other hand some studies have reveald consistent increase of fertility with consanguinity [Schull & Neel 1965, Mukherjee & Bhaskar 1974, etc.]. The average number of surviving children used as a measure of net fertility of consanguineous couples is lower than that of unrelated couples. This is result of increased reproductive wastage and infant mortality in consanguineous couples of the population. Differences between consanguineous and non-consanguineous marriages of the population in reproductive wastage and total mortality are significant. The same trend was observed in Vokkaliga caste populations of Karnataka [Reddy 1974]. However, insignificant results in amounts of survival and livebirths were observed. The present data in contrast to Japanese ones [Schull & Neel 1965] suggest that natural selection operates primarily at the postnatal level in Japanese data while in the present population it operates at the level of fertilization and early embryonic development. The possible explanation for the significant difference in foetal loss may be due to genetic factors involved, medical complications and methods of induced abortion leading to reproductive wastage.

Literacy and occupational factors have considerably reduced Kodava fertility. Their effect on fertility and mortality in groups of consanguineous and of non-consanguineous couples cannot be discussed on account of a small sample size. Insignificant differences in the majority of the above mentioned parameters of the two groups indicate that there is no consistent effect of consanguinity upon inbred offspring.

REFERENCES

Basu A., 1969, *The Pahira: A population genetic study.* Am. J. Phys. Anthr., 31, 399 - 416.

Cavalli-Sforza L. L., W. F. Bodmer, 1976, *The Genetics of Human Populations.* Freeman, San Francisco.

Crow J. F., 1958, *Some possibilities for measuring selection intensities in man.* Hum. Biol., 30, 1 - 13.

Lasker G. W., 1952, *Mixture and genetic drift in ongoing human evolution.* Amer. Anthrop., 54, 133 136.

Li C. C., 1963, *Population Genetics.* The Univ. Chicago Press, Chicago.

Mukheries D. P., S. Bhasker, 1974, *Studies on inbreeding and its effect in some endogamous populations of Chittoor District.* In the proceed. 1st Annual Conference of Indian Society of Human Genetics. Bombay.

Pollard A. M., Yusuf Forhat, G. N. Pollard, 1974, *Demographic Techniques.* Pergamon Press, Rushcutters Bay.

Rao P. S. S., S. G. Inbaraj, 1977, *Inbreeding effects on human reproduction in Tamil Nadu of South India.* Ann. Hum. Genet., 41, 87 - 98.

Rao P. S. S., S. G. Inbaraj, 1977, *Inbreeding in Tamil Nadu.* Soc. Biol. 24, 281 - 288.

Reddy B. R. C., 1974, *Genetic effects of consanguineous marriage.* Unpublished report of Anthropological Survey of India, Mysore.

Risley H. H., 1915, *The People of India,* 2nd ed., W. Thacker, London.

Roberts D. F., 1956, *A Demographic Study of Dinka Village.* Hum. Biol. 28, 323 - 349.

Salzano F. M., J. V. Neel, D. M. Lewis, 1971, *Demographic data on two Xavante villages: genetic structure of the tribe.* [In] „Human Populations, Genetic Variation and Evolution" L. N. Moris (ed.), Chandler Publ. Comp., London.

Sastry D. B., S. M. Sirajuddin, C. M. Raju, R. K. Gulati, S. Yassen Saheb 1980, *A_1A_2BO, MN, Rh, Kell, Duffy blood groups and sickle cell trait among the Kodavas of Kodagu District.* Przegl. Antrop., 46, 369 - 374.

Schull W. J., J. V. Neel, 1965, *The effects of inbreeding on Japanese children.* Harper and Row Inc., New York.

Schull W. J., H. Nagano, M. Yamamoto, I. Komatsu, 1970, *The effects of parental consanguinity and inbreeding in Hirado, Japan. I. Still births and pre-reproductive mortality.* Amer. J. Hum. Genet. 22, 239 - 262.

Schull W. J., J. V. Neel, 1972, *The effects of parental consanguinity and inbreeding in Hirado, Japan. V. Summary and interpretation.* Amer. J. Hum. Genet., 24, 425 - 453.

Srinivas M. N., 1952, *Religion and Society among the Coorgs of South India.* Asia Publishing House, Bombay.

Wright S., 1931, *Evolution in Mendelian populations.* Genetics, 16, 97 - 159.

Yaseen Saheb S., 1979, *Population structure of Kodava and Amma Kodava populations of Kodagu (Coorg) district.* Anthropological Survey of India (unpublished), Calcutta.

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CHARAKTERYSTYKA DEMOGRAFICZNA GRUPY KODAVA Z OKRĘGU KODAGU, STANU KARNATAKA, INDIE

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Kodava są endogamiczną grupą liczącą około 66 tysięcy ludzi zamieszkujących górzysty region okręgu Kodagu stanu Karnataka w południowych Indiach. Populacja charakteryzuje się wyraźną zmianą tempa przyrostu naturalnego odbijającą się w jej strukturze wieku. Współczynnik płodności jest obecnie bardzo niski. Średnia liczba urodzeń żywych w rodzinie o płodności zakończonej wyno-

si 4,54, a średnia dożywających dorosłości 4,20. Współczynnik sposobności do selekcji Crow'a I=0,35, jego składnik mierzący zróżnicowanie płodności I_f=0,24, a wymieralności I_m=0,09. Współczynnik krzyżowania wynosi 0,782. Efekt dryfu genetycznego szacowany kilkoma różnymi metodami wynosi, zależnie od metody, od 0,00010 do 0,00015. Średnia odległość małżeńska obliczana dla trzech różnych grup wieku dorosłych, mieści się poniżej 20 mil. Współczynnik wsobności loci autosomalnych jest w badanej populacji znacznie niższy niż w większości grup ludzkich południowych Indii. W niniejszej pracy badano też wpływ małżeństw pomiędzy krewnymi na płodność i wymieralność potomstwa.

Rupert Riedl, *Biologie der Erkenntnis. Die stammesgeschichtliche Grundlagen der Vernunft*, Berlin—Hamburg 1980, Verlag Paul Parey, ss. 230

Rupert Riedl jest autorem popularnych książek o florze i faunie morskiej, a także znanych prac o mechanizmach ewolucji („Die Ordnung des Lebendigen". 1975; „Die Strategie der Genesis". 1976). Należy on do bardziej znanych biologów niemieckich.

Prezentowana praca wiąże się ściśle z działalnością Riedla jako teoretyka ewolucji. Uważa on bowiem ewolucję jako proces uzyskiwania i powiększania wiedzy. Bada przesłanki w jakich dokonała się selekcja racjonalnego myślenia („rozumu") u naszego gatunku.

Celem Riedla jest próba stworzenia ewolucjonistycznej teorii poznania. Epistemologia — tradycyjna domena filozofów, często dalekich od biologii — uprawiana jest jako dyscyplina biologiczna. Autor kontynuuje dotychczasowe prace D. Campbella, K. Lorenza, J. Piageta, K. Poppera i G. Vollmera.

W poszczególnych rozdziałach rozważa się m. in. biologiczne nabywanie wiedzy, ewolucję mechanizmów poznania, ewolucjonistyczną teorię poznania, oraz istotę ludzkiego rozumu, gdzie dąży się do jego oceny biologicznej i wyjaśnienia niektórych jego niezwykłych osiągnięć. Credo autora tej fascynującej książki brzmi następująco: „Wskazujemy, że rozum i doświadczenie, idea i rzeczywistość, duch i materia zostały niesłusznie i ze szkodą dla nas rozdzielone. Ostrzegamy przed pomyłkami rozumu. Ostrzegamy także przed tymi, którzy wykorzystują swój rozum przeciwko każdemu innemu rozumowi: przeciwko humanizmowi i człowiekowi" (s. 14).

Książka stanowi krok w kierunku rozwiązania zagadki ludzkiego rozumu i wywołała już ożywioną dyskusję. Ewolucjonistyczna teoria poznania wydaje się być jednym z kopernikańskich zwrotów w samozrozumieniu się człowieka. W pracy tej próbuje się po raz pierwszy dać systematyczne podstawy dla tak rozumianej epistemologii. Ponadto charakteryzuje się ona ścisłością języka i wysokim poziomem naukowym. Stanowi znakomitą lekturę zarówno dla biologów i filozofów, jak i dla epistemologów i logików. Jest ona przykładem precyzji badawczej przy omawianiu tej bardzo trudnej problematyki. Należy dążyć do możliwie szybkiego przetłumaczenia tej interesującej książki na język polski.

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