Strobilanthes anisophyllus T. Anderson
Goldfussia. Recorded as naturalised, Waitakeres, Auckland. Very dark leaves, pink flowers. Popular garden ornamental. Common at the Auckland University, in shrubberies. Acanthaceae.

Tetrastigma voinieranum (Baltet) Gagne.
Chestnut vine. Laos. Used as a screening plant in California. Very vigorous. Excellent example at Auckland University. Vitaceae.

Trochodendron aralioides Siebold & Zucc.
Japan, Korea, Taiwan, China. An evergreen tree. Auckland Botanical Gardens. Auckland University. Trochodendraceae.

Wigandia caracasana Kunth
Large shrub with huge leaves. Mexico, Central America. Good example at Hort Research, Mt Albert, Auckland. Also at the Auckland University, Classics area. Showy purple flowers in September and October. Hydrophyllaceae.

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The Clandestine Flowering of Kikuyu Grass *Pennisetum clandestinum*

Alan Esler

Kikuyu grass does have flowers even though sexual reproduction seems to have no place when we see shoots rushing upwards (A on Fig.1), or outwards (B). Flowers develop not on these shoots but on the fascicled side branches (C) of established shoots close to the ground. They are evident from the ephemeral feathered stigmas (1) and the delicate slender stamens (2) up to 50 mm long. They arise from the inflorescence (flower cluster) partly buried among the short leaves (D). Slender conical flowers around 20 mm long arise in the leaf axils and emerge from the sheath (3) further up the stem. Sheaths longer than about 14 mm would obscure most of the flower, and it seems that flowers are not wasted where they could not function. Shoots from the lower axils (4) develop early alongside flowers and soon bury them deeper in the foliage.

The inflorescence has 1 - 4 (usually 3) spikelets (E,F). Each has a single floret (G) (sometimes missing) and two inner bracts - the palea and the firmer, larger lemma partly enclosing it (5). The two outer bracts (glumes) are difficult to see – the upper a few millimetres long and transparent, the lower smaller or absent. The lowest spikelet is usually male though sometimes sterile or seemingly reduced to a lemma. The upper spikelet is hermaphrodite (G) though it may be functionally male or female through the suppression of the ovary or the stamens. Some plants are male only or female only.

Soon after flowering the one or two ovaries in each inflorescence reach their 3 mm ultimate length (H).They become firm and brown within a week or so and the lemmas are quite leathery. The flowers are not entirely

hidden but are clandestine in comparison with other species in the genus well known for its showy heads. Among them are *Pennisetum villosum* (feathertop), *P. latifolium* (Uruguay pennisetum), *P. alopecuroides* (Chinese pennisetum), *P. macrourum* (African feather grass) and *P. setaceum* (fountain grass) . These are all ornamental grasses now well established as wild plants in this country. Kikuyu grass seeds seem doomed to be

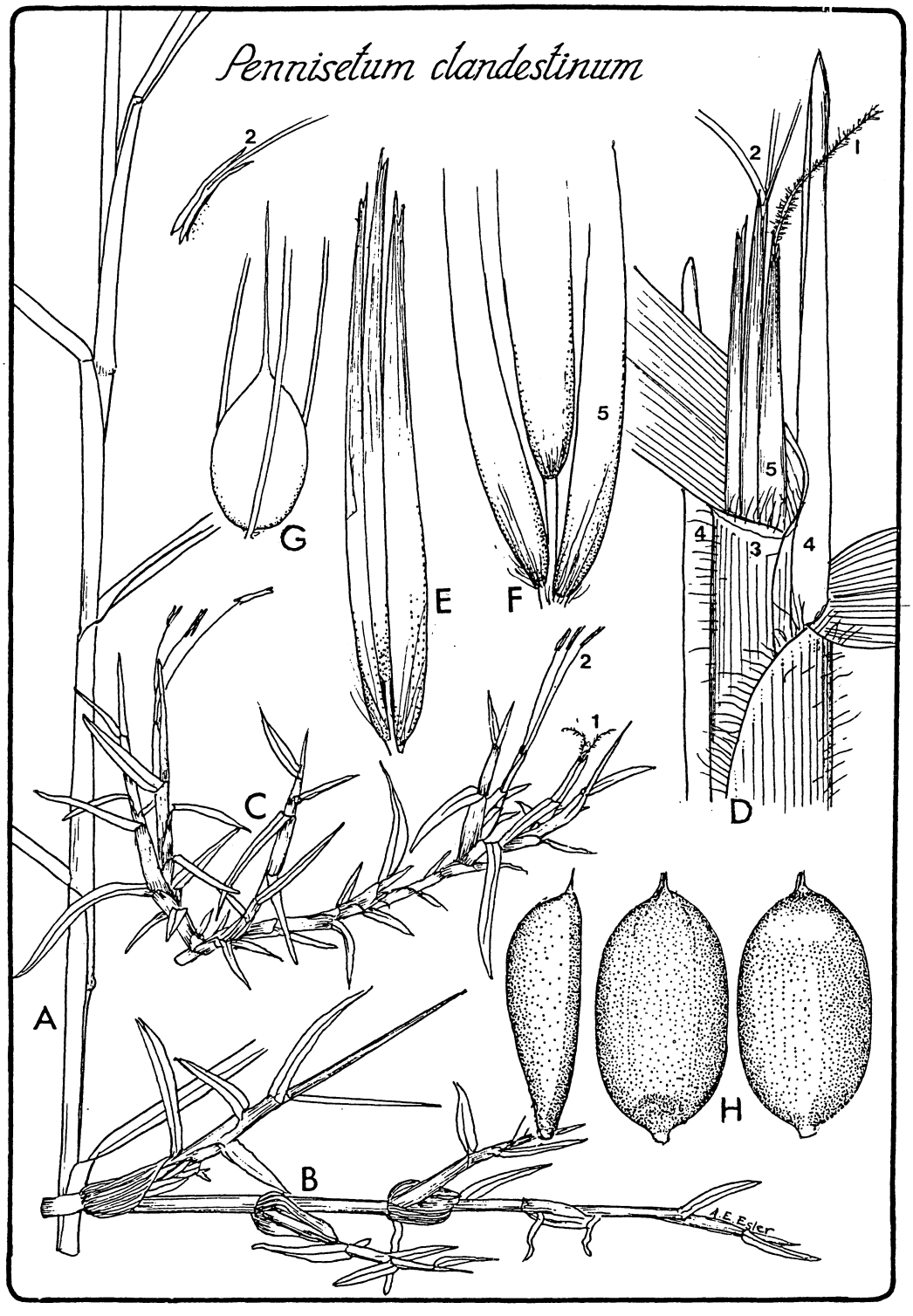

Fig. 1: The form of kikuyu grass: A erect shoots; B creeping shoots; C fascicled side shoots; D flowering shoot; E,F inflorescence; G base of floret; H seed.

1 = stigma 2 = stamen 3 = sheath 4 = young shoot 5 = lemma

seeds end up in the animal droppings ready to germinate in the most recently fertilised parts of the pasture. Small patches soon become large patches and we can watch the spread of kikuyu grass as it draws its own maps across the landscape. To a minor extent cattle carry seed-bearing shoots in cloven hoofs and spilling from the mouth. Some is also moved by machinery. Four principles stand out:

- Transfer of kikuyu grass around the farm is primarily in animal droppings
- Importing stock from infested farms is the surest way to introduce the grass
- Little if any seed is carried in hay
- Most urban colonies grow from contaminated soil.

There is an unexpected ecological twist to the dispersal of kikuyu grass seeds by animals. Birds may carry seed-bearing shoots as nesting material but there would seem to be no transfer by seed-eating birds because nourishment is within the seeds and these have to be cracked or ground to gain access to it. However, there is evidence that sparrows carry some kikuyu grass seeds as gut seeds. We have noted seedlings where sparrows wait for crumbs from the Esler table. For some time we had suspected that sparrows harvest kikuyu grass seeds. Flocks wrestle with kikuyu grass shoots in lawns but move off when we try to get a closer look. One day in Albert Park I was given a demonstration within arm's length while they waited for crumbs from the Esler lunch box. They ripped apart the leaf sheaths when projecting lemmas indicated where the seeds were to be found. It takes 4,000 seeds to make up a gram, but they are highly nutritious. The assumption is that some seeds pass through to the droppings intact.

Kikuyu grass, bearing the name of a tribe north of Nairobi, is a native plant of Kenya, Ethiopia, Tanzania and Zaire within a few degrees of the equator at altitudes equivalent to the mountain tops of Tongariro National Park. It grows in moderately fertile, well drained soils in high altitude grassland and on forest margins with a rainfall like that of Auckland. It has been grown as a pasture plant since early this century. One introduction was from Rhodesia to the Department of Agriculture Albany Experimental Area in 1920. It is said that some farmers desperate for a grass that would grow well on the inhospitable gumland soil did not wait for it to be released officially. Fences were no barrier to kikuyu grass or to farmers wanting to obtain it. Some early importations came from Australia and there have been improved strains from there since. David Hay the Auckland nurseryman is wrongly regarded as being the original importer. His plant *Pennisetum villosum*, and kikuyu grass were known under the same botanical name.

My first encounter with kikuyu grass seed was in the 1970s as a D.S.I.R. botanist trying to identify a mystery package taken by a suspicious airport regulatory officer from an unhelpful farmer returning from Australia. I was caught unprepared because kikuyu grass seeds travel as naked grains without the husks that give grass seeds their identity.

You may wonder how kikuyu grass seed is harvested. The short sward is mown several times, each time raising the cutting level to promote flowering. The final cut is made low enough to remove the seeding stems which are then windrowed and harvested.

Kikuyu grass is probably the most prevalent alien perennial wild grass in Auckland and well on the way to becoming much more significant. Please study it and record the details of the vegetation in its path for the archives.

Note Ewen Cameron

Although the flowers of kikuyu grass are inconspicuous, if the angle of sunlight is right, a patch of flowering kikuyu can be determined from 0.5 to 1.0 km away! This is because the very long, exposed, translucent filaments of the kikuyu stamens can cause a reflected sheen from flowering kikuyu pasture. I've noticed this several times in the summer while boating near grazed islands in the Hauraki Gulf.