

Notes on *Equisetum arvense* in New Zealand

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Equisetum arvense L., popularly known as common horsetail or field horsetail, is a weedy plant found in fields and waste, moist places in Europe, temperate Asia and North America. In North America the species is recognised as being a polymorphous one with a number of varieties and forms (Fernald, 1950) but in Japan where it is very common from the lowlands to the mountains (Ohwi, 1965) it is apparently more uniform.

The first record of *E. arvense* in New Zealand is by E. H. Atkinson (1922) when he identified specimens with cones sent to him from Wanganui by J. McGregor. The latter had made observations over the previous seven years on a colony which had established itself at the Esplanade, Wanganui. He considered that it originated from plants accidentally introduced with iris roots from Japan (Atkinson, 1922). For many years Wanganui Esplanade, now part of Kowhai Park, was the only place in New Zealand where the *Equisetum* was known to be established. It was collected again, with cones, by J. W. Davey in July, 1940. Today it is almost eliminated from this area (M. R. Boothby pers. comm.).

In order to have material for his classes the late Professor H. B. Kirk gathered some rhizomes from the Wanganui site and grew them at what is now Victoria University of Wellington. He took precautions to ensure that the *Equisetum* did not spread from the tin, set in concrete, in which it grew, and was careful to instruct all members of the department to destroy any pieces of the plants which they detached. Although the plants still grow at Victoria University and have provided vegetative material for the use of students for very many years, they disappointingly never produced cones.

In 1940 the *Equisetum* was inadvertently brought into nursery land in Palmerston North with sand from Wanganui and rapidly established itself. It grew vegetatively extremely well and was regarded as an ornamental plant until I identified it in 1949 and warned of its aggressive and persistent nature. Since that time, despite a regular programme of spraying with weedicides and repeated cultivation of the soil, the *Equisetum*, although kept under control, has never been completely eradicated.

By now the *Equisetum* has also been collected from other districts. Herbarium specimens at Botany Division come from the Botanic Gardens and from the Avon River at Helmore Street, Christchurch (January, 1945), from the garden of Miss Skellerup,

Christchurch (November, 1954), from the Mokihinui Valley, west Nelson (December, 1947 and January, 1962) and from a garden in Havelock North (December, 1965). None of these herbarium specimens show cones. At Massey University there are herbarium specimens from the garden of P. Skellerup, Desmond St., Christchurch (October, 1960) with a note that the weed came from Japan with Japanese irises and reached the Botanic Gardens in Christchurch from the same source. It also grows at Virginia Lake, Wanganui (M. R. Boothby pers. comm.).



Photo: D. Scott.

Cones of *Equisetum arvense* grown at Massey University.

In 1960 in order to have material for my classes I dug up a few rhizomes from the nursery land in Palmerston North and have kept the plants growing in an unheated glasshouse at Massey University. Until this year they produced only vegetative growth with new shoots appearing periodically, but at no definite season. For convenience in the summer of 1969 the plants were shifted to a new greenhouse. To my surprise at the beginning of May, 1970, David Sollitt drew my attention to an abundant crop of cones. These continued to open up until the end of June. Some of them are shown in the accompanying photograph.

The summer of 1969 was abnormally hot and dry. For three months the daytime temperature in the greenhouse reached 36° - 46°C. and during a week in mid-February the pots were not watered and dried out. The leafy stems of the *Equisetum* withered off and the plants appeared dead. However, the pots were placed under the bench at approximately one-half normal daylight and were kept watered. Meanwhile the cooler autumn weather kept the daytime greenhouse temperature below 25°C. Three months later, in May, the cones appeared. The Wanganui Esplanade site would also be hot and dry in summer.

It seems that subjection to heat and dryness in summer in New Zealand results in the production of cones when growth is resumed, whereas plants grown under relatively uniform and cooler climatic conditions produce only vegetative shoots. Curiously the cones appear in late autumn or early winter and not in spring as is usual in the northern hemisphere.

The evidence suggests that the New Zealand plants are derived originally from Japan, although they have been introduced on at least two separate occasions.

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