STUDIES ON THE TENSILE CHARACTERISTICS OF THE WAZIRI WOOL

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(Received August 28, 1964)

Introduction

Studies carried out by Amir,[1] Wakil[2] and Mumtaz[3] on the tensile characteristics of Kaghani, Harnai and Hashtnagri wool fibres have shown that these types of breed can be used for medium and low quality cloth and also in carpet manufacture. The present work deals with the tensile characteristics of Waziri wool fibres.[4] Three types of wool fibres, i.e. true, medullated and heterotypical, 35 samples of each, have been tested for the breaking strength, elongation and subsequently the stress, tenacity and tensile strength were calculated. The mean values of diameter, breaking strength, elongation, stress, tenacity and tensile strength were calculated and are presented in Table 1. The relationship between diameter, breaking strength, stress and elongation was studied and the graph (Fig. 1) was plotted between diameter and breaking strength. The percentage composition of 5395 fibres of Waziri wool have been carried out, in which 928 were medullated fibres, 2692 heterotypical and 1775 true fibres. kempy fibres were not present in any of the samples tested.

The methods used for determination of breaking strength and elongation and calculation of stress, tenacity and tensile strength are the same as described by Mumtaz Ahmad.[5]

Discussion

The relationship between diameter and breaking strength of true, heterotypical and medullated wool fibres is linear as shown in Fig. 1. There is a large variation between diameter and elongation in percentage. The diameter for the three types of fibres lie in the same range due to the number of crimps in the Waziri breed. As the number of crimps increase the diameter decreases and when the diameter increases the number of crimps will be scarce in fibres. The relation between stress and elongation in percentage increases as the stress decreases.

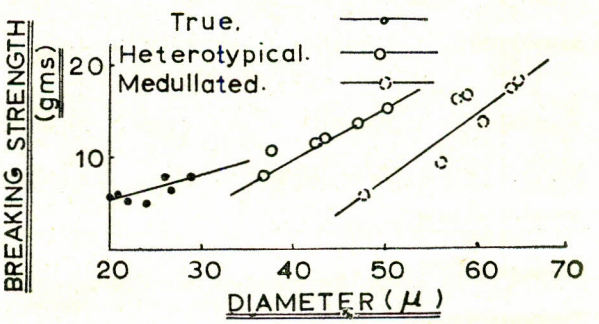

Fig. 1. Relationship between breaking strength and diamater of True, Heterotypical, Medullated Waziri Wool fibres.

TABLE 1.—MEAN VALUES OF ALL THE TRUE, HETEROTYPICAL, AND MEDULLATED WOOL FIBRES.

Name of type	Diameter in (μ)	Breaking Strength: Single fibres g.	Breaking Strength: Bundle in kg.	Elongation	Stress	Tenacity	Tensile strength
True	.. 24.4	5.7	1.40	35.1	13.0	1.7	2092
Heterotypical	.. 47.4	19.2	1.50	39.05	10.4	1.0	1208
Medullated	.. 58.8	27.2	0.06	39.50	7.9	0.8	988

Comparing the tensile properties of Waziri breed with that of other breeds it was concluded from the results that the mean elongation of true, heterotypical and medullated wool fibres is in the same order (as shown in Table 2), also the mean breaking strength of the said fibres lie comparatively in the same range. The mean d'ameter of true, like the four breeds, that is Kaghani, Hashtnagri, Harnai and Lohi is also fine and that of medullated wool is coarse.

Furthermore, the coefficient of variation of three types of fibres of Waziri breed agrees more

TABLE 2.—MEAN VALUES OF FIBRE ELONGATION.

Breed	True		Heterotypical		Medullated	
	Elongation %	Coefficient of variation %	Elongation %	Coefficient of variation %	Elongation %	Coefficient of variation %
Kaghani ..	34.0	17.9	41.0	8.8	49.0	6.7
Hashtnagri ..	28.0	13.9	29.0	11.2	31.0	9.3
Harnai ..	31.0	14.8	26.0	31.1	28.1	19.2
Lohi ..	40.0	32.5	48.0	26.2	54.0	20.0
Waziri ..	35.1	42.1	39.05	9.2	39.5	42.6

or less with that of four breeds (shown in Table 3). The mean diameter of three types of fibres are 24.4 μ with the coefficient of variation 3.5 for true whereas 47.4 μ with the coefficient of variation 3.1 for heterotypical and 58.8 μ with the coefficient of variation 7.4 μ for medullated (shown in Tables 1 and 2).

The percentage composition for the three types of fibres was also determined and it was observed from the results that percentage proportion of heterotypical fibres is greater, while for true and medullated, it is less.

Conclusoin

The percentage elongation and mean diameter of true, heterotypical and medullated wool fibres of Waziri breed are in the same range, while the breaking strength more or less agrees with those of the four breeds already tested. The tensile properties are similar with those of the other breeds and therefore, it is suitable for medium to low quality cloth as well as for the carpet manufacture.

TABLE 3.—MEAN VALUES OF FIBRE DIAMETER.

Breed	True		Heterotypical		Medullated	
	Diameter μ	Coefficient of variation %	Diameter μ	Coefficient of variation %	Diameter μ	Coefficient of variation %
Kaghani ..	29.2	7.5	40.0	10.2	57.0	18.9
Hashtnagri ..	25.2	11.9	40.5	9.3	51.8	12.5
Harnai ..	28.7	11.7	45.1	9.1	75.2	15.3
Lohi ..	20.8	10.9	39.8	16.8	66.8	16.1
Waziri ..	24.4	14.3	47.4	6.5	58.8	12.7

TABLE 4.—STANDARD DEVIATION AND COEFFICIENT OF VARIATION OF DIAMETER, BREAKING STRENGTH, STRESS AND TENSILE STRENGTH OF TRUE, HETEROTYPICAL AND MEDULLATED WOOL FIBRES.

Type of fibres	Coefficient of variation and standard deviation			
	Diameter μ	Tensile strength	Breaking strength	Stress
True ..	14.3 ±3.5	73.9±1564	19.3±1.1	49.2±6.4
Heterotypical ..	6.5±3.1	17.5±211	28.0±5.1	35.5±3.6
Medullated ..	12.7±7.4	37.0±365	11.7±3.2	91.1±7.2

TABLE 5.—MEAN VALUES OF FIBRE STRENGTH.

Breed	True		Heterotypical		Medullated	
	Breaking strength g.	Coefficient of variation %	Breaking strength g.	Coefficient of variation %	Breaking strength g.	Coefficient of variation %
Kaghani ..	16.4	9.1	21.6	9.4	29.9	7.7
Hashtnagri ..	8.3	20.5	20.2	19.3	31.3	7.7
Harnai ..	8.2	20.7	23.2	17.2	30.2	7.6
Lohi ..	7.4	34.3	10.6	37.2	19.0	24.3
Waziri ..	5.7	19.3	19.2	28.0	27.2	37.0

TABLE 6.—PERCENTAGE COMPOSITION OF TRUE, HETEROTYPICAL AND MEDULLATED KAGHANI, HASHTNAGRI, HARNAI, LOHI AND WAZIRI WOOL FIBRES.

Breed	Type of fibres as percentage of total fibres		
	True %	Heterotypical %	Medullated %
Kaghani ..	60	22	13
Hashtnagri ..	54	25	21
Harnai ..	55	27	18
Lohi ..	53	20	27
Waziri ..	33	49	17

Summary

Studies have been made on various samples of Waziri wool collected from tribal territories of North Waziristan and South Waziristan, including Razmak, Miran Shah and Wana. The samples were tested for diameter, breaking strength, elongation and subsequently stress, tenacity and tensile strength were found out. The tensile properties of true, heterotypical and medullated wool fibres have been compared with that of Kaghani, Hashtnagri, Harnai and Lohi wool fibres.

Acknowledgement.—The authors wish to express their gratitude to Dr. S.A. Warsi, Director, North Regional Laboratories, Peshawar, for his keen interest in the problem. Thanks are also due to Mr. Akhlaq Ali Khan Mr. Arbab Abdul Haleem and Miskeen Khan and A. Rashid, of these Laboratories for helping the authors with some of the testings and calculations.

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ON HELMINTH PARASITES OF VENOMOUS SNAKES OF WEST PAKISTAN

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(Received July 6, 1965)

Introduction

This paper is based on the collections of helminths made during 1963-1964 from 145 *Naja naja* and 205 *Vipera russelli* most common poisonous snakes of West Pakistan. The nematode and cestode faunas of both the kinds of snakes of this region are little known. A detailed taxonomic

study of the helminths, parasitic in the venomous snakes, was therefore, undertaken and the percentage of infection was recorded. The nearest well studied region is India where Southwell[1] had earlier recorded cestodes of the order *Pseudophyllidea* from India and Ceylon. Rahimullah and Das[2] reported a few species from Chandrabora Russell's viper—obtained from the Nizam's dominion of Hyderabad. Beddard[3] gave an account of some species of *Ichthyotaenia* and *Ophiotaenia* from *Ophidia*. Hsu and Hoeppli[4] studied parasitic nematodes of snakes from China. Ash and Beaver[5] redescribed *Ophidascaris labiatopapillosa*—an ascarid worm from North American snakes. Recently Vlastimil Barus and Frantisek Kornalik[6] described in detail some interesting parasites of snakes (*Ophidia*) *Bitis gabonica* A. Dum., *Vipera russelli* Shaw and Python molurus Bivittatus Schl. from Czechoslovakia.

Materials and Methods

Russell's viper and Indian Cobra were received through the courtesy of the Bureau of Laboratories, Karachi. The snakes were collected from different regions of West Pakistan. The parasites were carefully taken out of the intestines and were washed several times in luke-warm physiological solution in order to remove the debris. Cestodes were pressed and fixed in hot 70 percent alcohol. They were stained in Semichon's and Borax carmine which gave satisfactory result. Nematodes were also fixed in hot 70 percent alcohol, cleared and studied in lactophenol and glycerine jelly for identification. All the parasites were preserved in Glyceroalcohol.

Results

Among cestodes two species of the Genus *Ophiotaenia-Ophiotaenia indica* (Johri 1955) and *Ophiotaenia russelli* (Beddard 1913) from Indian Cobra and Russell's viper were recorded respectively.

CHARACTERS

Genus: *Ophiotaenia* LA RUE 1911

1. *Ophiotaenia russelli* Beddard 1913
Host: *Vipera russelli* (Russell's viper)
Location: intestine

The length of this *Pseudophyllid* worm varied from 4-6 cm. They had thin and transparent segments whose length was greater than the breadth. Its suckers were globose. Testes were found to be in two separate lateral fields and were placed anterior to ovary. Cirrus pouch had been in the cirrovaginal atrium. Ovary bilobed and H-shaped. Uterus extended in the median field in such a way that it occupied median half of the proglottis breadth. Vitelline glands appeared to be extending in the marginal region throughout the proglottis length. The percentage of infection was found to be 2.9.

2. *Ophiotaenia indica* Johri 1955
Host: *Naja naja* (Indian Cobra).
Location: Intestine.

This parasite resembled *O. russelli* in all respects except in the shape of ovary, the opening of vagina, in the length and breadth of the segment and that the number of testes was observed to be fewer. The infection of this parasite was 17.2 percent.

Among nematodes mostly a heavy infection of *Kalicephalus willeyi* (Linstow 1904) Railliet et Henry (1909) was encountered in Russell's viper. The authors, however, could only once find *Ophidascaris najiae* in Indian Cobra.

Genus: *Kalicephalus* Molin 1861

Host: *Vipera russelli*.

Location: Oesophagus, stomach and intestine.

Heavy infection of *Kalicephalus willeyi* mostly occured in the oesophagus, stomach and sometimes in the intestine of the host. Entire body length of the female varied from 10.5 mm 16.5 mm. Mouth was directed straight. Buccal capsule, in all the parasite was well developed, bivalvular and bore a chitinous ledge in its lateral walls. Its length varied from 0.168-0.210 mm. Oesophagus thickened posteriorly to form a pseudobulb which measured from 0.330-0.577 mm. in length. Oesophageal glands in all the specimens were conspicuous. The distance of the nerve ring from the anterior tip varied from 0.274-0.30 mm. while the distance between anus and the posterior tip was observed to be 0.430-0.637 mm. Posterior tip was pointed. Female genital opening was behind the first anterior half of the body. Vulva was situated on prominent papillae like processes and the distance from posterior end varied from 4.1 mm. to 8.8 mm. Eggs were oval, thin shelled and with developing embryos. They measured from 0.057 0.88 mm. in diameter. The infection of this parasite was recorded to be 20 percent.

Genus: *Ophidascaris* BAYLIS 1921.

2. *Ophidascaris najae* Godeolst 1916
Host: *Naja naja*
Location: Intestine.

The parasites could be sexually differentiated. Length in the case of male was found to be 62 mm. and in that of female 56.7 mm. The maximum thickness of female was 1-1.7 mm. Body more tapering in front than the posterior portion. Dorsal tips bore two double papillae. The lips whose length was almost equal to their breadth were squarish and had rounded extremities. Dentigerous ridges and small and narrow interlabia were conspicuous. Oesophagus did not bear any bulb at all. Nerve rings in both males and females were situated in the anterior fifth of the body. In males tail was blunt and conical. Gubernaculum was absent. Six pairs of post anal papillae were conspicuous and three of them were nearer to cloacal aperture. Preanal papillae were in 35 pairs. Spicules equal. Vulva in the females were in the posterior half of the body. Vagina with two uterine tubes and directed backward. Out of 145 Indian Cobra only one was infected with this worm.

Discussion

Inspite of the great care being taken in search of parasites the authors were unable to find any male specimen of *Kalicephalus willeyi*. Previous workers too have failed in finding males. Baylis and Daubney[7] examined a number of original material from snakes but could not report a single male. Ortlepp[8] and Maplestone[9] also could not be successful in such effort. Data on record, however, shows that only a single male was found by von Linstow [10,11] which measured 5.9 mm. in length and 0.33 mm. in thickness. Two immature males were also received by Baylis[12] from Das which measured upto 6.3 mm. and 7 mm. in length. The nonavailability of the males of this parasite with their females is still unaccounted for.

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TRANSISTORIZED FREE-RUNNING MULTIVIBRATOR

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(Received August, 11, 1964)

Using two OC71 transistors, a practical circuit of a free-running multi-vibrator has been designed. A third transistor OC72 has been added to act as an emitter follower amplifier for matching. In this circuit emitter, resistors are added to provide convenient output points for direct coupling to the emitter follower amplifier. Resistors of small values are chosen as they raise the natural frequency only slightly and can be neglected. Output from multi-vibrator is applied to base of OC72 acting as emitter follower. The output is developed across the emitter resistor.

In the circuit of Fig.1 the pulse width can be changed by varying the values of C_1 and C_2. Two values have been tried and the pulse widths obtained are shown in Fig. 2. Fig. 3 has been plotted for these cases. The curves show the variations of pulse widths with supply volts.

Data and Observations

Transistor OC71 (Medium gain general purpose); Collector voltage (Max)=V_c=-30 volts; Peak collector current=I_{CM}=30 m amperes; Collector current D.C.=Ic=10 m amperes ; Power dissipation (Max) at 45°C. ambient=75 m watts; Current gain=47; Transistor OC72 (low power output transistor); Collector voltage

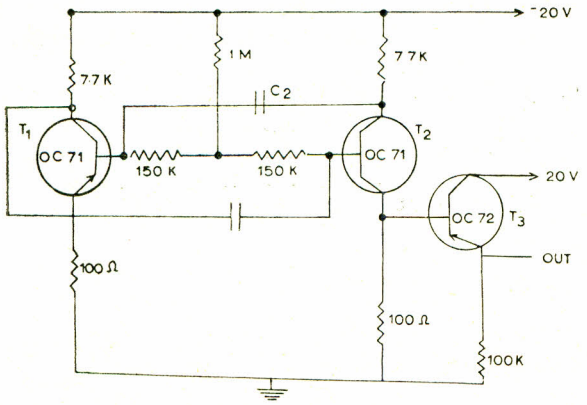

Fig. 1.

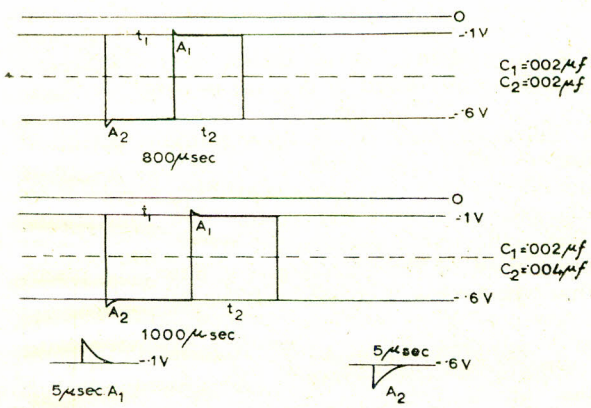

Fig. 2.

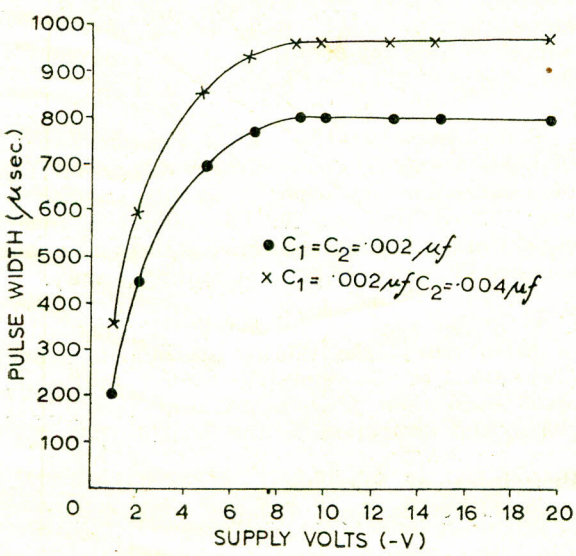

Fig. 3.

(Max)=V_c=−32 volts; Peak collector current=I_{CM}=125 m amperes; Collector current D.C.=Ic=50 m amperes; Power dissipation (Max) at 45°C. ambient=75 m watts; Current gain=70; Supply voltage=−20 volts; Pulse output (Peak to Peak)=0.5 volts; Pulse width (C_1=.002μf and C_2=.002μf)=800μ seconds (Wave form 1); Corresponding frequency=1.25 kilo cycles/second Pulse width (C_1=.002μf and C_2=.004 μf)=1000μ seconds. (Wave form 2); Corresponding frequency=1 kilo cycles/second.

Discussion

The switching of the collector current from one transistor to another in the multivibrator is always accompanied by brief transients indicated by A_1 and A_2 in Fig. 2. Thus at the beginning of the interval t_1 the voltage at the base of T_2 momentarily rises to a moderately positive value and then quickly dies away to zero. The effect of this transient in the base voltage of T_2 is to introduce in the beginning of the interval t_1 a short negative spike in the collector potential of T_2. The corresponding transient associated with transistor T_1 is designated as A_1 in Fig. 2. The duration of these transients lasts only a small fraction of the half period of the multivibrator. In this case the duration of the transient is about 5μ seconds.

The variation of pulse width with supply volts has been shown graphically Fig. 3. One curve has been plotted when C_1 and C_2 have an equal value i.e. .002 μf each. In the beginning the pulse width increases with the increase of supply volts i.e. upto -9 volts. After that the pulse width becomes independent of the supply volts. Varying supply volts from -1V to -9V, the corresponding change in pulse width is from 200μ second to 800μ second. In second curve (C_1=.002μf and C_2=.004μf) it can be seen that for variation of supply volts from -1 to -8 volts, the pulse width changes from 350μ seconds to 1000μ second and then becomes independent of the supply volts.

These observations have been taken on Cossor Oscillograph Model 1049 MKIII and photographs attached show the actual waveforms obtained on the oscillograph. As can be seen the waveform very closely approximates a square wave except for transients A_1 to A_2. These imperfections can be removed by passing the waveform through a clipping circuit.

Acknowledgement.—The authors gratefully acknowledge the guidance received from Mr. Masoud Anwar, Senior Scientific Officer, Head

of the Electronics Division, Atomic Energy Centre, Lahore. The authors also acknowledge the facilities provided by Dr. Karimullah, Director, West Regional Laboratories, Lahore.

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BOOK NOTICES

Precision Electrical Measurements in Industry. J.R. Thompson. 123 pp. Butterworths, London, 1965. Price 37s. 6d.

In November, 1963, a Symposium on the Procedures and Practices in Precision Electrical Measurements in Industry was held at Hatfield College of Technology. This book consists of edited version of the seven papers presented there together with the discussions that followed.

The topics treated were chosen to reflect the latest trends and developments and because of their current importance in the precision electrical measurement field in industry.

A review of the general principles of measurement and a survey of recent work on electrical standards forms the first two papers; this is followed by advances in precision measurement in the audio and radio frequency ranges. Trends in precision measuring bridges are also discussed and the book ends with a general paper on laboratory procedures and records.

The papers published in this volume represent the specialist knowledge and experience of a group of experts qualified to speak on the latest developments; the volume as a whole constitutes a valuable and authoritative review of the most significant modern developments in an important area of the electrical measurement field.

Systematic Guide to Flowering Plants of the World. S.A. Manning. 302 pp. Museum Press Limited, London. Price 42s.

Uniform with the popular Systematic Dictionary of Mammals of the World, this is a copiously illustrated work that will satisfy a real need felt by students, horticulturists, keen gardeners, and those interested in general botany.

The main body of the book contains, arranged under orders and families, concise but adequate details of nearly 400 species forming a representative cross-section of the world's flowering plants. This will enable the student to acquire a wide knowledge of the characters of flowering plants that will serve as a sound basis for more advanced study and as an introduction and key to the use of a complete Flora, which is intimidating and confusing to the beginner. In addition it will help him to appreciate vividly the general principles of classification. The very detailed index indicates the position in the classification list of numerous genera not represented by species included in this book. There is also a glossary, which will be invaluable to those with limited knowledge of botanical terms.

The author is a Fellow of the Linnean Society of London and a Fellow of the Botanical Society of Edinburgh. Formerly a teacher of biology and related subjects, he has published many papers in the scientific press and is the author of a number of books on popular natural history.

As in the case of the Systematic Dictionary of Mammals of the World, the numerous line illustrations are an important feature and, quite apart from their obvious practical value, lend charm and distinction to the book.

Principles of Statistics. M.G. Bulmer. 214 pp. Oliver & Boyd, London. Price 35s.

Dr. Bulmer has written an account at intermediate level of the fundamental principles and