Non-Chemical *Cyperus iria* weed management through rice densities and weed emergence times in dry-seeded rice eco-system

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Summary *Cyperus iria* is one of the most threatening weeds of rice in Sri Lanka, India and the Philippines. A broad knowledge about ecology and fecundity of *C. iria* is important for its effective management. Field studies were conducted over two seasons {wet season (WS) and dry season (DS)} to understand the influence of *C. iria* densities (40 and 80 plants m-2) on its growth, survival, and fecundity, with varying emergence times of 3, 15, 30, and 45 d after rice emergence (DARE) during 2013. We hypothesized that (a) high plant density of weed produces more biomass and fertile seeds per unit area, (b) interference of rice decreases the biomass and fecundity of the weed, and (c) a delay in weed emergence reduces the % survival and soil seed bank. The results indicated that rice interference decreased *C. iria* growth and seed production as compared to the plants grown without rice interference. A linear decrease in the percent survival of *C. iria* without rice and sigmoid decrease with rice was observed during both the seasons. Plant height of *C. iria* was moderately affected up to 30 DARE and a significant reduction was observed at 45 DARE. Likewise, with a delay in emergence of each *C. iria* cohort relative to rice, tiller number and shoot biomass per plant declined in a linear manner in the DS and exponential manner in the WS. There was a linear relationship between *C. iria* shoot biomass and the number of seeds plant -1, across rice seeding rate, weed density, and emergence time. *C. iria* seed production, 1000-seed weight, and seed yield were greater when seedlings emerged with the crop (3 DARE), relative to the late-emerging weed cohorts. Under rice weed interference growth, production of viable seeds was completely stopped at 45 DARE. Seed germination of the first two *C. iria* cohorts (3, and 15 DARE) was 89% in DS and 49% in WS. Third cohort (30 DARE) produced viable and germinable seed in the DS and was unable to produce seed in the WS. The delay in emergence of *C. iria* up to 45 DARE was unable to produce seed in both seasons. The results of the current studies advocate that the emergence, weed biomass and seed production of *C. iria* can be checked by adopting suitable cultural weed management practices, which can delay the emergence of weed relative to rice These approaches that make the associated crop more competitive will be useful in integrated weed management programs, and are thus valuable for hindering seed rain to the seed bank by noxious weeds in the field.