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Beliefs and management practices of weedy rices: A comparison among male and female rice farmers in the Mekong Delta, South Vietnam

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ABSTRACT

A survey of 200 male and female rice farmers in irrigated low land rice areas of Can Tho province revealed that more than half of the male and female farmers interviewed could identify weedy rice which is locally called "lua lon" and one fourth of them called them as "lua ma". A higher proportion of the male farmers (51%) than female farmers (44%) could identify two types of weedy rice. They were able to differentiate different types of weedy rice based on the presence of awn and awn length, shattering characteristics, leaf color and time of flowering. Both male and female farmers observed a higher occurrence of weedy rice during the Spring- Summer season when farmers do not till their lands. Female farmers estimated that weedy rice could reduce rice yields by 40%. There is no gender difference in the beliefs of weedy rice biology and management, except that more male farmers than female strongly believe that weedy rice is always shattering and that early flooding does not affect weedy rice infestation. Because of the long-term experience of female farmers in rice farming, particularly in weed management, their beliefs and management practices do not differ with men. Thus, training and extension programs should include both male and female farmers in activities related to integrated methods for weed and weedy rice management.

INTRODUCTION

Weedy rice is a serious weed in the rice field in over 50 countries of Africa, Asia and Latin America. It is undesirable for farmers and the consumers (Noldin 1998). The spread of weedy rice is almost always as contaminant in rice seed from cultivated varieties. In tropical area like Vietnam where wild rices exist in waste land or along the canal, weedy rices are the progenies of crosses between wild species and cultivated rices.

The seeds of weedy rices increase over time with self - regeneration to ensure the future re- infestation. The yield of rice fields can be reduced because the key morphological trait of easy grain shattering makes these weedy rice no longer harvestable upon ripening (Bakar et al., 1989). In Vietnam, weedy rice is becoming a new pest particularly in direct seeded rice areas.

Controlling weedy rices is difficult because there is no effective selected herbicide to eradicate them completely. According to Baker et.al. (1998), weedy rices will continue to evolve morphologically by inter-crossing with modern cultivars, making them difficult to control chemically. The adoption of new technologies is quite low due to some social, economic and technical factors (Chin et.al. 1998).

Hand weeding or pulling weedy rices has been a traditional method for eradicating this pest. Since weeding efficiencies will depend on knowledge, beliefs and abilities to recognize the weedy rice plants, understanding gender differences can help in targeting extension and training programs.

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This paper examines whether there are gender differences in beliefs and practices of rice farmers' management of weedy rice in the Mekong Delta.

METHODS

1 Methods of data collection.

This study was conducted in Phuoc Thoi village, OMon district, Cantho province. Data were collected through the use of a questionnaire. Attributes in the questionnaire were derived from focus group interviews with farmers. One hundred households were randomly chosen for data gathering. Within each household, the husband and wife were interviewed separately by different interviewers to avoid prompting from each other or other members in the household. Thus, a total sample of 200 respondents (100 males and 100 females) were interviewed. The structured questionnaire was used as instrument to collect data on farmers' cultivation practices, weedy rice identification and management, and their beliefs.

2. Measuring beliefs on weedy rice biology and weedy rice management

Farmers' beliefs are divided into two domains: (1) beliefs about weedy rice biology, and (2) beliefs about weedy rice management. In the questionnaire, eight attributes related to beliefs on weedy rice biology and management were used. Examples of these eight beliefs are:

(1) "weedy rice seeds remain alive in the soil for more than one crop season"

(2) "weedy rices are always shattering"

(3) "weedy rices are always taller than rice"

(4) "weedy rice grains with dark husks have red pericarps"

Each respondent was asked to assess his or her degree of belief by using 5 descriptors. The descriptors were "1= definitely not true; 2= in most cases not true; 3= may be true; 4= in most cases true; and 5= always true". We also asked farmers to evaluate the importance of each of the belief about weedy rice management by using 5 descriptors: "1= completely not important to me; 2= not important to me; 3= no opinion; 4= important to me; and 5= very important to me". The descriptors for each attribute of individual farmers were summed and the mean was derived. As the score of 3 suggests indifference, score greater than 3 would imply strong belief and score lower than 3, weak belief. T-Test was employed to compare the differences of means of scores.

RESULTS AND DISCUSSION

1 Weedy rice biology

This survey indicates that one-third of the male and female respondents noticed weedy rice from 1991-1995. Forty four percent of male and forty four percent of female farmers recognized weedy rice as problem from 1991- 1995. Both male and female farmers observed a higher occurrence of weedy rice during the Spring - Summer season when farmers do not till their lands.

Majority farmers could identify one to two weedy rices. However, a few male farmers (7%) could identify three types of weedy rices. The ability of farmers to identify the number of type of weedy rice in their fields is important for better rice management. Both male and female farmers can differentiate weedy rices from cultivated rice. They can differentiate by looking at the height of the plant, shape and color of the husk, presence of awn, shattering, length of the leaf and time of flowering.

They can distinguish the weedy rice from the cultivated rice due to its taller height. They said that panicles of weedy rices are long with less seeds per panicle. About 70% of male and female farmers described the weedy rice with round grains. Farmers observed that weedy rice produce fewer tillers than cultivated rice.

Most of male and female farmers said weedy rice having awn. It is hard to distinguish the weedy rice from the cultivated rice by leaf color. However, they can distinguish by length of the leaves. The weedy rices have longer and harder leaves with pointed tips.

More males (72.1%) than female farmers (60.5%) said that the grains of weedy rice very easily shatter. Some (13.3 % male

and 21.8% female) said that the weedy rices shatter a little (table 1).

More males than female farmers observed that flowering of weedy rice occurs 3 to 10 days earlier than cultivars. Some of the weedy rices flowers five days later than cultivars but it matures earlier than cultivars

2. Farmers‘ belief about the effect of weedy rice on the yield of cultivated rice

What is the effect of weedy rice on the yield of cultivated rice? According to Vongsaroj (1998), weedy rice competes with cultivated rice for nutrition, space, thus reducing rice yields and lowers the grade of rice due to presence of red grain. According to Pyon et al. (1998), the weedy rice reduced rice yield by 22.1% in direct seeded rice, reduced the number of panicles and quality of rice. A high proportion of both males and females interviewed are aware that weedy rices reduce rice yield because of fertilizer, sunlight and moisture competitions (Table 1). According to the group interviews with female farmers, weedy rices could reduce rice yield by about 40% at harvest.

Table 1. Farmers' beliefs about the effect of weedy rices on yield of cultivated rice (% of responses)

Perceptions	Male	Female
Reduce rice yield because of competition of sun light & fertilizer, and preventing of moisture from fog	44	48
Reduce rice yield	50	39
Reduce rice yield and quality of rice leading to low selling price	-	1
No effect on yield	5	9
Reduce the number of tillers of cultivated rice	1	3
Total	100	100

3. Farmers’ beliefs about weedy rice biology

Table 2 shows the mean of belief scores of the attributes related to weedy rice biology. A score of 3 suggests indifference, score greater than 3 would imply strong belief and score lower than 3, weak belief. Both male and female farmers strongly believe that weedy rice seeds survive in the soil for more than one season. Male farmers have significantly stronger belief that weedy rice always shatters. According to 21% of female farmers, some types of weedy rice only shatter a little or do not shatter at all. Male and female farmers similarly and strongly believe that weedy rice is always taller than cultivated rice. Both male and female farmers have weak belief that weedy rices have more tillers than rice. There is no gender difference in beliefs that grains of weedy rice have awns and dark husks; have awns and red pericarps; dark husks and red pericaps. Both male and female farmers have strong beliefs that weedy rice is not a problem in transplanted rice. According to the female farmers, land preparation and water control is better for transplanted rice and thus, weeds are lesser. Besides, weeds are easier to remove under transplanted rice cultivation.

Table 2. T -Test for difference of mean scores of beliefs on weedy rice biology among male and female farmers

Attributes	Mean		T- value
	Male	Female	
Weedy rice seeds survive in the soil for more than one crop season	4.22	4.30	-0.46
Weedy rice is always shattering	4.41	4.02	2.17*
Weedy rice is always taller than rice	4.83	4.92	-1.22
Weedy rice always has more tillers than rice	3.27	3.28	-0.04
Weedy rice grains with awns have dark husks	4.36	4.17	1.05
Weedy rice grains with awns have red pericarps	4.31	4.12	1.04
Weedy rice grains with dark husks have red pericarps	4.41	4.20	1.19
Weedy rice problems are low in transplanted rice	4.47	4.37	0.61

Table 3: T -Test for difference of mean score of beliefs and evaluation of its important about weedy rice management between male and female farmers

Attributed	Belief			Evaluation		
	Male	Female	T- value	Male	Female	T- value
Weedy rice problem will increase if seeds are exchanged with other farmers	2.77	2.93	-0.76	3.96	3.89	0.30
Some herbicides can reduce the weedy rice problem	1.68	1.65	0.17	2.39	2.52	-0.63
The best way to reduce weedy rice is by cutting the panicles at harvest	3.63	3.56	0.35	3.96	3.97	-0.06
Not preparing the land can reduce weedy rice	1.72	1.83	-0.61	2.28	2.49	-1.09
Rotary cultivation can reduce weedy rice	4.27	4.17	0.59	4.24	4.13	0.81
Deep plowing will reduce weedy rice	4.16	4.05	0.63	3.36	3.63	-1.42
Early flooding has no effect on weedy rice infestation	2.64	2.11	2.46*	3.13	2.5	3.08**
A high seeding rate will reduce weedy rice	1.77	1.99	-1.14	1.98	2.05	-0.42

4 Farmers' beliefs about weedy rice management.

Table 3 shows the farmers' belief scores and evaluation of the attributes of weedy rice management. Farmers do not believe that weedy rice problem will increase if seeds are exchanged with other farmers. Thus, farmers feel that it is important to them to exchange seeds as a strategy for reducing weedy rice. However, to ensure the quality of seeds exchanged with other farmers, they inspect the field plots of the seed stock. There is no gender difference in the belief that herbicides can reduce the weedy rice problem. In fact the women say that herbicides only kill the weeds but not the weedy rice. Farmers believe that pulling the plants and cutting the panicles of the weedy rice is an important strategy to reduce weedy rice infestation. Both male and female farmers strongly believe that rotary cultivation is necessary to reduce weedy rice. Although farmers believe that deep plowing could reduce weedy rice, this is not commonly practiced by them. Both male and female farmers do not believe that early flooding has no effect on weedy rice infestation. Farmers do not believe that applying more seeds than the recommended rates will reduce weedy rice. They use higher seed rates for gap filling rather than to reduce weedy rice.

In summary, there are no gender differences in the beliefs about weedy rice management except for the effects of early flooding on weedy rice infestation. Because of women's high participation in most of the rice operations, particularly in removing weedy rices, they are equally knowledgeable as their male counterparts in weedy rice management.

5. Farmers' weedy rice management

This survey shows that farmers use different strategies in eradicating weedy rices. Farmers practised a combination of weedy rice management such as burning the field, using rotavator to prepare the land, cleaning and maintaining water on the soil, releasing the ducks to eat the remaining seeds on the soil, pulling up weedy rice plants, and removing off-type weedy rices. Cutting the panicles is the strategy that farmers use to control the weedy rice during the heading phase. During the maturity phase, farmers pull up the weedy rice plants, select off-types and remove them from the harvested rice bundles and remove weedy rices seeds after harvest.

We conduted group interviews with female farmers to find out their perceptions regarding the effectiveness of the methods to control weedy rices. They perceive that buying pure seeds from the research institute and removing the top soil of their farms can reduce the prevalence of weedy rice by 100%. They are aware that the pure or uncontaminated rice seeds and uncontaminated soils could be very effective weed management methods. The other effective control methods are the natural submergence of field with water before sowing during the dry season, buying and exchanging seeds with other farmers, pulling weedy rice, selecting off-types from the harvested rice bundles, threshing separately, and releasing ducks to eat the remaining seeds on the soil. However, these strategies are based on their own experience, they need more information on the integrated management and holistic approach for effective suppression of weeds and weedy rice in their farming system.

CONCLUSIONS

Weedy rice is increasing becoming a pest in direct seeded rice areas in South Vietnam. This poses a severe threat to rice production because it reduces rice yields. This study has shown that farmers could identify two to three types of weedy rices and also use strategies to eradicate them, based on their farming experience. The strategies that farmers employ are influenced by their strong beliefs on weedy rices. They strongly believe that the weedy rices survive in the soils for more than one season. Thus, they use a combination of different strategies such as selecting the field plots of other farmers wherein they obtain the seed stock, removing weedy rice plant and cutting the panicles, preparing the land with the use of rotavator, cleaning the fields, controlling irrigation water, burning the fields, and using ducks to eat the remaining seeds from the soil. They do not believe that early flooding, use of herbicides and use of high seed rates can reduce weedy rice infestation. Their observation that the weedy rices are taller than the cultivated rice enables the farmers to remove these off-types when bundling rice during harvest season. Because of the shattering characteristics of weedy rices, they release ducks to the fields to eat the remaining seeds on the soils.

Men and women are equally knowledgeable about the biology of weedy rices and management of weedy rices. Women's knowledge and skills are based on their long-term experience in rice farming and the labor they provide in most of the rice operations particularly in hand weeding. Controlling weedy rices is difficult because there is no effective selected herbicide to eradicate them completely. While farmers use of different strategies in different rice stages to control weedy rices, these are not done in a holistic or integrated manner. Technical information and agricultural extension program need to emphasize the Integrated Weedy Management and should include not only men but women farmers as well.

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SUMMARY IN VIETNAMESE

Niềm tin và quản lý lúa cỏ của nam nữ nông dân

Điều tra 200 nam và nữ nông dân ở xã Phước Thới, Cần Thơ cho thấy nhiều nam (51%) hơn nữ (44%) có thể nhận dạng và phân biệt được 2 loại lúa cỏ. Một số ít nông dân phân biệt được 3 loại lúa cỏ. Họ phân biệt sự khác nhau này dựa vào sự hiện diện và chiều dài râu, đặc tính dễ hay khó rụng hạt, màu sắc lá, độ dày lá, chiều dài và rộng của phiến lá, thời gian trổ hoa. Cả nam và nữ nông dân thấy rằng vụ Xuân -Hè xuất hiện lúa cỏ nhiều nhất do sạ chay. Nhóm nữ nông dân ước đoán lúa cỏ làm giảm 40% năng suất lúa. Họ cho rằng lúa cỏ cạnh tranh ánh sáng, phân bón và ẩm độ với lúa trồng và rụng hạt sớm là nguyên nhân làm giảm năng suất lúa. Niềm tin về sinh học lúa cỏ và phương pháp quản lý lúa cỏ không có sự khác biệt giữa nam và nữ nông dân ngoại trừ rằng nam tin tưởng mạnh mẽ hơn nữ về'lúa cỏ luôn luôn rụng hạt' và 'cho nước vào ruộng sớm làm giảm sự xâm nhiễm lúa cỏ'. Thực tế có gần một phần tư nữ quan sát thấy một số loại lúa cỏ có hạt dai không rụng. Vì phụ nữ có kinh nghiệm nhiều năm tham gia vào khâu quản lý cỏ và lúa cỏ (nhổ và cắt bỏ cỏ và lúa cỏ) nên hiểu biết về sinh học lúa cỏ và phương pháp quản lý lúa cỏ của họ không khác với nam giới. Vì vậy các chương trình khuyến nông mở các lớp tập huấn nâng cao kiến thức và kỷ năng về quản lý lúa cỏ nên có sự tham gia của nhóm nữ nông dân.