

# DEDICATION

**To my mother,**

**Brothers,**

**Sisters,**

**and Wife,**

**with love.**

## ACKNOWLEDGEMENTS

*My full praise to Allah for enabling me to complete my study.*

*This is a real blessing from Him and thanks to Him in the way that suits His supreme greatness, will and power.*

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## بسم الله الرحمن الرحيم

الحشائش فى الذرة الشامية (الاهمية والمكافحة)

بالتركيز على الولاية الشمالية-السودان

### خلاصة الاطروحة

اشتمل هذا البحث على مسح جميع الحشائش التى تنمو مع محصول الذرة الصفراء (*Zea mays* L.) وتجارب لمعرفة بيولوجية إنبات ودورة حياة بعض بذور الحشائش السائدة فى المنطقة بالإضافة الى تجارب حقلية ومسوحات. لحصر الحشائش فى محصول الذرة الصفراء بمنطقة دنقلا بالولاية الشمالية أجرى البحث فى جزر مختلفة لتحديد الحشائش الشائعة او السائدة والتى ترافق هذا المحصول. والحشائش السائدة تمثلت فى النجيل، السعدة، التمليلة، الرجلة، العدار، لسان طير كبير، لسان طير صغير والدفرة. اتضح من البحث أن الحشائش السائدة فى لب، بنا، م قاصر والمساكين عبارة عن حشائش عريضة الأوراق بينما الحشائش السائدة فى ارتقاشة، مروارتى وناوا عبارة عن حشائش ضيقة الأوراق وهذا يرجع الى استعمال مبيدات الحشائش الحولية العريضة فى جزر لب، بنا، م قاصر والمساكين بينما استعمال المبيدات المذكورة قليل فى الجزر الأخرى.

لمعرفة بيولوجية إنبات ودورة حياة بعض بذور الحشائش السائدة فى المنطقة تم اجراء دراسة لحشيشتى لسان الطير الكبير والفجيلة وأوضحت الدراسة بان دورة حياة الحشيشتين تتم فى 99 و 101 يوم على التوالى، بالإضافة الى اجراء بعض التجارب المعملية التى اوضحت الاتى:-

(1) درجة الحرارة المثلى للإنبات هى 30°م (24 ساعة ظلام) ودرجة الحرارة 30/20°م (12 ساعة ضوء + 12 ساعة ظلام) للسان الطير الكبير *Amaranthus viridis* L. و 20°م (24 ساعة ظلام) و 20°م (12 ساعة ضوء + 12 ساعة ظلام) للفجيلة *Sinapis arvensis* L.

(2) هاتان الحشيشتان لهما مدى حرارى واسع للإنبات وهو (20 – 40) للسان طير كبير *A. viridis* L. و (10 – 40) للفجيلة (*S. arvensis* L.).

(3) إنبات بذور هاتين الحشيشتين ي قل بزيادة الضغط الاسموزى والعكس صحيح.



4) النسبة المئوية لانبات وظهور هاتين الحشيشتين فوق سطح التربة تقل بزيادة عمق زراعة بذورهما والعكس صحيح.

5) هاتان الحشيشتان تفضلان الاراضى الحامضية والقلوية للانبات.

اجريت ثلاث تجارب حقلية، تجربة منافسة الحشائش (1)، تجربة منافسة الحشائش (11) وتجربة مبيدات الحشائش فى محصول الذرة الصفراء خلال موسمى الشتاء وموسمى الصيف للاعوام 2002، 2003 و 2004 بمنطقة اقباج-دقلا بالولاية الشمالية.

ولقد اظهرت هذه التجارب النتائج التالية:-

فى التجربة الاولى والثانية قد اوضحت النتائج ان عدم مكافحة الحشائش ادى الى نقص معنوى فى انتاجية محصول الذرة الصفراء وتراوح هذا النقص ما بين 58 - 62% فى الموسمين الشتويين وبين 67 - 79% فى الموسمين الصيفيين. وان هذا النقص مرتبط بفترة المنافسة الحرجة بين المحصول والحشائش اى انه كلما نقصت هذه الفترة كلما زادت الانتاجية والعكس صحيح.

كذلك اظهرت الدراسة ان الفترة الحرجة لمنافسة الحشائش فى محصول الذرة الصفراء تتراوح ما بين 2 و 8 اسابيع من الزراعة فى الموسمين الشتويين وما بين 2 و 9 اسابيع من الزراعة فى الموسمين الصيفيين.

ايضاً اظهر البحث بان المحصول مقاوم نسبياً للحشائش فى الموسم الشتوى عنه فى الموسم الصيفى وذلك لنمو المحصول نمواً قوياً فى الشتاء.

فى التجربة الثالثة وجد ان استخدام الجرعة العالية من الأتزازين والجرعة العالية من دول قود وخليط الجرعة المتوسطة من الأتزازين مع الجرعة العالية لدول قود اعطى اعلى زيادة معنوية فى الناتج الكلى للذرة الصفراء وكان مشابهاً للعزيق اليدوى خلال الموسمين الشتويين و الموسمين الصيفيين مقارنةً بالشاهد.

ايضاً وجد ان استخدام المبيدات ومخاليطها اعطت أقل نقص معنوى فى الوزن الجاف للحشائش خلال الموسمين الشتويين والموسمين الصيفيين مقارنةً بالشاهد. وبتقييم اثر المبيدات فى مكافحة الحشائش اظهرت الدراسة فعالية جيدة فى مكافحة الحشائش الحولية وبخاصة الجرعات العالية للمبيدين والجرعات المختلفة للخليط بين المبيدين الاتزازين ودول قود.

## ABSTRACT

A weed survey in maize (*Zea mays* L.) was carried out in different islands in Dongola Area namely Lebeb, Artigasha, Marawarty, Binna, Magasir, Nawa and Elmasakeen to determine the most common and prevalent weed species associated with maize. The most common and prevalent weed species associated with maize in these islands were found to be *Cynodon dactylon* L., *Cyperus rotundus* L., *Gynandropsis gynandra* L. Brig., *Portulaca Oleraceae* L., *Sorghum arundinaceum*, *Amaranthus viridis* L, *Amaranthus graecizans* L. and *Echinochloa colona* Link.

In general, the weed flora of Lebeb, Binna, Magasir and Elmasakeen was dominated by broad- leaved weeds whereas that of Artigasha, Marawarty and Nawa were dominated by gramineae weeds. This result could be attributed to the use of broad-leaved weed herbicides like 2, 4- D which kill only broad-leaved weeds in Artigasha, Marawarty and Nawa while in the other islands the use of the mentioned herbicides is rare. Also this result could be attributed to the variation of soils and the different crops which sown in the North Sudan.

Biology of seed germination of some selected weed species was studied to determine their life cycles and to study the effect of temperature, simulated drought, depth of sowing and pH on their germination. The weed species were *Amaranthus viridis* L, and *Sinapis arvensis* L., the field experiments which were conducted explained that, their life cycles are 99 and 101 day, respectively.

However, the laboratory experiments results showed the following:

1) The optimum temperature for seed germination is 30 °C (24 hr dark) and the alternative temperature 30/20°C (12 hr light/12hr dark) for *Amaranthus viridis* L. and 20°C (24 hr dark) and 20°C (12hr light/12 hr dark) for *Sinapis arvensis* L..

- 2) These weeds have a wide range of temperatures for germination, (20 – 40°C) for *A. viridis* L and. (10 – 40°C) for *S. arvensis* L.
- 3) Seed germination for the two weed species decreased with increasing osmotic pressure and vice versa, as there is a negative correlation.
- 4) Seed germination and emergence for the two weed species decreased with increasing depths of sowing and they can be controlled effectively by plowing them at least 4 cm soil depth.
- 5) These two weed species prefer acidic and alkaline soils for germination.

Three field experiments were conducted, included two sets of competition experiments (the first set involved weed free subplots for X weeks after sowing and kept weed free till harvest, while the second set involved weedy subplots for X weeks after sowing and left weedy till harvest) and a herbicide experiment in maize (*Zea mays* L.). The experiments were conducted for two consecutive winter and two consecutive summer seasons of the years 2002, 2003 and 2004 at Agja-Dongola-Northern State-Sudan-located within latitude 16° and 22° N, and longitude 20° and 32° E.

Results obtained from the first and second experiments indicated that, unrestricted weed growth reduced significantly maize total grain yield by 58 - 62% in both winter seasons and by 67 - 79% in both summer seasons, and this reduction mainly affected by the duration of weed-infested period, whereas the maize total grain yield increased when the duration of weedy-period was decreased.

From the two sets of experiments was found that, the critical period for weed competition in maize according to this investigation was between 2 and 8 weeks after planting in both winter seasons and between 2 and 9 weeks after planting in both summer seasons. Also

results indicated that, the maize is relatively more tolerant to weeds in the winter season than in the summer season because the growth of the crop is very good in the winter season.

Results obtained from the third experiment showed that within the three herbicides the best weed control was achieved by Atrazine at its highest rate, Dual gold at highest rate and the tank mixtures of Atrazine at intermediate rate with Dual gold at highest rate in both winter seasons and both summer seasons and they gave maize total grain yield comparable to full season weed free treatment.

The use of herbicides and their tank mixtures significantly reduced weed biomass in both winter seasons and both summer seasons as compared to full season weedy treatment.