Table 1. DENGUE VIRUSES TYPED BY THE MICRO-PRECIPITIN AGAR-GEL DIFFUSION TEST

Mouse brain passage	Virus strain*	Dengue type
2nd	S-721/64	1
3rd	S-631/64	2
4th	S-212/63	2
	S-634/64	1
5th	S-413/64	1
7th	S-843/60	2
	S-280/64	1
	S-583/64	2
8th	S-641/64	1
	S-107/64	2
	S-136/64	1
	S-365/64	1
	S-490/64	1
	S-518/64	2
9th	S-539/64	1
10th	S-1033/63	3
11th	S-389/64	1
14th	S-430/61	2
	S-452/62	2
	S-461/62	2
16th	S-212/61	4
	S-588/63	2
	S-675/63	1
	S-902/63	2
18th	S-888/63	3
22nd	S-604/63	1
26th	S-601/60	1
32nd	S-509/62	2
46th	S-132/61	4

* Year of isolation is indicated by last two digits.

The micro-precipitin test has been found to be highly specific for the typing of dengue virus types 1, 2, 3 and 4. It is also specific for the identification of JEV. The test enables rapid identification of dengue viruses since extracts of low mouse brain virus can be used and preparation of antiserum to the virus isolate is not necessary. It requires small volumes of reagents and simple equipment. Although, in the present investigation, only 70 per cent of the dengue viruses were successfully typed, the test offers a useful screening procedure for dengue virus isolates, especially in countries where dengue viruses associated with haemorrhagic fever are isolated in large numbers. The failure to obtain a precipitin reaction may be purely technical or it may be due to low antigen concentration in the brain suspensions. The possibility that the untyped viruses are new dengue types other than the four types tested must also be considered.

This work was assisted by a grant to the Department of Bacteriology of the University of Singapore by the Rockefeller Foundation, New York.

Y. C. CHAN

Department of Bacteriology,
University of Singapore, Singapore, Malaysia.

¹ Clarke, D. H., in *Symposium on Biology of Virus of the Tick-borne Encephalitis Complex*, edit. by Libikova, H., 67 (Czechoslovak Academy of Science, Prague, 1962).

² Lim, K. A., Chan, Y. C., Phoon, W. O., and Hanam, E., *Bull. Wild. Hth. Org.*, 30, 227 (1964).

AGRICULTURE

Control of Hassock (*Deschampsia caespitosa* [L.] P.B.)

ON many grasslands and pastures along the south coast of the Baltic Sea hassock has been playing an increasingly important part in recent years. Areas with excess humidity of soil are sometimes heavily infested. Lack of man-power has led to a decreasing care of the drainage system. Moreover, the reduction in the number of horses, which formerly kept hassock short, has favoured the spread of this grassland weed.

The control of hassock is said to be difficult. Drainage and use of fertilizers can stop a further increase in the number of hassock plants, but are not effective in areas with an abundance of hassock. In these cases only ploughing of the grassland and re-seeding can be recommended, and the year's harvest is thus lost, and considerable expenditure is involved.

A small percentage of hassock in grassland can be controlled by local application of herbicides. NaClO_3 , TCA, 'Dalapon' and ATA have been recommended^{1,2}. Shortage

Fig. 1

Fig. 2

of man-power prevents a local application when a good deal of hassock is present.

Experiments in 1963 and 1964 were designed to determine whether certain herbicides could exert selective action against hassock. This would make for more effective control of hassock on heavily infested grasslands and pastures. In our experiments several concentrations of TCA, TCP, 'Dalapon', NaClO_3 , 'Simazin' and 'Atrazin' were used on a pasture with prevailing *Poa pratensis* L., *Poa trivialis* L., *Festuca pratensis* Huds. and *Agropyron repens* [Juslen.] P.B. and with a small percentage of dicotyledons.

Atrazin controlled hassock only in concentrations which destroyed all plants. 5 g/m² of Simazin harmed the fodder grasses more than the hassock; couch-grass (*Agropyron repens* [Juslen.] P.B.) being the only fodder-plant to withstand this treatment. Moreover, the long residual effect of these triazine-derivates makes their use in high concentrations impossible. 5 g/m² of TCP failed to suppress the hassock completely, but damaged the fodder grasses extensively. Total hassock destruction was possible with 20 g/m² of 'Dalapon'; however, this caused considerable damage to the fodder grasses and resulted in a marked appearance of dicotyledons. In the second year, however, the fodder grasses had recovered and gave a good yield. Even more promising is the use of NaClO_3 . 10 or 20 g/m² suppressed the hassock rapidly, while the fodder grasses recovered quickly. Application of the herbicide in May appeared to be most successful, but sprayings in July were almost equally effective. The figures demonstrate the percentage of hassock (shaded column) and fodder grasses (unshaded column) in percentage of untreated plots at intervals after spraying the plots with 20 g/m² 'Dalapon' (Fig. 1) or with 20 g/m² NaClO_3 (Fig. 2) on May 13, 1963. The dead thickets of hassock on the plots treated with NaClO_3 were overgrown in August by *Poa pratensis*. Up to now (June 1964) no hassock has been seen again on these plots. The optimum conditions for the use of 'Dalapon' and NaClO_3 remain to be clarified.

GERHARD GRÜMMER
KLAUS KLOSS

Department of Plant Pathology,
Ernst-Moritz-Arndt University,
Griefswald, Germany.

¹ Dame, H., *Gesunde Pflanzen*, 10, 53 (1958).

² Holz, W., *Kali-Briefe*, 4, 8 (1963).