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COMMON WEEDS IN RICE FIELDS AT MANZALLA AREA AND THEIR CONTROL METHODS

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ABSTRACT

Four field experiments were conducted during four successive seasons of 2001, 2002, 2003 ant 2004 at EL-Manzalla district, Dakahlia Governorate in the salt affected regions, which close to Manzalla Lake, Egypt. The experiments were conducted to known weeds species associated with rice crop as well as to produce a program for controlling all weeds in rice fields with herbicides without any effect on rice yield. These treatments were included four herbicides with three different rates as well as three mixture combinations, hand weeding at two times at 30 and 45 days after planting and weedy check. The obtained results could be summarized as follows:

Survey of common weed species associated with rice in salted affected regions which close to Manzala Lake, were *Eleocaris geniculata* which was the predominant weed with the highest frequency and density at proportion of 76.6 % weed flora, *Cyperus difformis* which recorded the second rank 10.8 %, the occurrence of *Echinochloa curus – galli* reached 6.5 % and *Ammannia spp.* rank for four number in important 6 % in both seasons.

All weed control treatments gave better control number of total weed/m^2, fresh weight of all weeds/m^2 and dry weight of total weeds g/m^2 as compared with weedy check. The tank – mixed application of bispyribac – sodium plus pyrazosulfuron – ethyl at (16 + 10 g ai/fed) released 100 % control of all weeds at 60 days after planting.

The results indicated that all weed control treatments significantly increased panicles length (cm), panicles weight (g), 1000-grain weight (g) and grain yield (t/fed). The tank – mixed herbicide of bispyribac – sodium plus pyrazosulfuron – ethyl at (16 + 10 g ai/fed) produced the highest grain yield (t/fed), while the lower grain yield (t/fed0 produced from the weedy check treatment.

INTRODUCTION

Rice (*Oryza sativa* L.) is the leading cereal crop in the world. One third of the world's population depends on rice for nearly two third of its food.

In Egypt, rice has played a role of paramount importance to the economy of coming second after wheat in terms of contribution to foreign exchange earnings (Badawi *et al.*, 2002). Rice, which is the preferred food by most Egyptians, contributes about 20 % to the per capita cereal consumption. Its impact on the economy lies within the fact that rice occupies about 22 % of the cultivated area in Egypt during the summer season, thus consuming about 18 % of the total water resources.

Weeds contribute about 10-85 % of rice yield losses (Labrada, 2001). In Egypt, weed competition is the most important yield-reducing factor. The potential yield loss due to uncontrolled weeds ranged from 4.42 to 7.60 t/ha, with an average yield loss of 6.67 t/ha [75 %] (Hassan and Rao, 1993, 1994).

Yield loss was lowest (36 %) in manually transplanted rice compared with 90 % losses in direct-seeded rice.

The competitive advantage of weeds over rice is attributed to some weeds being C4 plants with high photosynthetic rates and corresponding high growth rates (unlike rice, which is a C3 plant) ; high potential to acclimatize to a changing environment ; and more efficient seed production (Kim and Mody, 1989).

Continuous rice planting and changing in the methods of planting have resulted in changes in weed populations, emergence of new weed problems *i.e. Cyperus rotundus* and *Eleocharis geniculata* and increased herbicides use (Hassan *et al.,* 2004).

Eleocaris spp. has been considered the most difficult to control with herbicide applications at the early growth stage because of its irregular sprouting habit and insensitivity to herbicides (Noda, 1972).

Recently, several herbicides have been found useful to eradicate rice weeds. The use of herbicides for eradicating weeds of rice fields has received considerable attention from many research workers aiming in achieving better rice yield and yield components. This investigation was undertaken: to survey weeds associated with rice at El-Manzalla district and to improve rice yield productivity through using chemical weeds killer.

MATERIALS AND METHODS

Field Survey:

A field survey was carried out at El-Manzala district, Dakahlia Governorate to know weeds species associated with rice crop and to produce program for controlling all weeds in rice field. A field survey was conducted in rice growing season from May to July, 2002 and 2002 in the salt affected regions, which close to Manzalla Lack. The area was divided into four homogenized areas. About 100 feddans were selected from each area. Weeds of 400 samples (each equal one square meter) from each area had taken at 25, 35, 45 and 55 days after planting (DAP) and were classified by species and recorded by numbers. The dominant weed species were classified in each sample in both seasons as shown in Table 1.

Table 1: Classification of weed species as scientific name, family name, English name and common Arabic name accompanied rice cropping in the field survey site during 2001 and 2002 seasons.

Scientific name	Family name	English name	Arabic name
Eleocaris geniculata	Cyperaceae	Brush	شعر القرد
Cyperus difformis	Cyperaceae	Small umbrella flower	العجيرة
Echinochloa crus-galli	Poaceae	Barnyard grass	الدنيبة
Ammannia spp: (*A. multifolia, A. baccifera* and *A. auriculata*)	Lythraceae	Redstam	رجل الحمامة

Field Experiment:

A field experiments were carried out during the tho successive seasons 2003 and 2004 seasons at EL-Manzalla district, Dakahlia Governorate to study the effect of some weed control treatments on weed suppressing, yield and its components of rice. The experimental area was prepared through two ploughing, harrowing and leveling.

Calcium super phosphate (15.5 P_2O_5) was added at the rate of 100 kg/fed on the dry soil before ploughing. The experiment arranged in a randomized complete block design with four replicates. The size of each plot was occupying an area of 21 m^2 (1/200 per fed). Rice grains of Giza 178 variety at the rate of 60 kg/fed were soaked in water for about 36 hours and incubated for 36 hours. Mau ally broadcasting seeds planted on 11th May in the first season and second seasons. Nitrogen in the form of urea (46 % N) at the rate of 60 kg N/fed was applied into three equal portions, before seeding in the dry soil, at tillering and at panicle initiation. The other usual agriculture practices of grown rice were conducted as recommended by Ministry of Agriculture and Land Reclamation.

Weed control treatments:

Common name, commercial name and chemical group of used herbicides are presented in Table 2. A randomized complete block design with four replication was carried out using weed control treatments. These treatments were included four herbicides with three different rates as well as three mixtures combinations, hand weeding at two times 30 and 45 days from planting and weedy check (17 weed control treatments). These treatments were sprayed through knap sack sprayer with 100 liters of water per feddan on drained soil and the water was introduced after 1 to 2 days according to the herbicides.

Table 2: Common name, commercial name, active ingredient, time of application and chemical group of used herbicides.

Common name	Commercial name	Active ingredient	Time of application (DAP)	Chemical name
Bentazone	Basagran	50 %	20	3-150 propyl – H. 2,1,3 benzothiadiazin – 4 (3H) – one 2,2 – dioxide.
Bensulfuron methyl	Londax	60 %	10	2-[[[[(4,6 – dimethoxy – 2 – pyramidinyl) amino] carbonyl] sulfonyl] methyl] benzoic acid for bensulfuron.
Bispyribac sodium	Nominee	2 %	25	Sodium 2,6 – bis [(4,6 dimethoxy pyrimidin – 2 – yl) oxy] benzoate.
Bensulfuron ethyl	Sirius	10 %	10	5 – [3 – (4,6 dimethoxy pyrimidin – 2 – yl) – carbonoy sulfomyl) – 1 – methyl pyrazole – 4 carboxyic for pyrazosulfuron – ethyl.

DAP = Days after planting

The Studied Characters:

Weeds:

One weed sample was taken at 60 days after planting using one square meter quadrate. The following measures were recorded:

1- Number of weeds/m^2 for all species.

2- Fresh weight of weeds/m^2: Weeds were cleaned and left for sun dried for 2 hours and then their weight was recorded as g/m^2.

3- Dry weight of weeds/m^2: The dry weights of the different weed species were recorded at 105 °C for 48 hours.

Rice:

1- Number of panicles/m^2.

2- Number of filled grains/panicle.

3- Weight of 1000 grains (g).

4- Grain yield (t/fed). The plants in the inner two square meter of each plot were harvested, collected together, labeled and tied and were left for five days for air drying. Plants were transferred to the threshing floor. The grain yield was recorded in kg/m^2, and then it was converted to record grain yield in t/fed at 14 % moisture content.

Statistical Analysis Of Data:

All data were subjected to statistical analyses according to the technique of analysis of variance (ANOVA) for the completely randomized block design by means of "MSTAT-C " computer software package as published by Gomez and Gomez (1984). Differences between treatment means were compared using New Least Significant of Difference (NLSD) method as described by Duncan (1955) and Steel and Torrie (1980).

RESULTS AND DISCUSSION

Field Survey:

There is a great differences in weed occurrence among different rice area grown at Manzalla district. This study aimed to survey of weeds to can be used as program for controlling all weeds in rice field. The kind and number of weed species associated with rice have been reported to be twenty species. However, only two species are considered to be of economic concern to the rice growers in the old cultivated area of Manzalla. These are *Echinochloa curus – galli* and *Cyperus difformis.* Systematic survey of common weed species occurring in salted affected area of El-Manzala district feds revealed numerical predominance of sedges over grass and broadleaved weeds (Table 3). Variation in the abundance, density and frequency of weeds in relation to location is an important observation. In all locations *Eleocaris geniculata* was the predominant weed with the highest frequency and density. The second weed in importance over the two years survey was *Cyperus difformis.* While, the distribution of either barnyardgrass or *Ammannia spp.* were in slightly. The average number of *Eleocaris geniculata*/m^2 over four locations in two years were 587, while the number of

Cyperus difformis was 334/m^2. The occurrence of *Echinochloa curus – galli* reached 168/m^2, while *Ammannia spp.* occurred at a density of 144/m^2. Consequently, the perennial sedge *Eleocaris geniculata* comprised the high proportion (47.6 %) of weeds flora in El-Manzala area, where most of rice fields were suffered from it as well as no appriate control measure was available. Continuous planting of broadcast-seeded rice and the reliance on Saturn (50 % E.C) as a single herbicide have resulted in the present quantitative change in the structure of weed population. *Eleocaris geniculata*, which is not a target weed for Saturn (50 % E.C) become increasingly dominant in the salt affected area of Manzalla distract. As recorded in Table (3) *Eleocaris geniculata* posses series problem in rice fields. Knowledge the ecology of this weed is requested. Hassan (2002) reported similar information *Ammannia spp.* is a complex of *Ammannia multiflora* (Roxb), *Ammannia baccifera* (L.) and *Ammannia auriculata* Wild. In particular, new reclaimed area, which included in the survey, *C. rotundus* will be increased unless a special control measure will be selected. From 400 sites, high populations of *C. rotundus* were recorded at 30 sities at the average of 5-8 plants/m^2. In general, the prolonged application of Saturn (50 % E.C) based herbicides that target the *Echinochloa* species had successfully reduced the population of this species but favored the shift to *Eleocaris geniculata* as major weed in direct seeded rice at Manzalla district. In recent years, it is considered as nuisance at best or competition to economic production at worse and therefore should be eradicated. The results in this study led to use four herbicides at three different rates, three combination mixture, hand weeding twice at 30 and 45 DAP and the unweeded control.

Field Experiment:

Weed characters:

Number of total weeds/m^2:

Number of total weeds/m^2 at 60 DAP were significantly affected by different weed control treatments (Table 4). The lower number of total weeds were recorded in rice plots treated with high rates of either bensulfuron – methyl (44 and 36 g a.i./fed) or the high rate of pyrazosulfuron – ethyl at (12 g a.i./fed) each plus one hand weeding in both seasons. Moreover, it is important to observe that the tank-mix herbicide treatments of bispyribac – sodium at 16 g a.i./fed with pyrazosulfuron – ethyl at 10 g a.i./fed or bensulfuron – methyl at 18 g a.i./fed were an essential herbicides treatments in keeping the rice plots almost free from different weed species during both seasons. The results indentified the effective and economical herbicide treatments for managing a mix population of weeds in direst-seeded rice.

Fresh weight of total weeds (g/m^2):

Hundred percent control of weeds at 60 DAP was found in plots treated with mixture treatments of bispyribac – sodium plus pyrazosulfuron – ethyl in the two years of study. The tank-mix herbicides treatments were recorded to decrease fresh weight of total weeds at 60 DAP, as compared with herbicides alone, hand weeding and weedy check, because complete between rice and weeds inferior and controlling annual and perennial grasses.

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Bispyribac – sodium is a post emergence herbicides acive on annual and perennial grasses, especially on *E. crus-oryzicola* sedges and broadleaf weeds (William, 1994). From the former results, it could be states at the application of bispyribac – sodium + pyrazosulfuron – ethyl at 25 days after plating at the rate of 16 g a.i./fed, 10 g a.i./fed, respectively could be recommended for controlling weeds commity in rice plantation at El-Manzalla region.

Dry weight of total weeds (g/m^2):

According to data in Table 4, the dry weight of total weeds at 60 DAP gave the appreciate figure to efficacy of most treatments because of the application of bispyribac – sodium either alone or in mixture at 25 DAP. The high rate of bispyribac – sodium applied in 2003 or 2004 seasons produced clear and adequate weed suppression. Weed control treatments developed greatest significant suppression at 60 DAP (Table 4) compared with the weedy check. The tank-mix application of bispyribac – sodium plus pyrazosulfuron – ethyl at (16+10 g a.i./fed) in both seasons released 100 % control of the mix weed population at 60 DAP. In 2004 season, the tank-mix application of bispyribac – sodium plus either pyrazosulfuron – ethyl or bensulfuron – methyl almost both produced 100 % reduction on weed dry weight at 60 DAP compared with hand weeding and weedy check treatments. However, all other weeds control treatments, except the low rate of bentazone followed by one hand weeding operation produced non-significant potential suppression effect compared with two hand weeding and weedy check treatments. Bensulfuron – methyl and bispyribac – sodium, a post emergence herbicides active on annual and perennial grasses, especially on especially on *E. crus-oryzicola* sedges and broadleaf weeds (William, 1994). Similar data were obtained by Ulug (1978), Chiang and Leu (1987), Danilets (1994), Hassan and Rao (1996), Hassan and Abo El-Darag (1998 and 2000), Wang et al. (2001), Fischer et al. (2004) and Park et al. (2005).

Growth Parameter:

Number of panicles/m^2:

Data in Table 5 show that the highest number of panicles/m^2 were obtained from rice plots treated with the tank-mixed treatments of bispyribac – sodium and bensulfuron – methyl (533.0/m^2) or high rate of bensulfuron – methyl plus one hand weeding (516.0/m^2), medium rate of bispyribac – sodium alone gave 514.0/m^2. The high rate of other herbicides produced better panicles than its low or medium rates. The weedy check treatment produced the lowest number of panicles (186.0/m^2) among the weed control treatments in 2003 season. The highest productions of rice panicles/m^2 in 2004 season were recorded in rice plots received the tank-mixed treatment of bispyribac – sodium plus pyrazosulfuron – ethyl (578.6/m^2), high and medium rate of bispyribac – sodium alone (599.6 and 548.6/m^2) and tank-mixed treatment of bispyribac – sodium plus pyrazosulfuron – ethyl (544.0/m^2).

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The lowest production of rice panicles were found in plots received the low rate of pyrazosulfuron – ethyl (492.6/m^2) each plus one hand weeding, bensulfuron – methyl (432.3/m^2) and bentazone (472.0/m^2) each plus one hand weeding. The rice crop produced better panicles in 2004 season when it treated with high rate of bispyribac – sodium (599.6/m^2) plus pyrazosulfuron – ethyl (578.6/m^2) or plus bensulfuron – methyl (524.0/m^2), and its medium rate (548.06/m^2) and high rate of bentazone (515.3/m^2) plus one hand weeding, and weedy check (189.0/m^2). Minimum panicles productions were found in plots treated with hand weeding (411.0/m^2). The number of rice panicles is the major yield components and it was affected significantly by the season long competition of the several weeds after different weed control measure. The increase in number of panicles/^{m2} might be attributed to the excellent control of weeds which minimized weed competition with crop and giving chance for better growth. Similar findings were previously reported by Hassan and Rao (1994) and Choi et al. (1995).

Panicle weight (g):

Different weed control treatments significantly affected the weight of rice panicles (Table 5). The best weight of rice panicles in 2003 season were found in rice plots received the high rate of pyrazosulfuron – ethyl (2.60 g), the high rate of bensulfuron – methyl (2.57 g) and the medium and high rate of bispyribac – sodium (2.59 g). inferior weights of rice panicles were found in plots received low rate of bentazone. Hand weeding treatment produced comparable weight of rice panicles of the other treatments. Application of one shot treatment of bispyribac – sodium plus pyrazosulfuron – ethyl in 2003 season resulted in the best weight of rice panicle (2.80 g) followed by the application of the high rate of pyrazosulfuron – ethyl (2.60 g), high rate of bensulfuron – methyl (2.57 g), high rate of bentazone (2.60 g) and the tank-mixed treatment of bispyribac – sodium plus bensulfuron – methyl (2.56 g). Application of low and medium rate of bentazone as well as the two hand weeding treatment produced poor values. The best weights of rice panicles in 2004 season were resulted from the tank-mixed application of bispyribac – sodium plus pyrazosulfuron – ethyl (2.96 g), bensulfuron – methyl (2.84 g) or bentazone (2.86 g). The lowest weights of rice panicles were observed in plots treated with all rates of pyrazosulfuron – ethyl, low rate of bensulfuron – methyl, all rates of bentazone and the hand weeding treatment. Similar results were obtained by Hassan (2002).

1000-grain weight (g):

Table 5 show the mean weight of 1000 grains as affected by different weed control treatments. The mean weight of 1000 grains increased due to spraying of bispyribac – sodium. For example, in 2003 season, the highest values were found in plots treated with the medium rate of bispyribac – sodium as a single herbicide (25.9 g) or when it mixed with either pyrazosulfuron – ethyl (26.3 g) or with bensulfuron – methyl (25.2 g) each plus one hand weeding alone gave significant value, compared with low rate. Application of the low rate of bentazone resulted in the lowest value of 1000-grains weight, compared with other rates. However, it did not significantly different from the weights of 1000 grains resulted from rice plots treated with

low and high rate of pyrazosulfuron – ethyl, low and medium rate of bensulfuron – methyl, all rates of bentazone and the hand weeding treatment. It is noteworthy that, the most herbicide treatments produced significant higher values of 1000-grain weight as well as he superior values obtained from the tank-mixed treatments contained either pyrazosulfuron – ethyl or bensulfuron – methyl. The lower weight of 1000 grains was observed in weedy check treatment. In 2004 experiment, all weed control treatments showed non-significant different on weights of the 1000 grains. Moreover, all these weed control treatments had a significant effect as compared with weedy check.

Grain yield (t/fed):

The grain yields of rice were significantly affected by the major yield components (Tables 5) which they directly affected by the levels of efficiency of weed control treatments against mixed weed populations. Results obtained in Table 5 shows that the superior grain yield in 2003 experiment was closely medium and high rate of bispyribac – sodium alone (3.569 and 3.517 t/fed). The next better grain yield (3.422 t/fed) was obtained from the application of bispyribac – sodium (16 g a.i./fed) plus bensulfuron – methyl (18 g a.i./fed) as a tank-mix, and low rate of bispyribac – sodium (3.422 t/fed). This treatment also resulted in better production of rice panicles and better value in 1000-grain weight than the other single herbicide treatments. The application of bentazone at low or medium rates followed by one hand weeding at 30 DAP resulted in the lowest grain yield (2.425 t/fed). Poor grain yields were found in weedy check, hand weeding and low rate of bentazone treatment. Results of 2004 season indicated inferior rice grain yield (0.465 and 2.634, t/fed respectively) was reported in the weedy check and two hand weeding treatments and the lower rate of bentazone followed by one hand weeding (2.747 t/fed). Superior rice grain yield was released in plots received the tank-mix treatment of bispyribac – sodium plus either one of sulfonyl-urea herbicides. However, the other treatments were not significant differed from each other. From the above mentioned results, it could be stated that maximum rice grain yields could be obtained by application of bispyribac – sodium plus pyrazosulfuron – ethyl, followed by bispyribac – sodium plus bensulfuron – methyl. Park et al. (2005) pointed out that without using sulfonyl-urea herbicides, it is possible to reduce rice production cost because it was inhibited the aquatic weeds sufficient where it is possible to control by hands. In the present study, the economic treatments produce a powerful suppression effect of *Echinochloa curus – galli*, *Cyperus difformis*, *Eleocaris geniculata* and *Ammannia spp.* at Manzalla rice growing area were the mixture of 16 g a.i./fed of bispyribac – sodium plus pyrazosulfuron – ethyl at 10 g a.i./fed or bensulfuron – methyl at 18 g a.i./fed. These two treatments approximately produce a synergistic effect on sedges when they applied at 25 DAP. They produced a long-acting effect on *Eleocaris geniculata,* which has a prolonged period of emergence. Consequently, protect rice plants from different weed species. These two treatments release the weed-free rice with the highest value of major yield contribution, consequently the best grain yield as compared to hand weeding which has a single tool or in sequence with

sulfonyl-urea herbicides or bentazone. So, it not aquatic enough measure to compare with the tank-mix treatments based on bispyribac – sodium. One means factors in requested that an absolutely improving both treatment is the good water depth fro 5-7 days soon in the next day after application. These increases in grain yield per feddan of rice and its yield components might be attributed to the excellent control of weeds which minimized weed competition with crop and giving chance for better growth. Similar findings were previously mentioned with many researchers including Hassan and Rao (1994) and De Datta and Balatazar (1996).

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الحشائش المنتشرة بحقول الأرز بمنطقة المنزلة وطرق مقاومتها

عوض طه القصبى ، محسن عبد العزيز بدوى ، محمد حامد الهندى و رمضان محمد موسى

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أقيمت سلسلة من التجارب بدأت من موسم ٢٠٠١ حتى موسم ٢٠٠٤ بمركز المنزلة – محافظة الدقهلية فى الأراضى المتاخمة للبحيرة والمتأثرة بالملوحة. وبدأت التجارب بحصر الحشائش المصاحبة لمحصول الأرز بهذه المنطقة ، وذلك بتقسيم المساحة الواقعة فى هذه المنطقة إلى أربعة مناطق ممثلة لجميع المساحة كلا منها حوالى ١٠٠ فدان. تم أخذ ٤٠٠ عينة من كل منطقة مساحة كلا منها ١م٢ وذلك لحصر الحشائش المصاحبة لمحصول الأرز فى هذه المنطقة حتى يمكن وضع برنامج متكامل للمكافحة المتكاملة لهذه الحشائش.

وفى موسم ٢٠٠٣ و٢٠٠٤ تم تنفيذ التجارب الخاصة ببرنامج المقاومة لمعرفة أثر ذلك على الحشائش المصاحبة وكذا المحصول ومكوناته. وذلك بإستخدام أربعة مبيدات للحشائش هى: السيريس ، اللوناكس ، النومينى والبازاجران بثلاث معدلات لكل منهما وكذلك دراسة مخلوط من النومينى مع الثلاث مبيدات الأخرى والنقاوة اليدوية مرتان بعد ٣٠ و٤٥ يوم من الزراعة علاوة على معاملة بدون مقاومة للمقارنة.

وكانت أهم النتائج التى تم الحصول عليها كما يلى:

١- إتضح أن الحشائش المصاحبة لمحصول الأرز فى المنطقة المتخمة لبحيرة المنزلة والمتأثرة بالملوحة هة حشيشة شعر القرد ، العجيرة ، الدنيبة ورجل الحمامة. وكانت نسبة كلاً منهما إلى العدد الكلى للحشائش فى المتر المربع ٧٦.٦ % لحشيشة شعر القرد ، ١٠.٨ % لحشيشة العجيرة ، ٦.٥ % لحجشيشة الدنيبة و٦.٠ % لحشيشة رجل الحمامة.

٢- أدى إستخدام مبيدات الحشائش الكيماوية إلى نقص معنوى فى الوزن الغض والجاف لجميع الحشائش/م٢ وذلك بالمقارنة بالنقاوة اليدوية مرتان بعد ٣٠ و٤٥ يوم من الزراعة وكذلك معاملة بدون مقاومة. وأدى إستخدام المخاليط (نومينى + سيريس) إلى الحصول على أقل وزن غض وجاف لجميع الحشائش/م٢ مما يدا على أنها أفضل برنامج لمكافحة جميع الحشائش.

٣- أثرت معاملات مقاومة الحشائش الكيمياوية تأثيراً معنوياً فى كلاً من عدد السنابل/م٢ ، عدد الحبوب الممتلئة/دالية ، وزن الألف حبة وكذلك محصول الحبوب للفدان وسجلت أعلى القيم لتلك الصفات عند إستخدام المخاليط وكان أفضلها مخلوط النومينى + السيريس.

من ذلك يمكن التوصية بإستخدام مخوط النومينى بمعدل ١٦ جم مادة فعالة + السيريس بمعدل ١٠ جم مادة فعالة للفدان وذلك للتخلص من أكبر عدد من الحشائش المصاحبة لمحصول الأرز والحصول على أعلى محصول حبوب للفدان تحت ظروف منطقة الدراسة.

قام بتحكيم البحث

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Table 3: Survey for common weed species (No./m^2) in four locations in Manzalla district in 2001 and 2002 seasons.

Weeds	2003									2004								
	Location 1		Location 2		Location 3		Location 4		Total %	Location 1		Location 2		Location 3		Location 4		Total %
	Freq.	%	Freq.	%	Freq.	%	Freq.	%		Freq.	%	Freq.	%	Freq.	%	Freq.	%	
Eleocaris geniculata	0	0	244	77.4	1062	89.9	878	94.6	93.4	183	37.9	567	69.0	1724	91.3	40	8.6	68.8
Cyperus difformis	0	0	13	4.1	55	4.6	32	3.4	4.2	143	29.6	137	16.5	93	4.9	195	42.1	15.5
Echinochloa crusgalli	36	78.0	34	10.7	19	1.6	16	1.7	2.0	17	3.5	64	7.7	29	1.5	179	38.6	7.9
Ammannia spp	10	22	24	7.6	45	3.8	2	0.2	1.2	139	28.8	53	6.4	41	2.1	49	10.5	7.7
Total	46		315		1118		928		2480	482		821		1887		463		3653

- **Each location 100 feddans.**
- **Average number of different weed species in four locations:**

	2001	2002	Average/plot	%
Eleocaris geniculata	**2184**	**2514**	**587**	**47.6**
Cyperus difformis	**100**	**568**	**83**	**108**
Echinochla crus-galli	**105**	**289**	**50**	**6.5**
Ammannia sp	**91**	**282**	**46**	**6.0**

Table 4: Number fresh and dry weights of total weeds/m^2 at 60 DAP as affected by weed control treatments during 2003 and 2004 seasons.

No.	Treatments			Number of total weeds/m^2		Fresh weight of total weeds/m^2		Dry weight of total weeds/m^2	
	Herbicides	g a.i./fed	Time of application F.B. H.W.	2003	2004	2003	2004	2003	2004
1	Pyrazo-sulfuron -ethyl	8	10 + 30	42.6	25.0	476.3	458.5	159.0	174.3
2		10	10 + 30	15.0	4.6	483.2	633.0	78.0	201.0
3		12	10 + 30	6.0	2.3	733.0	733.3	120.0	90.3
4	Bensulf-uron -methyl	12	10 + 30	40.0	9.2	807.0	435.6	129.3	71.2
5		24	10 + 30	9.0	7.0	667.0	314.6	105.7	37.1
6		36	10 + 30	9.0	3.0	621.0	341.6	98.6	55.0
7	Bispyri-bac -sodium	12	25	56.6	46.3	701.0	304.9	77.8	176.2
8		16	25	54.0	30.2	645.5	1045.6	72.0	14.1
9		20	25	31.0	22.3	628.2	606.6	71.0	0.1
10	Bentazone	500	20 + 30	202.3	161.5	526.0	713.0	82.8	110.6
11		750	20 + 30	47.2	36.2	713.0	617.1	113.4	93.6
12		1000	20 + 30	20.6	13.6	733.0	602.0	117.0	97.3
13	Bispyri-bac –sodium+ Pyrazo-sulfuron -ethyl	16+10	25	0.0	0.0	0.0	0.0	0.0	0.0
14	Bispyri-bac -sodium + Bensulf-uron -methyl	16+18	25	0.5	1.0	375.0	1.5	31.9	0.2
15	Bispyri-bac -sodium + Bentazone	16+750	25	15.2	1.7	466.6	313.6	30.3	37.4
16	H.W. (two times)		30 & 45	144.2	135.5	420.8	313.4	52.7	37.3
17	Unweeded			325.0	344.0	7713.1	6655.9	1233.1	815.5
NLSD at 5 %				-	9.2	-	61.4	16.4	40.4

Table 5: Number of rice panicles/m^2, panicle weight, 1000-grain weight and grain yield/fed at harvest as affected by weed control treatments during 2003 and 2004 seasons.

No.	Treatments			Number of rice panicles/m^2		Panicle weight (g)		1000-grain weight (g)		Grain yield (t/fed)	
	Herbicides	g a.i./fed	Time of application F.B. H.W.	2003	2004	2003	2004	2003	2004	2003	2004
1	Pyrazo-sulfuron -ethyl	8	10 + 30	436.3	492.6	2.39	2.08	22.6	24.0	3.044	3.150
2		10	10 + 30	499.0	500.6	2.39	2.17	23.6	24.3	3.314	3.298
3		12	10 + 30	501.3	508.6	2.60	2.23	24.6	25.3	3.565	3.220
4	Bensulf-uron -methyl	12	10 + 30	442.6	432.3	2.35	2.34	22.9	25.6	3.099	3.006
5		24	10 + 30	496.6	472.3	2.40	2.37	24.6	26.0	3.321	3.429
6		36	10 + 30	516.0	482.0	2.57	2.52	25.2	26.3	3.559	3.475
7	Bispyri-bac -sodium	12	25	477.3	494.3	2.37	2.56	24.6	26.1	3.422	3.405
8		16	25	514.0	548.6	2.59	2.46	25.9	26.8	3.669	3.661
9		20	25	499.3	599.6	2.53	2.51	25.0	26.2	3.517	3.612
10	Bentazone	500	20 + 30	435.3	472.0	2.07	2.08	23.3	25.3	2.425	2.747
11		750	20 + 30	458.0	488.3	2.23	2.10	24.3	25.6	3.012	2.861
12		1000	20 + 30	481.0	515.3	2.60	2.11	25.3	25.6	3.016	2.930
13	Bispyri-bac –sodium+ Pyrazo-sulfuron -ethyl	16+10	25	494.6	578.6	2.80	2.96	25.2	26.6	3.396	3.875
14	Bispyri-bac -sodium + Bensulf-uron -methyl	16+18	25	533.8	544.0	2.56	2.84	26.3	26.0	3.399	3.845
15	Bispyri-bac -sodium + Bentazone	16+750	25	472.6	460.3	2.52	2.86	26.3	26.3	3.185	3.380
16	H.W. (two times)		30 & 45	426.0	411.0	2.20	2.17	24.3	25.3	2.340	2.634
17	Unweeded			186.0	189.0	1.50	1.70	14.0	13.0	0.245	0.465
NLSD at 5 %				-	27.3	-	-	-	-	0.220	0.270