The authors are grateful to Dr. Jean R. Adams, Research Entomologist, Insect Pathology Laboratory, Beltsville, Maryland, for making the electron micrograph and confirming the identity of the virus.

Dept. of Entomology, Agricultural College and Research Institute, Coimbatore 641003, *September* 11, 1974.

R. JEBAMONI RABINDRA.
A. V. NAVARAJAN PAUL.
B. VASANTHARAJ DAVID.
T. R. SUBRAMANIAM.

1. Laudeho, Y. and Amargier, A., *Rev. Pathol. Vegetale Entomol. Agr. France*, 1963, **42**, 207.
2. Lépine, P., Vago, C. and Croissant, O., *Ann. Inst. Pasteur (Paris)*, 1953, **85**, 170.

CROSS INFECTIVITY OF NUCLEAR POLYHEDROSIS OF *AMSACTA ALBISTRIGA* WALK. TO OTHER SPECIES OF LEPIDOPTERA

RESULTS of recent work on possible cross infection of polyhedrosis between closely related and unrelated Lepidoptera have been reviewed by Aizawa[1], Huger[2] and Smith[3] and it appears that insect viruses are far from being species specific as was once thought. Knowledge of the cross infectivity of insect viruses is of theoretical and practical importance especially in the area of virus epizootiology and microbial control. This paper presents the results of inoculation tests with NPV of *Amsacta albistriga* Walk. (Arctiidae) on thirteen species of Lepidoptera.

Apparently virus free larvae of 1 to 5 days old were fed with NPV of *Amsacta albistriga* as inclusion bodies by contaminating the foliage of respective host plants with 10^6 polyhedra per ml. The insects tested were *Pericallia ricini* Fab. (Arctiidae), *Euproctis fraterna* Moore., *Notolophus posticus* Walk. and *Porthesia scintillans* Walk. (Lymantridae), *Earias vitella* Fab., *Spodoptera litura* Fab., *Heliothis armigera* Hub., *Orthago exivanacea* M. and *Cosmophila erosa* F. (*Noctuidae*), *Hyblaea purea* Cramer (Hyblaeidae), *Eupterote mellifera* Walk. (Eupterotidae), *Papilio demoleus* L. (Papilionidae) and *Sylepta derogata* Fab. (Pyralidae). The inclusion bodies were from semipurified stock of 5 to 7 months old. However, 100% infectivity was retained even after one year on *Amsacta albistriga*. The cause of death of test insects was diagnosed microscopically with squashed preparation. Cadavers having inclusion bodies in tissues were scored as virus-infected and those lacking inclusion bodies as negative.

It was evident from the results that nuclear polyhedrosis virus of *Amsacta albistriga* was not cross infective to the 13 species of Lepidoptera tested. Most of the test species died of bacterial infection and of other unknown causes. The rest pupated normally without any pathological changes. No natural incidence of viruses were reported for the species tested except in *Spodoptera litura* (Nuclear polyhedrosis[4]), and *Pericallia ricini* (Nuclear polyhedroses and granuloses[5]). Since these two species were not cross infective to NPV of *Amsacta albistriga* the possibility of induction of latent virus infection was ruled out. The negative results agree with older view of Steinhaus[6] that a high degree of host specificity is a characteristic of insect viruses.

Department of Entomology, Agricultural College and Research Institute, Madurai 625104, *September* 9, 1974.

N. RAJAMOHAN.
S. JAYARAJ.

1. Aizawa, K., "The nature of infections caused by nuclear polyhedrosis virus," In: *Insect Pathology*, (E. A. Steinhaus, Ed.), Vol. I, Academic Press, New York, 1963, p. 381.
2. Huger, A., "Granuloses of insects," *Ibid.*, p. 531.
3. Smith, K. M., "The cytoplasmic virus diseases," *Ibid.*, p. 457.
4. Jacob, A. and Subramaniam, T. R., *Curr. Sci.*, 1972, **41**, 536.
5. —, Thomas, M. J. and Chandrika, S., *Agri. Res. J. Kerala*, 1972, **10**, 65.
6. Steinhaus, E. A., *Principles of Insect Pathology*, McGraw-Hill, Book Co., Inc., New York, 1949, p. 757.

EFFECT OF CROP AGE ON FIBRE QUALITY (TENACITY) IN JUTE (*CORCHORUS* SP.)

ALTHOUGH the jute crop is generally harvested soon after formation of pods, earlier harvesting is often found necessary, particularly for fitting it in a suitable crop rotation. While there is evidence of reduction in fibre yield when early harvesting is resorted to, not much information is available with regard to its effects on fibre quality. The present study was undertaken at the Block Seed Farm, Singur, Hooghly, in 1972, with a number of *C. olitorius* types and was repeated at the Seed Multiplication Farm, Chinsurah, in the same district, in 1973, to ascertain how far the tenacity of fibre, a very important quality character, is affected by advancing the date of harvest. The layout and different cultural operations were similar in both the years, but the retting conditions were a little different, stagnant water being used in the former and slow moving water in the latter. In the second year, a similar separate experiment was undertaken with types of *C. capsularis*.

In 1972, 23 types of *C. olitorius* were sown in two replications, each unit plot consisting of a single row of 1 metre length having 15 plants. Three plants were harvested at random from each row at crop ages of 90, 100, 110 and 120 days. The tenacity of fibre of each type was determined with the help of a 'bundle tester', as is done at the Jute Technological Research Laboratories, Calcutta. In 1973, the study was repeated with 21 of these types along with 5 others, and one extra harvest at 130 days' crop age was investigated. In addition, 23 *capsularis* types were tested separately.

Typical values of fibre tenacity are given in Tables I and II to indicate the nature of the results.

TABLE I

Average fibre tenacity of olitorius *types (gm/tex)*

			90 days	100 days	110 days	120 days	130 days
1.	JRO-632	1972	34·20	27·10	21·50	16·60	..
		1973	34·31	32·06	28·93	26·81	15·12
2.	JRO-620	1972	34·10	22·70	20·40	14·60	..
		1973	31·62	24·68	22·81	19·52	16·06
3.	C.G.	1972	30·00	21·70	16·40	12·60	..
		1973	30·93	23·50	22·93	20·18	13·06
4.	JRO-7835	1972	28·10	24·30	18·10	15·40	..
		1973	28·87	28·75	27·18	19·62	15·37
5.	JRO-878	1972	24·90	23·90	22·10	14·30	..
		1973	29·87	29·81	29·37	23·18	15·18
6.	Sudan Green	1972	27·90	26·.0	19·40	15·20	..
		1973	29·75	23·87	23·00	22·75	14·00
7.	R-26	1972	29·30	27·50	22·30	17·30	..
		1973	27·68	27·56	25·00	16·00	14·87
8.	Tanganika-I	1972	..	..	..	..	..
		1973	30·87	30·25	30·87	28·50	23·31

Tenacity Grades

1. Very good — above 31·0
2. Good — between 27·1 and 31·0
3. Fairly good— between 23·1 and 27·0
4. Average — between 19·0 and 23·0
5. Bad — below 19·0

TABLE II

Average fibre tenacity of capsularis *types (gm/tex)*

		90 days	100 days	110 days	120 days
1.	JRC-321	19·5	26·1	24·4	23·8
2.	D-154	19·5	25·1	22·8	15·0
3.	JRC-212	18·6	25·4	19·8	11·2
4.	JRC-201	20·9	25·7	20·5	16·1
5.	JRC-1108	21·3	26·1	19·1	16·7
6.	JRC-7447	20·5	23·6	18·2	15·1
7.	Narrow leaf	19·3	24·6	23·3	19·9
8.	Zaoping-2	20·1	25·6	13·5	12·7

Tenacity Grades

1. Very good — above 29·0
2. Good — between 25·1 and 29·0
3. Fairly good-- between 21·1 and 25·0
4. Average — between 17·0 and 21·0
5. Bad — below 17·0

It is seen in Table I that, despite somewhat erratic performance of certain types, the tenacity of fibre, on the whole, decreased with delay in harvesting. While the types barring only a few were good or very good in tenacity at the crop age of 90 days, there was a fall in each case as the date of harvest was deferred, and, at the last harvest (at 120 days and 130 days in 1972 and 1973 respectively), almost all the types, irrespective of their earlier performance, were found to be bad (tenacity being below 19). Even the types, which recorded very high tenacity values (above 31) at 90 days, registered in many cases fairly big fall with a delay in harvesting. The performance of *capsularis* types (Table II) was more or less similar to that of *olitorius* in so far as the decrease in tenacity of fibre with delay in harvesting was concerned. However, unlike the latter, the former showed an increase in tenacity at 100 days' age, after which the decrease actually started. This indicated that, while in *olitorius*, the first date, *i.e.*, 90 days' crop age was found to be the best of all the dates considered, in *capsularis*, the second data, *i.e.*, 100 days' crop age, was the best. This decrease in tenacity of fibre in both the species as the harvesting was delayed was probably due to the adverse effects of increasing age. In the case of *olitorius*, the correct period appears to be 90 days or even less and in the other species, 100 days was found to be the best.

Of the *olitorius* types studied, Tanganyka-I, which was studied in the second year only, recorded almost the same value till the third harvest, there being a slight fall in the fourth. Even at this stage, there was a little deterioration in tenacity. It was only at the age of 130 days that an appreciable decrease was observed and the tenacity was found to be fairly good. JRO 878, which was studied in both the years, showed considerable differences between the tenacity values of the two years at a particular crop age. However, the data, particularly of the second year, indicated that the variety was quite stable till the age of 110 days. In the case of *capsularis*, only one of the types, JRC 321, showed some stability till the last harvest.

The tenacity values, recorded in the second year at the crop age of 130 days, appeared on the whole, more or less similar to that of the first year at 120 days' age (Table I). The reasons for this difference can perhaps be traced to the difference in retting conditions. It may be that the quality of fibre of the later charges in the first year was adversely affected because the same water was used over and over again.

A detailed study is proposed to be taken up shortly to ascertain the exact reasons for deterioration in fibre tenacity of jute with an increase in crop age.

Thanks are due to the Director, Jute Technological Research Laboratories, Calcutta, and the Director of Agriculture, West Bengal, for providing the necessary facilities.

All India Coordinated Research Project on Jute and Allied Fibres,
12, Regent Park, Calcutta-40,
June 21, 1974.

S. N. MAITI.
A. K. NEOGI.
S. SEN.

A REPORT ON TRANSITION IN THE STOMATAL SIZE WITH AGING OF LEAVES IN *CLEOME VISCOSA* LINN.

POLYMORPHISM in the stomata has been recorded in a few plants[1-4]. During survey of stomata in arid zone plants, it was discovered that there is a distinct variation in stomatal size of *Cleome viscosa*. This is a very common plant growing wild in the rainy season. Plants were demarcated from different habitats under different conditions in the Jodhpur University campus. Three types of leaves were graded according to their maturity or aging (young, adult and old). Epidermal peelings were made from the abaxial surface of the leaf and stomatal measurements were made with the help of precalibrated microscope. The measurements are tabulated in Table I.

TABLE I

Size of stomata, the epidermal content and the stomatal index of leaves of C. viscosa

Age of leaf	No. stomata per sq.mm	Size of stomata in microns								No. epi. cells per Sq.mm	Stomatal index
		1		2		3		4			
		l	*b*	*l*	*b*	*l*	*b*	*l*	*b*		
Young	833±61	27	21	24	18	21	18	18	15	2320±243	26·4
Adult	593±54	30	21	27	21	24	18	21	18	2070±193	22·3
Old	340±46	33	24	30	21	27	21	24	18	1293±154	20·8

l = Length of stomata; and *b* = Breadth of stomata.

It is evident from Table I that the number of stomata and epidermal cells per unit area decrease with the maturity or aging of leaves. Old leaves have fewer stomata and epidermal cells as compared to young ones. It is a well known fact that stomata continue to develop through a considerable part of the epidermal extension of the leaf by cell enlargement[5], and new stomata would hardly arise when a leaf has attained full maturity. As per stomatal measurements, the stomata appear to fall in more than one group. It may appear that hardly new stomata arise in a mature leaf. Stomatal measurements at random show four distinct groups. The smallest stomata were seen only in the young leaves and the largest in the old ones only. Stomata of four sizes were seen common in all ages of leaves. The number of stomata of size $27 \times 21\,\mu$ and $24 \times 18\,\mu$ were common to all ages of leaves (Fig. 1). This indicates that there is an increase in the size of stomata and decrease in the number of epidermal cells with the maturity of the leaves. Epidermal cells form a beak like structure on both the edges of stomata. Stomata with a single functioning guard cells were also observed. Thus from the present study a correlation can be made between: (1) the number of stomata and number of epidermal cells; (2) number of stomata and maturity of leaf; (3) size of the stomata and maturity of leaf in this species.

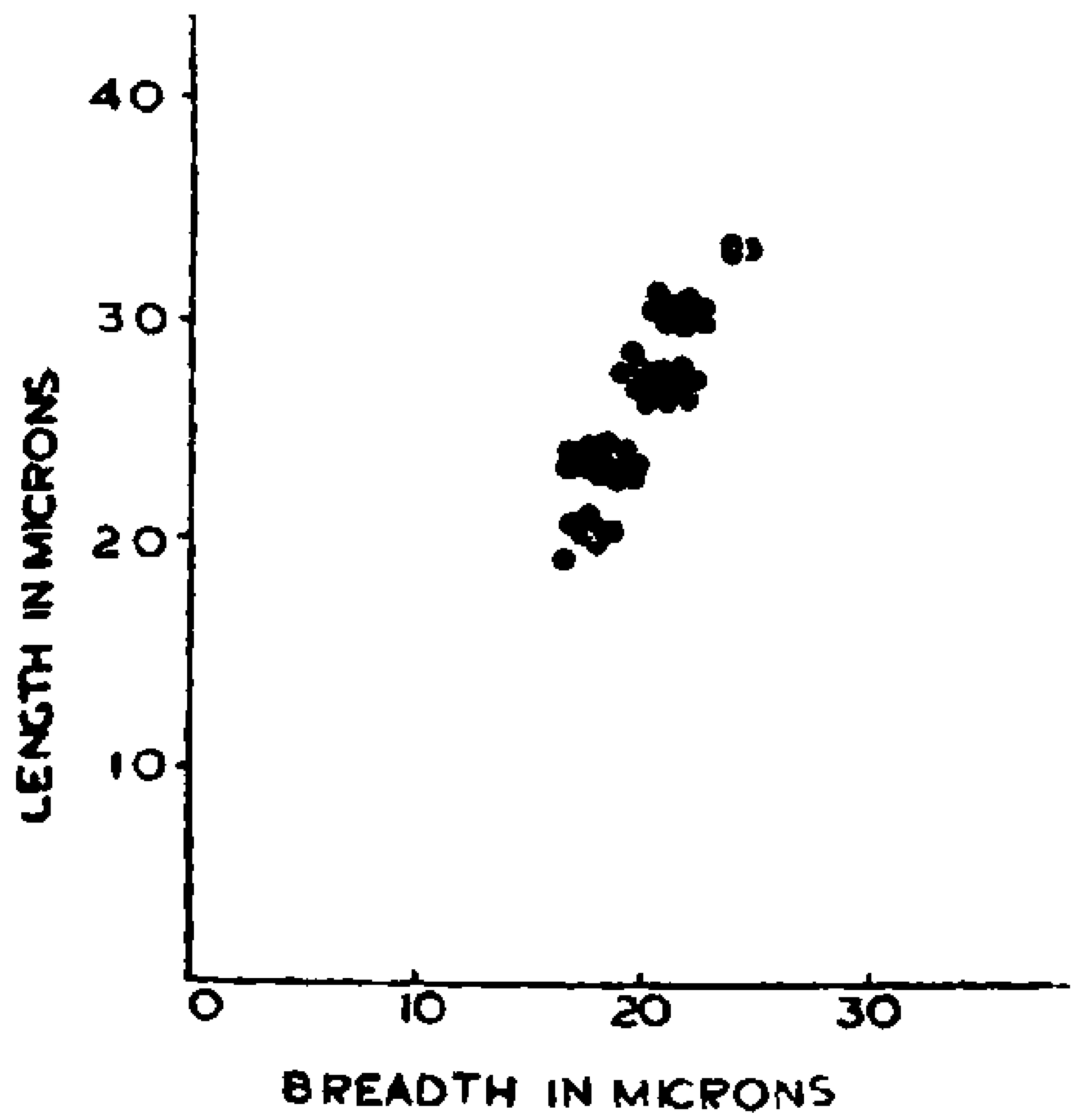

FIG. 1

The authors are thankful to Prof. H. C. Arya, Head, Department of Botany, for providing necessary facilities.

Ecology Laboratory,
Botany Department,
University of Jodhpur,
Jodhpur (India), *September* 8, 1974.

T. S. KACHHAWAHA.
M. C. BHANDARI.
D. N. SEN.

1. Dunn, D. B. *et al.*, *Amer. Midl. Nat.*, 1965, **74**, 165.
2. Sharma, G. K. and Dunn, D. B., *Bull. Torrey Bot. Club*, 1965, **95**, 464.
3. — and Sen, D. N., *Curr. Sci.*, 1968, **38**, 394.
4. Jain, D. K. and Singh, V., *Geobios*, 1974, **1**, 101.
5. Esau, K., *Plant Anatomy*, 1953.