Management information: *Sorghum halepense*

**Preventative measures:**

Prevention of seed dispersal and rhizome production is an important measure to avoid high Johnson grass infestation in crop areas. Seeds are normally dispersed through wind, water, animals and contaminated crop seeds. Therefore slashing the plants at the beginning of the flowering stage in field margins, ditchbanks, canals and crop land and/or avoiding animal grazing in infested areas, helps to prevent new Johnson grass infestations.

A risk assessment of *Sorghum halepense* for the Pacific region was prepared by Pacific Island Ecosystems at Risk (PIER) using the Australian risk assessment system (Pheloung, 1995). The result is a score of 25 and a recommendation of: reject the plant for import (Australia) or species likely to be a pest (Pacific).

**Physical:**

Mechanical control of Johnson grass aims to prevent new rhizome production and must be implemented within the first month after shoot emergence. McWhorter (1989) considers that cultivation is most effective when the grass is about 36 cm tall. This helps prevent plants from forming rhizomes or seeds. In arable land Johnson grass infestation may be reduced by dragging the rhizomes onto the soil surface with a sweep or spike-tooth tiller during land preparation as this facilitates desiccation by sunlight (Crovetto and Rojo 1957; Grupce 1975; Labrada et al. 1982). Desiccation of rhizomes can be accelerated by cutting them into fragments less than 5 cm length. Rhizomes dried to 20% of their original weight completely lose their regenerative ability (Anderson et al. 1960). In fruit tree orchards regular mowing when the shoots are 20-25 cm tall tends to deplete rhizome food reserves and limits further rhizome production. Pasturing over a period of several seasons is advocated as an effective method to reduce Johnson grass stand (Hauser and Arle 1958; McWhorter 1981). Miller et al.
(1962) also indicated that geese provide excellent control of Johnson grass and other grasses in cotton, but required a high level of management.

**Chemical:**

Johnson grass is not easily controlled with herbicides but several systemic foliarly-applied compounds can be effective. Glyphosate is useful in pre-planting treatment, applied to well-developed foliage 2-3 weeks before planting or seeding, and may also be used in fruit tree orchards. Post-emergence application of fluazifop-butyl, haloxyfop-methyl, fenoxaprop-ethyl, quizalofop-ethyl and sethoxydim are selective in broadleaf crops and provide control of seedlings and suppression of established plants. A single application of these herbicides is not usually enough to reduce heavy Johnson grass infestations below the economical threshold in the affected crops. In sugar cane, post-emergence treatment with compounds such as asulam, dalapon and MSMA have been selective in the crop (Millhollon and Fanguy 1989). These compounds are usually applied when the shoots are 20-25 cm high. Dalapon is less selective to sugar cane than asulam or MSMA, and application should be directly onto the weeds, avoiding any contact with cane foliage.

Trifluralin as a soil-incorporated pre-planting treatment is effective for the reduction of Johnson grass stand from rhizomes. This treatment is most effective against short rhizomes (less than 10 cm) (McWhorter 1974). Good to excellent effectiveness is provided by a second treatment in the second year of a Johnson grass control program (McWhorter 1989). This treatment is selective in crops such as sugar cane, beans, soybeans, goundnut and cotton (McWhorter 1974; McWhorter 1977; Millhollon 1978; Kleifeld et al. 1986; Labrada et al. 1987). However, this treatment is not selective in all sugar cane varieties (La O et al. 1985). Another useful dinitroaniline herbicide for the control of Johnson grass seedlings is pendimethalin. Pre-seeding soil-incorporated EPTC+dichlormid is also effective for Johnson grass control in maize crop (de Falcón et al. 1985). It is important to stress that chemical control measures alone do not usually control johnsongrass. Furthermore, chemical treatments are not always economically
feasible for smallholder farmers. Therefore, the best control option for this perennial weed is the integration of land preparation, crop rotation and rational chemical treatments.