

These experiments were carried out during two consecutive seasons from 1988/1969. and 1909/1990 at the Experimental Station of the Faculty of Agriculture at Mouhohor University. The experimental design was WUB in completely randomized block system with three replicates. This work included two main parts. The first includes three experiments i.e., the third experiment was to study the effect of soil modification treatments on the premonition character.

Part II : Phenological studies and fungicidal treatments: Pathological studies. Effect of Bonefungicide on growth. Flowering time and chemical composition of cumin plant. The most important results for the following treatments were as follows; Part I ; 1- Fertilizer treatments - All four treatments increased height or plant height in both seasons whereas with the control treatment plant height increased only in the second season. All fertilizer treatments increased the number of branches/plant in both seasons except low NPK medium level of , partly X in the first stage. The treatments B and dry weight of h... increased significantly with all fertilization treatments both sea30n... the largest weight of 100 seeds was produced from the... and high rate of J () t 4 3 sprayings /Season) of Jifollax and Fort, YX... in... The fertilization treatments increased oil percentage and though the highest value obtained with the highest foliar application (It a pray Inga)rile fertili... , application of lorty X nwl ...o1111rX increase as... d hit r02'<?':. concentration in p f: It fo 118,ge than unfert 11 izf'd plf.1J1t-. The increase... ,&) proportion with the i:croae of Foliar X or l'orty ;X' i'-rt ilizer application , Phosphorus and potassium concentration increased also with all fertilizers treatments. Total carbohydrate concentration in plant foliage was also increased due to all fertilizing treatments of both kinds of fertlizer. All fertilization treatments increased the amount of cuminaldehyd/plant compared with unfertilizing plants. Irrigation (water stress) Sprayin irrigation : All irrigation treatments increased plant height in both seasons compared with control plants. The low level of irrigation {25 ~ at V.c.) produced the highest yield of JpeC ally in the first year. All levels of irrigation increased the yield of JpeC ally in the first year. Inguot value; obtained by the medium level (50 % of li'.C.) compared with other treatments. The mean weight of herb increased with all levels of irrigation used than control plants. The highest S'tvalue Q)tained with the low level of irrigation followed by medium and high ones. Generally all irrigation rates under the 19 experiment increased root length compared with water. The low level produced the large value for this character. The mean Weight of root increased as well as the ratio of root length to plant height although the highest weight was obtained by the lowest level. The mean diameter of umbel and the mean number of Ullbela/plant increased with all irrigation levels compared with control plant. The low level of irrigation produced the highest values of the two characteristics with other treatments. The seed yield/plant increased with tillage treatment compared with un-irrigated plants. The most effective treatment in this

respect waa luw level (25 % F.G)followed by med1~ level (50 % F.C.) then high level(75 , F.C.) treatment. _ Genero.IIJ. all irr1ga-;1on treatments increased the averagewe1~ht of 100 aeed than control ~rcatment, the lowlevel or irrigatiun (25 % or F.e.) produced the ~eutraaul t flJl' th La character. _ All 1rr1t~J.t10n le vell) inc z-eaae d Oi1 pore ent uge than unirrigatedFl&nta~ Al~o th~ low level of irrigation wasmora promising 1n tb1& concl~. _ Tho Uitrogunt phosphorus, potass1~u and totul carbohydrateC ncnet rat ion increased with a.ll lrr1gtit ion levelsthan u.n.-irrtgo.tad plant. The moder6.te level of irrigationpz-odue ed the best results for t ho.re charuc t erc comparedwith :>ther trehtmenta.Tht: 1rr1gu ;oc plants wi th high o r med;...Wt filliount of Yfuterdec re aeed C'H; emount of c uminaldehyde/ lu.n t c ompar-ed withcant rol ple.nt.. While irriga.tion pl~.l1"t;j with low amountof water gavl: the same control val ue fer' th iiJ charuc t c r ,,"b) Surface lrrL!atlon,- All surface irrigation tr~atments incr~aseJ the ~uanplant he ;1..ylt over conti"ol plant 3 fo:- bothpl&.l1 t s irrj gat.:d at 40-days interval vusn mor-e tallerthan both control or thoseirrig<ed z.t 30 and J5days interala.- The irrigation intervale affected c12urly thenumber of branches carried by p.Lan t , ~J.lhQ highest value:obtained N+th the medium interval (J5-Ut~ys).- 'i'he t"reat (.nd dl"y wc1cj1t of herb Lncr-c u.ae d with ullirr1e;ati(.n intervals than control plw..itlJ (without irrigation)d.Iso the me an dr.Y weight of a t em s Lnc r-a asndan the irrig~tion i~terYal increased.- 'l'he ae aa 0:'." root length, mean frcah and dry we1ehts ofroo ts inc r.:aa~d with all 11'.rigut ion t r-e atment a than con~trol pla.at~J (without irrigation).tor these characters wcr~ obtained with plante irrig~t~da~ the 4J-Jaya iAtery~l over all other treutment~.- Th\$ n~b~r or umbela/plant increaHOu with all irri8ut1on1intervilla than control plAnt. 'l'h= longur irrigationperio~ (40 da3a) resulted in the h1~.~t val~~ rol1ow~dby medLum period (J5-daya) and ahort one () O-day.:J) t he nco ntrol plWlt s , _ The mean cliumeter of umbels and meWl n'.Hnb~r of ulflb~lu/plant inc re aae d with irrigated plWltu thW1 the un-irrigat~d ones. The 40 days interval wa~ th~ most eff~ctivein these cfl],ractere over all other t!:l'::ltt;l1ent~• _ i'he yie ilt of cwnin seeds/plant inc rt:tl.:3tHl wftb irrigatedpLarre s than the un-irrigated on~.. Alao t nel~ngest ~nterval wae the most sup~r[Dr in thi~ concernt han 0 thar treatments. _ The lar,~Nit weight cf 100 seeds produced from pl ant sirr1gatnd at 40•.days interval follc-j,0d bydays tllld contral plants. _ The oil percentage increased with h] 1 irrigl1t Lon per-iads UDce. the longer period (40~dQY~) produced thehighest ,ercontage in bo';h.aeutJonu,- rrrhc Nit'l'o,!::en. phosphorus and po t aue Lum c onc en t r-at LonaLnc a-eaae c wi th all irrigation 1nterv[,da under a t udyin this V!c,rk.. Also the concentrLtion of these alementat er.de d to increase as the irr:'~ut ion Lnt erv aLincr~afled • _ Total cnrbohydrat~ content alao incr~uad with irrigationtreatments than control p.Lant a, and t n> trend ofthe lnora~~e waa with the lnoread13Y Dr th~ int~ryul. _ J.t'he short a,uC, medtum interval. between :~rri~u't ion plunt udecreased 'Chi'; ::UnCiWlt of cwn1nclddehyde/p::ant. while longintarval 1l::..l.O:~8ed the amou.n~ Dr cumintJ. dt:'hyae/ plant comparedwith. cent ro 1 plan t •Soil modificut1onThe high t ;",1'plall t dec re aeec with all BO 1.1 modtr i c at iontreatmentg 1n both seaSOIIS compared with control plantexcept (Lime and Sand t Lime 't SLllrurJ t r-o ntmerrt a inthe ~H:cor1':Jaa90n.The fresh w&ight of herb increased with 8.11 soil moditicat f on treatments in the firtd ae ason, whi1l.1 mos t of the~aatments decr~ased it in the socond 3eU90n except 81.41-fur treatm~nt.The s011 Inc,d1f1cat1on treatments incrt~u.:hjd the dry weightor heY'b except with (Sancl and Lime + :::u.lfur) treutli~ont3ill the ii l' ;t Scie:Jon. while 1t 1nCreU3(.j it only with(Sand and ~;u,lflL:r) treatments in the sec end seuson....The only ~oil modification treatments as (Lime, Sulfur,Sand ..•.Sul.'ur and Sand + Lime ..•.Sultl.l.r). incr~U:Jed theroot length than control ple.nt in the first aeti,son whileall aoil ~••ol.l1f1catioll treatments dec r-eas ed root l~ngth insecond SBU _Jn.A.l1 9011 m'~difica.t1on treatments deCrCl!sed the fr&shweight ot loot in the second season, b..L't (nly (SUIldSand T" Lim' Wld Lime •. Sulfu.r) treutml:' •t u dc:creu~cdthe freab. ll.'a1ght of root 1n the first seaacn couipur-edwi th cont::~'ol plant. Also all soil !Hodificlt1on trOutmentsdac:~eo.sed the dry weight ot roc t in tne scccdnseuson but .1th 0 lIPoa1t e ' ~tt."c t 1r. t45 i rst 3er.~Don 0.11'ao11 lUod1ti(.atiQ~tre.:itmeAts increased tk.: dry wtllght ofroot"c~mparHd with control plant.'L'he aoil moc.if1cation treatmanta incretl.tkd t ne numbe r' ofumbela/plant in the a ec cr.d• ae ascn eXCt-pt (;,s.n.d) tr~fitment.But ol.ly (Lime and Sulfur) treatn:::~nt 3 inc reo:::H:dthe nuabe r' of..unbels/pla.nt than co nt ro ; p Lant in the fir:ltseason.Sl.~LU" ..) trea.tment 1ncrea.a~:dl'h~ d iWlietl.l.r of(StL.nd. :\$t...nd. !' Lime) treatment lJ deCl~i::Lli.O~"~d the fiv~rageweight of seed s/ plant in the firs t ue a son , but n,ll ao11modificat Lon treatment s

decreased the weight of seed/plant in treatment compared with control. The average weight of 100 seeds was recorded with 111 mg. Significant difference at menta except (Sand) treatments in the first season and (Sand + Lime, Lime + Sulfur; Sand + Lime + Sulfur) treatments in the second season. All soil modification treatments decreased the percentage gain both treatments except (Sulfur) treatments in the first season and (5. L. tur., Sand, Lima UJH.: la-ld T Sulfur) in the first season. Only (S-d • 1. IU-) treatments decreased the nitrogen concentration compared with other treatments. The phosphorus concentration increased with all treatments under this experiment compared with control plant. The (Sand + Lime + Sulfur) treatment had the highest potassium concentration than control plant, but other treatments decreased potassium concentration than control plants. All soil modification treatments increased total carbohydrate content than control treatments. Only (Sulfur, Sand or Lime, Sand + Sulfur and Sand + Lime + Sulfur) treatments increased the amount of formaldehyde compared with control treatment. Part II in the pathogenic test: 3 tests - each of Fungus, Xylophora and Fusarium spp. attained the low value; for Utagot hctL1thy survival plwtn comparee with other fl. U1gufJ.in botil saac ns •With qaariu.fil oxysporUln. all r ungd c rd e a c onc e nt r-at Lcnaincreased th~ pe:r-enta.ge ot healthy DU1",1vtll plWlt:J com~ with cpntrol plant: except low IQV~rJ. or Benlate~Olin the second season. With FLISH.:ri urn iio1a.n1 all f'LUL.g101daa cone~nt.J,~~H1one 1.ncreasedthe poz-cen t age ot he:althy a ur-v z.va L plants compar-ed with c cr.t r-oL plant except high l-v.:l (;:f lk:,n.lutc-50in t-e f1rat s~ason.Under field cand it iens all tW'lgicIdo~ t r,u.ttl.;:nt f) inc r(:usedtha perce~ltti.ge of healthy 3uryivf~1 pLant s OOUlp1:l.rt:d• witA cont ro 1 treatment.1 irrht and mean n"" b>r of branchefJ CtLrr-_ Mean P c1n~ ne-&- ~. -- -lad by J.IAlt WdX"U improved by iolsing diff~rt~nt tung1c1dt:t.l au bu ~unc e s thun l.1ntreut e d pJtln t!J • Tn~ meun fr~ nn and- dry we 1ght.fj 0 f" ~l' rb •e.L u"0 Lncr-c uaa~l by l.uing:Wlt;i(i:1~ au bs t nnc ea t: flpt:c' iullyRovral, "3a,vist1n, Benlate and HOUII.i- The mean lengh of roots, and ru.:M fresh ,WIU dri wai;3htof roots inert-ased as a result of using l'uagicide3 substWlceain bO'tt. sea.sons at the exparime!!':~s._ The num ber ,,~l' Ull:OE:ls/pl~.1Jlt Inc r-eaae d y,t;j{i~ to ua Lng funinthis reaspect was that of Baviat1n.,, _ 'lhe mean d 1Lunet~r 01" umbels iu.proved by lur.glc Ld ea subst anc e s ue ed than controlplanto, especially with HOIJui- All fungicid~a treatments produced seed yield/plunt1oreover l.Intraatedplants. Homa1~O treated plantsproduced the highest seed yield/plant ov~r all other ~ub~t anc e a ,a,:e d a t h an un , re llt ~r.l pllall t J3, the mea t cf f~: c t iv(: :J Ub:Jt an cein this conce~n w~s Bavistin.to l.4:ling fLU,,,:C Ld e a au uat enc e a ,t\$ges were 0 btained w1th Homa-i.-80 treated plr10t in the, firslt season ,Ind j)th.r t r eat ed with Relllatc tu the sec ondSijD.Son. Mineral.s cot: t ent of N. P and K in plc.nt he r-b WU8 tnc re aaedas a re;Hl.lt of utii!lg fung1c1das aubs t unc ee t hun con-trol plr.1lt._ All fung1c1offJJSubstances increasod tot41 carbohydrCl.tr: cClntentover cont :-01 plant s except with mli.~ol-X t r-e a't ed plants.from th~ obtaining reaults of the~ inv~3tig~tionsit co uld r-rec o","endedt 0 r , •in1n3 tho n19ho" t Y te III ot cuminseed. with hic:h .ontent ot oil o.nd cumin:.1Jl1ye<l to rage.rd.:30Ult 4~pect:i th-rnughthe dittel't:nt ~ttJ.g~a or' cumin prljdl.1) Sine. it ia known that germina.tion p~rc:.lt ..or cULLii~~,ed a is vr:r,y low due to P!"uJarium 1n!ec t ~un ~:It preem~:re1nce and post.:mergence stuge9, so ~,:::ud.!J mua t bdtre~ted wi th~ne or the t'un8ic1des. 'l'L.u be lJ t r' unr;icideused in these e~per1ment wusHom~i - 80 nt 0.4%which resul'~u 1 in higher number ot survi _al plc.nt8 andalso good yild of seeds and oil pe r plE:Jlt.2) Fert i11zitlg cumin l>lallt with to11 ••r re r r ili~"t 10.1 0 ctainedgood rcsi.~lts f.:ll" higher yl~ld or :Je~jh ano oil t;:,Jl~tcially••hell Foliar X was used at concentr"Uotor four tim~~during gr~wth period •J) Durillg .~o ••Inl period of cumin pl~t it ,. pr.f.r"bly touae lealler ""~,unt of irrigation water (2:i % or 1'.C.) a",oliar spray ll three ti,n es tnro ugnout t~,e er,wing ae lIUOn ,the interval batYleon the ini:iltiOn till 4 C dlly" with moderateamouri of Vir. tel' (100 % of P.C.) ~t..Lch reo uli.d illth~ higheat yield ot se~cis and oil undt:l' this work.4) ~odifig 9oil of planting by "ome~additi"" i •• Bultur,LiliIB Or Sane .100 i""Pro ved growth -.no tL10 0 f c"min p1.-.nto'.T'h~ Glost effecti~c of tnese a.':' itlvcs ~..a.s fiullur which re~-