ments with 0·004% concentration of MES for 6 hr at 3·5 pH and 9·2 pH at room temperature.

These two types of dwarf plants could easily be distinguished on the basis of the morphological characters like leaf and earheads. These are :

1. Dwarf mutants with broad leaves, long and thick earheads. Plant height in this type ranged from 80 to 100 cm with 5 to 8 tillers, all producing earheads. All of the tillers come to the same height and all of them produce earheads at about the same time.
2. Dwarf mutant (one) with narrow erect leaves, thin and long earhead. This plant measured only 78 cm and it had 5 tillers and 4 earheads which were relatively thin compared to other types of mutants.

Cytologically these dwarf plants showed only 7 bivalents ($n = 7$) and did not show any meiotic irregularities. All these plants were selfed covering the entire plant with cloth mask, and plant-wise progenies were raised in M_3 generation to study their breeding behaviour. From each dwarf plant, a progeny of 150 plants was raised. All the dwarf mutants bred true for the dwarf character and no normal plants were recovered. Table I summarizes the data relating to the various morphological characters in a random sample of 30 plants of these two types of dwarf mutants in M_3 generation. Further generations raised also bred true establishing the true nature of the mutation. As these dwarf mutants did not show any cytological abnormalities, this mutation may be treated as point mutation.

TABLE I

Morphological characters of the dwarf mutants in M_3 generation (30 plants in each type)

Character (average per plant)	Dwarf No. 1	Dwarf No. 2	Diploid
Plant height (cm) ..	85·00	77·80	192·00
No. of tillers ..	7·00	4·06	5·00
Leaf nature ..	*drooping*	*erect*	*drooping*
Leaf length (cm) ..	45·25	48·15	53·25
Leaf width (cm) ..	4·5	2·3	4·2
No. of earheads ..	7·00	3·60	6·00
Length of the earhead (cm)	38·25	37·35	28·35
Girth of the earhead (cm)	13·00	7·00	10·35

Of the two types, the first one with broad leaves, long and thick earheads seems to be promising as an economically important plant type and further studies are under way with reference to uptake of nitrogenous manures and better yields when compared to diploids.

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A NEW RECORD OF A CYST FORMING NEMATODE (*HETERODERA CHAUBATTIA* N. SP. FROM THE HILLS OF UTTAR PRADESH

POSTERIORLY rounded cysts of an unknown *Heterodera* sp. were found in soil samples collected from around roots of apple trees in the U.P. Government orchards of Chaubattia in November 1972*. None of these cysts was seen attached to any root tissue encountered in the examined soils. The description of the cysts and the larvae liberated on crushing them, with discussion on the specific identity of the *Heterodera* producing them, proposing the epithet *H. chaubattia* n. sp. (Heteroderidae : Nematoda) is included in this paper.

Cysts— (number—25; preserved jn lactophenol)

Length (including neck)	520–765 μ	(636·9±16·6)
Greatest width .. (Number—10)	353–582 μ	(496·1±14·4)
Fenestral length ..	18– 22 μ	(20·5± 0·46)
Fenestral width ..	23– 28 μ	(26·1± 0·40)

Cysts shining brown ; body round to subglobose with protruding neck (Fig. 1); mature cysts ambifenestrate (Fig. 2), abullate becoming circumfenestrate with age (Fig. 4); vulval fenestra elliptical (Fig. 2), encircled by a distinct ring of thick dark brown crust (Fig. 3) ; anus not visible.

2nd stage larvae—(number 25 specimens) from crushed cysts (Fig. 5) preserved in lactophenol.

Length ..	408–492 μ	(461·75±·4)
Breadth ..	15– 20 μ	(17·76±0·2)
Stylet ..	23– 28 μ	(25·28±0·2)
Tail terminus ..	23– 30 μ	(26·0 ±0·4)

Oesophageal gland opening 4–8 μ from base of stylet.

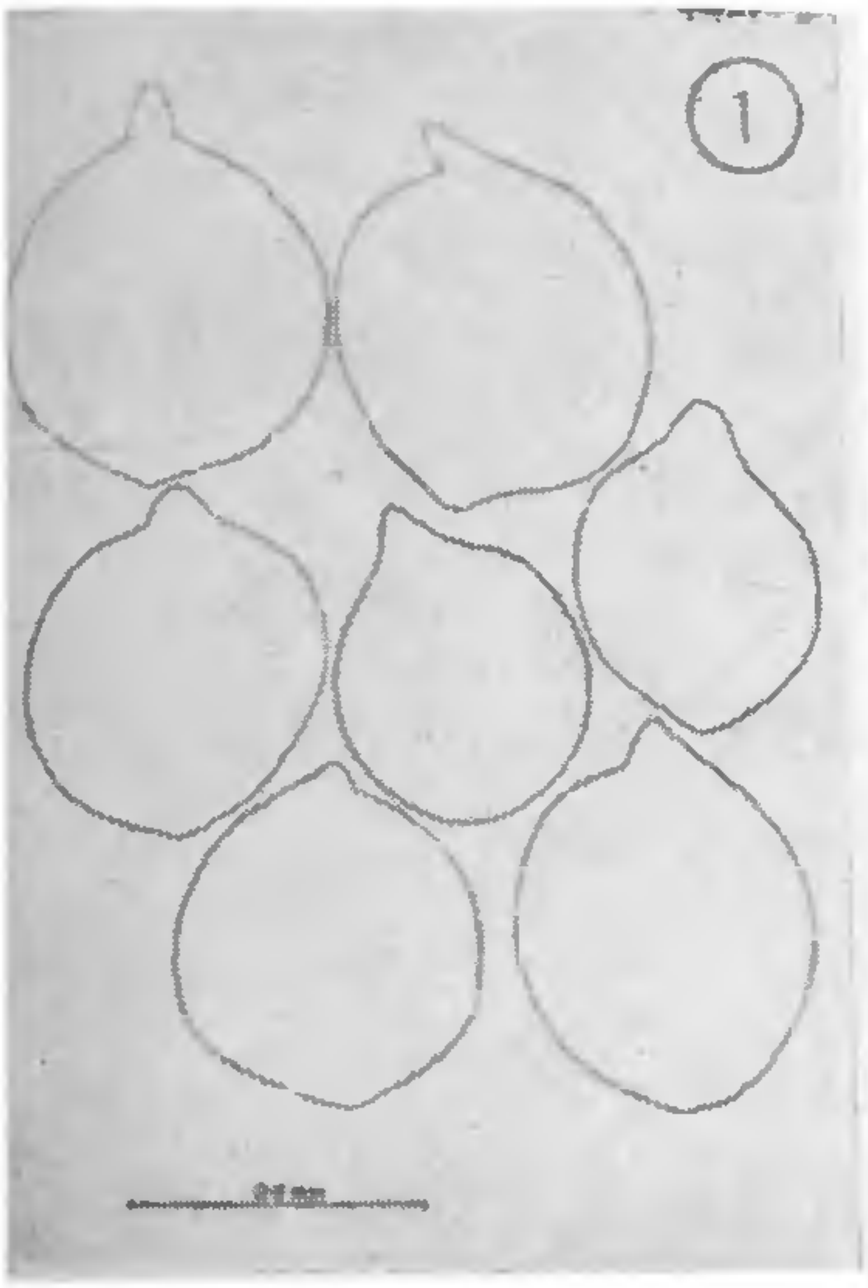
Eggs (with larvae)

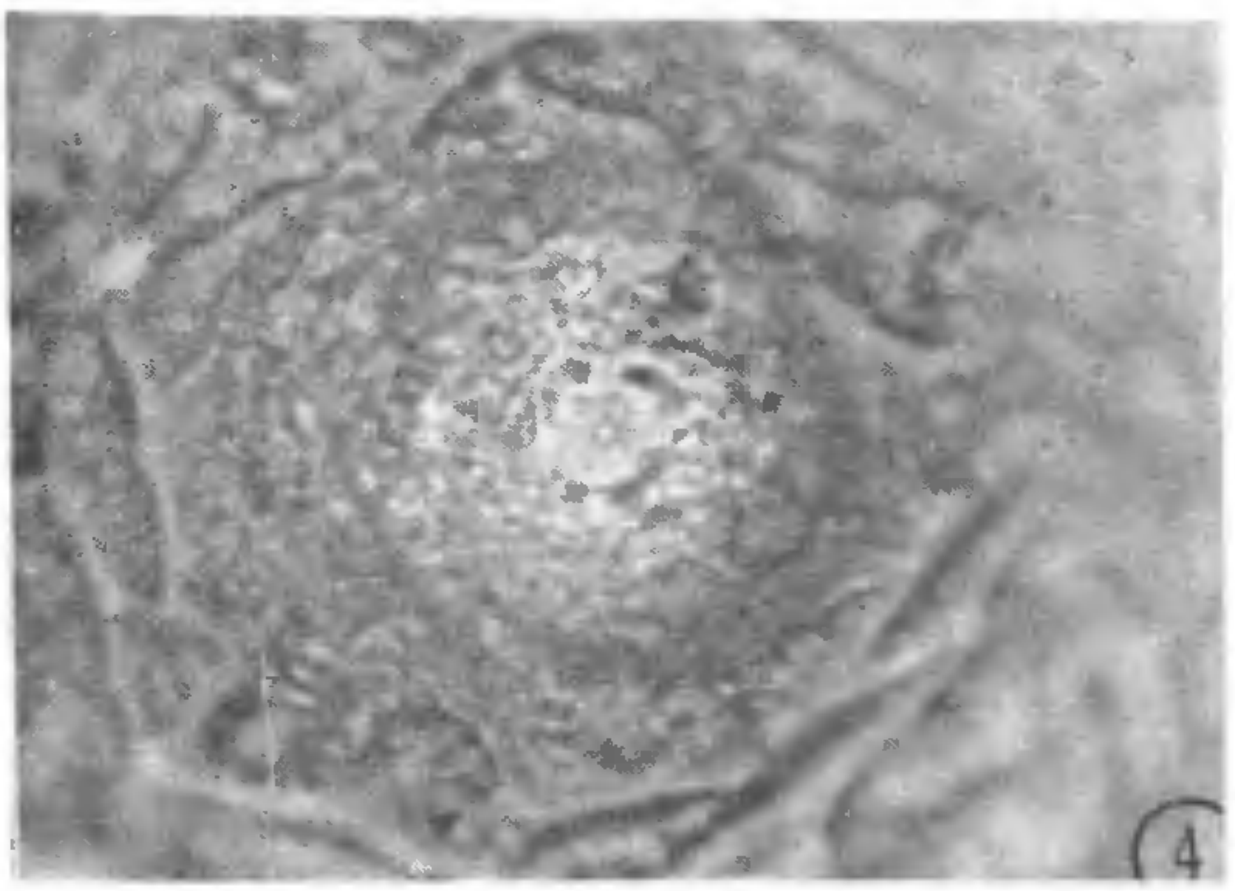
Length ..	90–110 μ	(100·9±4·6)
Width ..	38– 42 μ	(40·3±1·8)

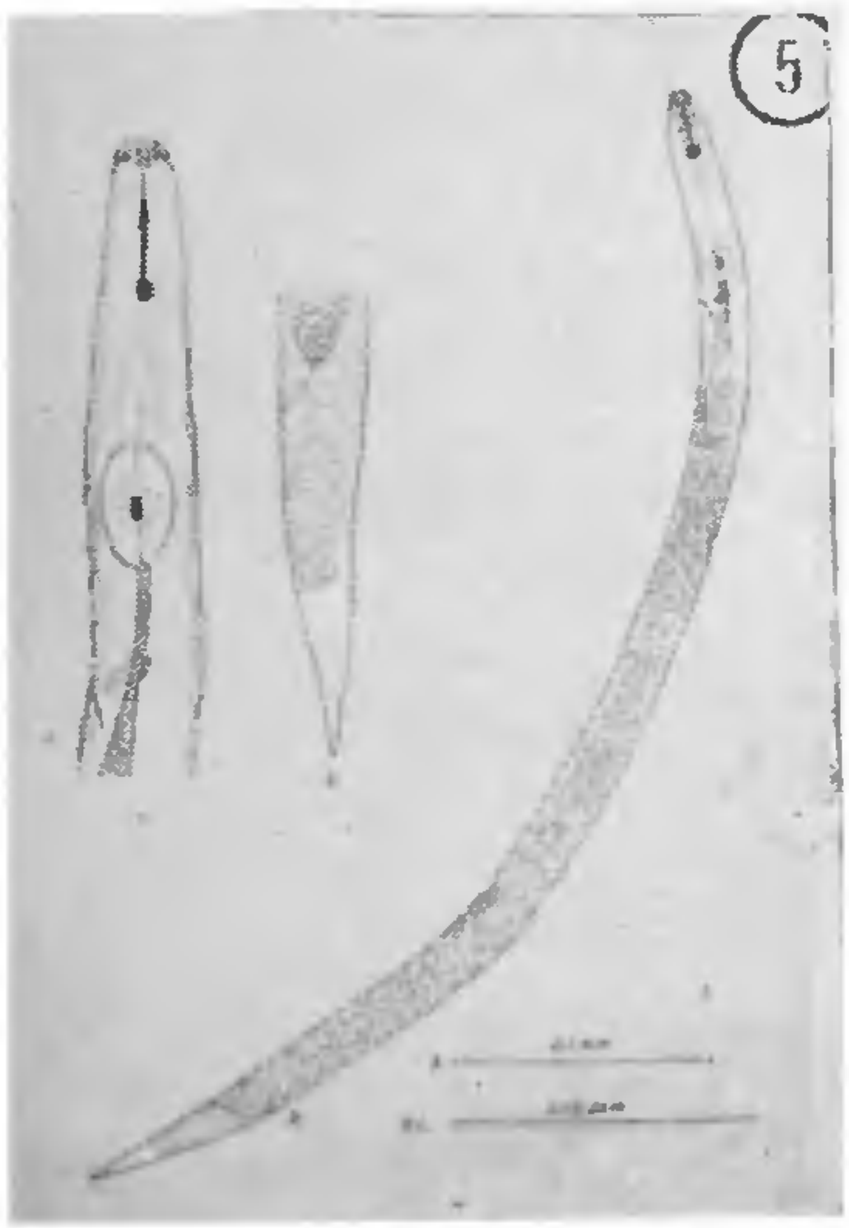
Type host.—Unknown.

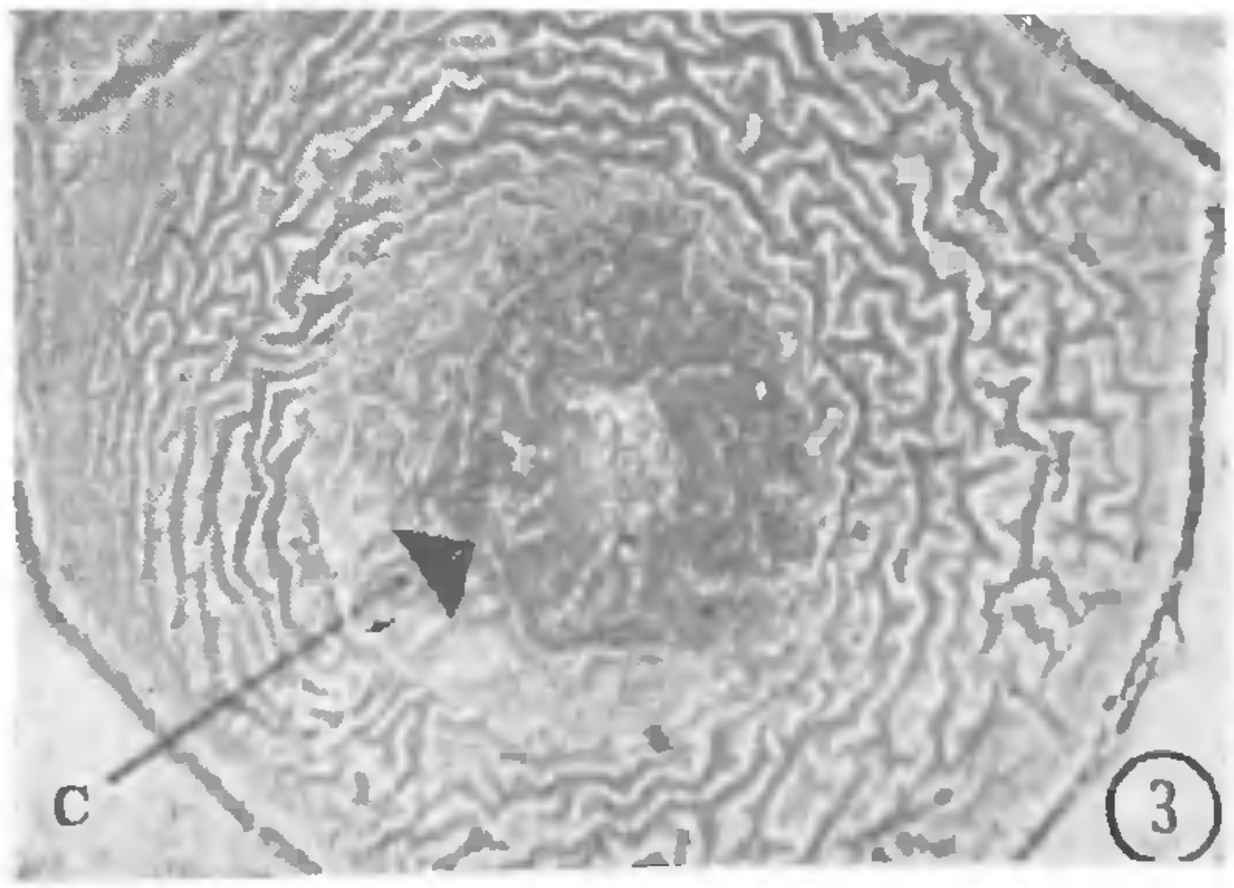
Type locality.—Soil samples from around apple trees in the U.P. Government orchards of Chaubattia.

Differential diagnosis.—In as much as the cysts described are without posterior protuberance and are essentially rounded, the *Heterodera* producing them may be classified under Group I of the key to *Heterodera* given by Mulvey (1972). There









FIGS. 1–5. *Heterodera chaubattia*. 1, Cysts; 2, 4—surface view of cone top. 2—mature cyst, 4—aged cyst; 3—cyst wall with ring of brown crust (C) around vulval fenestra; 5 (A, B, C) —second stage larva.

are 6 species included under this group. Since the cysts of the present species do not possess bullae, it would key close to abullate species, *viz.*, *H. leptonepia* Cobb and Taylor, 1953, *H. rostochiensis* Wollenweber, 1923, *H. tabacum* Lownsbery and Lownsbery, 1954 and *H. virginiae* Miller and Gray, 1968.

In having the fenestra encircled by a distinct ring of a thick dark brown crust the present specimens can be separated from all the four previously

mentioned species. Besides, it differs from *H. leptonepia* in having oesophageal gland opening about 1/4 stylet length posterior to stylet base and a tail terminus that is nearly 1/2 of the tail length. It can also be separated from *H. virginiae* in having a wider fenestra (lower limit corresponding with the highest of *H. virginiae*), (Miller and Gray 1968). In view of the above the species described is considered new and the name *H. chaubattia* n. sp. proposed to it.

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CHENOPODIUM MURALE—A DIFFERENTIAL HOST FOR COWPEA MOSAIC VIRUSES

SEVERAL mosaic diseases have been reported on different species of cowpea[1-6]. Of these, two viruses, *viz.*, cowpea mosaic virus—Rod-shaped (CpMVR) and cowpea mosaic virus—Spherical (CpMVS), are of common occurrence and are known to infect cowpea sp. *Vigna sinensis* Savi simultaneously.

In a naturally virus infected field of *Vigna sinensis*, it is not possible to distinguish the rod-shaped virus from a spherical one since both are similar in symptomatology. Both these viruses produce local lesions on *Chenopodium amaranticolor* Coste & Reyn.

In order to obtain a differential host for the two virus isolates under study, both the virus cultures, namely, CpMVR and CpMVS, maintained separately on cowpea var. Pusa phalguni in an insect-proof glass-house, were inoculated on leaves of test plants, *viz.*, *C. amaranticolor*, *C. album* and *C. murale*.

It is evident from Table I that CpMVR produces local lesions on *C. murale* within five days after inoculation (Fig. 1). Back inoculations from lesions on *C. murale* produced typical lesions

TABLE I

Local lesions on Chenopodium *sp. with two different isolates of cowpea mosaic virus*

Test plant	Appearance of local lesion with time taken	
	CpMVR	CpMVS
Chenopodium amaranticolor	+ (4 days)	+ (7 days)
C. album	—	—
C. murale	+ (5 days)	—

+=Positive infectivity; —=Negative infectivity.

as also it resulted in systemic infection on cowpea plants on inoculation. It, therefore, serves as a good indicator host to differentiate, screen and purify CpMVR from a mixture of CpMVR and CpMVS on cowpea.

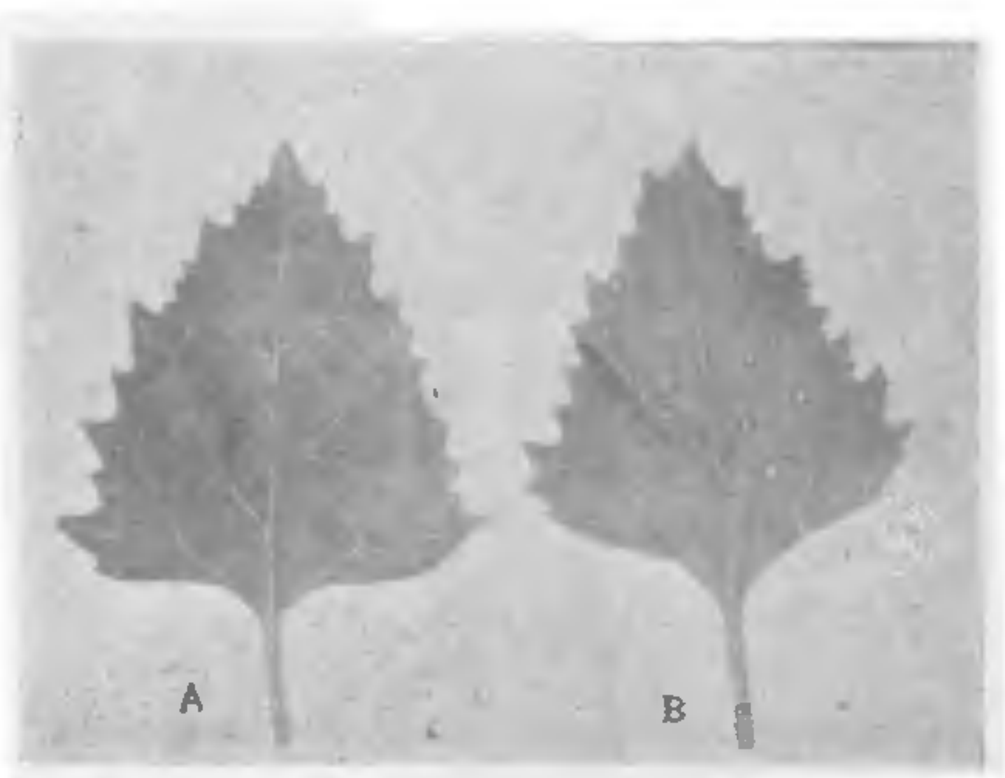

FIG. 1. Leaves of *C. murale* (A) Healthy; (B) Local lesions produced by CpMVR.

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