pathologic criteria, and in some of the clinical signs. Differences existed in the distribution of lesions in the gray matter. All the squirrel monkeys developed a similar disease at the same time after being held in isolation for a period of 11 months. Similar spontaneous neurologic disease in subhuman primates is not known to occur (*5*, *6*). Specific efforts were not made to identify simian passenger viruses (*11*). The possibility that such agents would have contributed to these findings seems remote.

Transmissible encephalopathy of mink in squirrel monkeys provides a readily available inexpensive primate model for the study of "subacute spongiform viral encephalopathies." This investigation lends support to the suggested relationship between animal and human transmissible viral encephalopathies.

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Mutation in Internode Length Affects Wheat Plant-Type

Abstract. *A mutant form was found in an* M_2 *population of wheat* Triticum aestivum *L. em. Thell. (aestivum group) 'Seneca'. The population was derived from soaked grains treated with 3.2 kilorads of gamma rays. The first and second internodes below the spike were reduced in length 33 and 15 percent, respectively, and the total height was 18 percent shorter than the prototype. The flag leaf sheath was normal in length resulting in spike placement below the flag leaf lamina. Segregation data suggest that one dominant gene controls this character. The canopy structure of a population of mutant plants is different from that of the normal type; therefore, this mutant can be used to evaluate light interception and physiological aspects of crop productivity.*

The study of canopy structure as it is related to productivity has led to a concept of plant-type by which production efficiency of crop plants is to be maximized (*1*). Such attributes as leaf angle and size, tillering ability, and plant height influence the amount and distribution of light intercepted in the canopy of cereal crops at a given plant population density and, therefore, are expected to affect photosynthetic efficiency. Photosynthesis in the culm, flag leaf, spike, and awn contribute variously to carbohydrate accumulation in the grain (*2*). Genetic modification of plant form through the use of isogenic lines provides information on the relative contribution of plant parts to grain yield (*3*). Thus the concept of plant-type has provided some previously unrecognized guidelines for the improvement of cereal crops. The major breakthroughs in increasing the yield of wheat (*4*) and rice (*5*) have been accompanied by major changes in phenotype, notably the development of short-statured wheat varieties and short-statured, erect-leaved varieties of rice. Full analysis of the concept of plant-type and whether it provides meaningful breeding objectives requires genetic variants with a common background genotype. We report here the finding of one such mutant of wheat. The mutant has reduced length of upper culm internodes with normal flag leaf lamina and sheath. This results in spike placement below the flag leaf lamina which in turn alters the canopy by placing the flag leaf in a more prominent position for light interception.

Four lots of grains of 'Seneca' wheat [*Triticum aestivum* L. em. Thell. (aestivum group)] were soaked in water for 24 hours, and each was given one of the following mutagenic treatments: 1.0 or 3.2 krad of gamma rays (^{137}Cs), or 100 or 320 rad of unmoderated fission neutrons. Similar lots were soaked for 24 hours in 0.011 or 0.100*M* ethyl methanesulfonate. The M_1 plants from all treated seeds and a control population were grown in reproductive isolation near Oak Ridge, Tennessee, in 1966. Approximately 850 M_2 plants, spaced 45 cm apart, of each of the six treated and the control populations were grown near Knoxville and Springfield, Tennessee, in 1967. Three plants (S636-1, S636-4, and S785-5) with reduced length of the upper internode were found in the population irradiated with 3.2 krad of gamma rays; no plants of this type were found in the other populations. Plants from the M_3 and M_4 generations derived by self-pollination from these putative mutant plants were observed when grown at

Table 1. Culm length of M_4 mutant and normal plants derived from S636-1. Internode 1 is the peduncle directly below the spike. Means of measurements of five culms each on nine homozygous mutant and 19 homozygous normal plants are given.

Internode	Culm: Mutant Length (cm)	Culm: Mutant Percentage of total length	Culm: Normal Length (cm)	Culm: Normal Percentage of total length	Percentage of normal
1	19.9*	32	29.7	39	67.0
2	15.7*	25	18.5	24	84.9
3	10.9	18	11.9	16	91.6
4	8.8	14	9.4	12	93.6
5	5.8	9	5.8	8	100.0
6	1.0	2	0.7	1	
Total	62.1*	100	76.0	100	81.7

* Significant difference from normal ($P < .05$).

Table 2. Comparison of M_4 mutant and normal plants derived from S636-1. Data on leaves and spikes are means as in Table 1. Coleoptile length was obtained at 20°C from 15 M_5 seedlings from each of the measured plants.

Characteristic	Mutant	Normal
Flag leaf sheath (cm)	24.4	25.6
Spike length (cm)	11.5*	13.5
Spikelets per spike (No.)	21.5*	22.8
Coleoptile length (cm)	7.2*	7.9
Seed weight (mg)	29.5*	35.3

* Significant difference from normal ($P < .05$).

30-cm spacing in field plantings at Davis, California, in 1968 and 1969.

From 16 M_3 plants produced by S636-1, five were classified as normal and 11 as mutant type on the basis of appearance and culm measurements. The M_4 families from these plants were classified in the following year. All normal M_3 plants produced normal, nonsegregating families; 9 of 11 mutant plants produced both normal and mutant plants in the M_4 families. The remaining two mutant M_3 plants produced all mutant M_4 progeny. Complete dominance is indicated for this character because, based on measurements of the culm, mutant M_3 plants were phenotypically similar and progeny-testing proved that some of the M_3 plants were heterozygous. The data for M_4 families fit a ratio of one mutant to two segregating to one normal; in the segregating families, a ratio of three mutant to one normal was closely approximated. These results suggest that a single dominant gene conditions the mutant phenotype. Mutant plant S636-4 produced all mutant M_4 progenies, and S785-5 segregated similarly to S636-1 in the M_4. Stability of expression of the mutant phenotype has been obtained through three generations.

This mutation mainly affects the length of the first internode below the spike (peduncle) (Table 1), and the reduction in length of lower internodes lessened until there was no reduction at internodes 5 and 6. In this regard it is similar to mutants found by Konzak *et al.* (*6*). The total height of the mutant, including the spike, is 18 percent less than that of the normal phenotype. The length of the flag leaf sheath is not reduced in the mutant type (Table 2), although elongation of the peduncle may be modified somewhat by population density. This characteristic apparently has not been observed previously with wheat mutants. It is the unmodified length of the flag leaf sheath that results in altered canopy structure of the population. At present it is not suggested that this is a desirable feature for improvement of photosynthetic efficiency, but it is believed that this mutant provides a means by which certain relationships of light interception in the canopy may be evaluated. Translocation of carbohydrates from the flag leaf lamina and sheath or peduncle and lower internodes to the spike may be altered in this mutant and must be considered along with its effect on canopy structure. With respect to the subtended spike, mutant plants appear somewhat similar to the high-yielding 'IR-8' rice in which the panicle is displayed somewhat below the flag leaf lamina (*7*).

Table 2 shows other effects apparently associated with the mutant character: reduction in seed size, spike length, number of spikelets per spike, and coleoptile length. Coleoptile length has selective value for seedling emergence, and the reduction in length with this mutant is less than with many short-statured wheats (*8*). Nilan (*9*) has pointed out that pleiotropism is a common feature of induced mutations in higher plants; he suggested that this is an indication of the "gross and extragenic nature of detectable mutations in plants." Detailed genetic and developmental analyses are required to judge the appropriateness of this remark for the present mutant.

The induction of dominant mutations by chemical or physical means is quite rare (*9*); however, dominant short-stature mutations were found recently in common wheat (*10*) and in durum wheat (*11*). With both of these mutants the normal relationship of flag leaf sheath and peduncle was maintained so that the presently described mutant is morphologically distinct.

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Demyelinating Encephalomyelopathy Associated with Lead Poisoning in Nonhuman Primates

Abstract. *Lead poisoning was diagnosed in four primates by the finding of toxic amounts of lead in tissues. Abnormalities in the brain and spinal cord were characterized by vascular lesions and demyelination. These findings suggest a new animal model for the study of demyelination and strengthen the supposition that lead may be a factor in some idiopathic demyelinating diseases.*

Reports of lead poisoning in nonhuman primates are sparse. We are aware of only a few accidental poisonings (*1*), none of which was necropsied, and several experimental poisonings (*2*). This report summarizes the findings in four primates in which accidental lead intoxication existed for various lengths of time before death. A spectrum of central nervous system changes was found. The lesions closely resembled one or the other of two previously described conditions of unknown cause in primates. A detailed study of a larger number of similar cases is being prepared for publication elsewhere.