A REVISED MAP OF THE EIGHT LINKAGE GROUPS OF *ASPERGILLUS NIDULANS*[1]

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THE homothallic ascomycete *Aspergillus nidulans* has become an important organism for genetic studies as a consequence of the basic research of PROFESSOR G. PONTECORVO and his associates. A preliminary linkage map was constructed nine years ago by KÄFER (1958). A revised genetic map is presented in the present paper, which complements the listing of Aspergillus stocks published by BARRATT, JOHNSON and OGATA (1965).

In 1966, Aspergillus workers were requested to send pertinent linkage data to this laboratory. Tables 1, 2 and 3 and Figure 1 were compiled from this information and that published in the literature; they are intended to serve as a reference for individuals who wish to use *A. nidulans* for research or teaching.

Recommendations: Hopefully, this paper will encourage the isolation and mapping of new genetic markers; a representative mutant of each new locus should be deposited in the Fungal Genetics Stock Center[2]. Furthermore, it is recommended that the system of genetic nomenclature for bacteria (DEMEREC, ADELBERG, CLARK and HARTMAN 1966) be employed in the assignment of symbols to new Aspergillus mutants. Recently, it has been shown (KÄFER 1965) that several of the genetic strains of *Aspergillus nidulans* contain one or more translocations. In crosses such strains produce a high frequency of inviable ascospores and give spurious linkage relations. In order to prevent the introduction of additional translocations into the stock strains, new mutants should so far as is possible be tested by mitotic analysis (PONTECORVO and KÄFER 1958; MCCULLY and FORBES 1965) with translocation-free tester strains (available at the Fungal Genetics Stock Center [see Table 5 of BARRATT *et al* 1965]).

Over 140 different loci are listed in Table 1, which includes the genetic symbol, name and description of each mutant, together with the linkage group, list of allelic mutants, availability from the Fungal Genetics Stock Center, and origin of each mutant. The reference cited for each mutant does not necessarily refer to the person who isolated it; in several instances more than one investigator was involved in the isolation, characterization and mapping of a given mutant. For proper credit to the originator refer to the cited reference. The probable location of the centromeres is indicated in Figure 1 by a solid circle (●). Mutants placed

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[2] Fungal Genetics Stock Center, Department of Biological Sciences, Dartmouth College, Hanover, New Hampshire 03755.

to the right of a linkage group indicate that they have been assigned to that group by mitotic analysis but have not been further mapped.

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SUMMARY

One hundred forty-four mutant loci of *Aspergillus nidulans* are described, and a revised genetic map is presented.

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TABLE 1

Located mutants of Aspergillus nidulans

Symbol	Designation	Phenotype	Linkage Group	Allelic Mutants†	Available From FGSC††	Origin of Mutant: Strain	Origin of Mutant: Mode	References
	VISIBLE							
bl1	blue 1	blue ascospores	II	2,3,4	yes	y; w2; s12	nitrous acid	Apirion, 1963
cha	chartreuse	yellowish green conidia	VIII R	-	yes	-	spontaneous	" Kafer, 1961
cl4	colorless 4	colorless ascospores	IV	-	no	y; w2; s12	nitrous acid	Apirion, 1963
cl6	colorless 6	colorless ascospores	I L	1,3,5	no	y; w2; s12	nitrous acid	
co	compact	compact colony	VIII R	-	yes	paba1 bi1	spontaneous	Pontecorvo et al, 1953
dil*	dilute	dilute conidial color	III	-	yes	-	U.V.	G. Jansen, unpublished
fw	fawn	yellowish brown conidia	VIII L	-	yes	bi1	spontaneous	Clutterbuck, 1965
mo96*	compact 96	compact colony with grooves	III	-	yes	y; ad3; s1	β-propia-lactone	Bainbridge, 1963
p1*	pale 1	light grayish green conidia	V	-	no	an1 bi1	spontaneous	Van Arkel, 1962
				2	yes	ad14 bi1	spontaneous	" Kafer, 1965
sl*	slow	reduced growth rate	III	-	yes	-	-	Bainbridge, unpublished
sm	small	colony compact	III L	-	yes	bi1; lys5	spontaneous	" Kafer, 1958
ve	velvet	fluffy appearance	VIII L	-	yes	bi1	spontaneous	" Kafer, 1965
wl	white 1	colorless conidia, epistatic to y	II L	-	no	wild type	spontaneous	Pontecorvo et al, 1953
				2	yes	y	x-rays	
				3	yes	paba1 bi1	spontaneous	
y	yellow	yellow conidia	I R	-	yes	wild type	x-rays	
yg*	yellow-green	yellow conidia and green conidia on complete; yellow conidia on minimal	II R	-	yes	bi1	U.V.	Dorn & Rivera, unpublished
	RESISTANT	Resistant to						
Acr1	Acriflavine 1	Acriflavine/ malachite green dominant	II L	-	yes	paba1 y; co	Spontaneous	Roper & " Kafer, 1957
				3	no	bi1; ad1; s12; pyro4	Spontaneous	
acr2	acriflavine 2	acriflavine/ malachite green	II R	-	no	ad15; paba1; y	spontaneous	
Act1*	Actidione 1	Actidione, dominant	III L	-	yes	ribo1 y; nic8	U.V.	Warr & Roper, 1965
facA	fluoroacetate A	fluoroacetate; acetate non-utilizer	V	303	yes	bi1	spontaneous	Apirion, 1965
				2,3,4, 305,306	no	bi1	spontaneous	
facB	fluoroacetate B	fluoroacetate; acetate non-utilizer	VIII R	101	yes	-	spontaneous	
				302,308, 309	no	-	spontaneous	

TABLE 1—Continued

Symbol	Designation	Phenotype	Linkage Group	Allelic Mutants†	Available From FGSC††	Origin of Mutant: Strain	Origin of Mutant: Mode	Reference
	RESISTANT	Resistant to						
facC	fluoroacetate C	fluoroacetate; acetate non-utilizer	VIII R	102	yes	w3; pyro4	spontaneous	Apirion, 1965
fanA	fluoroacetate A	fluoroacetate	V	1,3,4,10, 11,12,14,16	no	-	spontaneous	
fanB	fluoroacetate B	fluoroacetate	VII	52,54,60	no	-	spontaneous	
fanC	fluoroacetate C	fluoroacetate	VI	101	no	-	spontaneous	
fanD	fluoroacetate D	fluoroacetate	VIII	151	no	-	spontaneous	
fanE	fluoroacetate E	fluoroacetate	VI	5,7	no	-	spontaneous	
fpA	fluorophenyl-alanine A	fluorophenyl-alanine	I L	1	yes	bi1	spontaneous	McCully, unpublished
fpB	fluorophenyl-alanine B	fluorophenyl-alanine	I	37	yes	ribo1 bi1	spontaneous	
fpC	fluorophenyl-alanine C	fluorophenyl-alanine	VIII	43	no	ribo1 bi1	spontaneous	
FpD	Fluorophenyl-alanine D	Fluorophenyl-alanine, dominant	III	11	yes	ribo1 bi1	Spontaneous	
Iod1*	Iodoacetate 1	Iodoacetate, dominant	II L	-	yes	-	Spontaneous	Warr & Roper, 1965
Sul1*	Sulfanilamide 1	Sulfanilamide, dominant	I L	-	yes	-	U.V.	G. Jansen, unpublished
te6*	teoquil 6	teoquil	III	-	no	-	spontaneous	Warr & Roper, 1965
	NUTRITIONAL	Growth response to						
adA*	adenine A	adenine	I L	AM74,AM3	yes	wild type	U.V.	Foley et al,1965
adB*	adenine B	adenine	VIII R	AM57	yes	wild type	U.V.	
ad1	adenine 1	adenine/hypoxanthine	II R	-	yes	y	x-rays	Pontecorvo et al, 1953 & Foley et al, 1965
ad3	adenine 3	adenine/hypoxanthine	II R	-	yes	y; thi1	x-rays	
ad8	adenine 8	adenine/hypoxanthine	I R	10,11,12, 16,19,20,21, 22	yes	bi1	U.V.	Pritchard, 1955 & Foley et al, 1965
ad9	adenine 9	adenine/hypoxanthine	I R	13,17	no	bi1	U.V.	Pritchard, unpublished, Calef, 1957 & Foley et al, 1965
				15	yes	bi1	U.V.	
				32	no	bi1; w3	U.V.	
ad14	adenine 14	adenine/hypoxanthine	I L	-	yes	bi1	U.V.	Pontecorvo & Käfer, 1958 & Foley et al, 1965
				18	no	bi1	U.V.	
ad23	adenine 23	adenine/hypoxanthine	II L	-	yes	bi1	U.V.	Käfer, 1958 & Foley et al, 1965
ad50*	adenine 50	adenine/hypoxanthine	III L	-	no	bi1	U.V.	Dorn & Rivera, 1965
aaX*	allantoic acid X	urea/ammonium	VI	1	yes	bi1	diethyl sulfate	Darlington & Scazzocchio, unpublished
ab1	aminobutyric acid 1	aminobutyric acid	II R	-	yes	bi1	U.V.	Forbes, 1959
an1	aneurin 1	thiamine (aneurin)	I L	-	yes	bi1	U.V.	Pontecorvo & Käfer, 1958
an2	aneurin 2	thiamine (aneurin)	II R	-	yes	bi1; Acr1 w3	U.V.	Pontecorvo & Käfer, unpublished

TABLE 1—Continued

Located mutants of Aspergillus nidulans

Symbol	Designation	Phenotype	Linkage Group	Allelic Mutants†	Available From FGSC††	Origin of Mutant: Strain	Origin of Mutant: Mode	References
	NUTRITIONAL	Growth response to						
arg1*	arginine 1 (argino-succinase)	arginine	VI	-	yes	bi1	x-rays	Bainbridge, Dalton & Walpole, 1966
arg2	arginine 2	arginine	III L	-	yes	bi1	U.V.	Forbes, 1959
arg3	arginine 3	arginine	VIII R	-	yes	bi1	U.V.	Forbes, 1959
bi1	biotin 1	biotin	I R	-	yes	wild type	x-rays	Roper, 1950
				2,3	no	y; thi1	x-rays	"
cho	choline	choline	VII	-	yes	bi1	U.V.	Kafer, 1958
hisA*	histidine A	histidine	IV R	10	yes	-	-	M. Berlyn, 1966
hisB*	histidine B (IGP dehydrase)	histidine	I	-	no	-	-	M. Berlyn, 1966
hisC*	histidine C (IAP transaminase)	histidine	VIII R	38	yes	-	-	M. Berlyn, 1966
hisD*	histidine D (histidine dehydrogenase)	histidine	VIII R	-	no	-	-	M. Berlyn, 1966
hisE*	histidine E (PR-ATP pyrophos-phohydrolase)	histidine	VIII R	-	no	-	-	M. Berlyn, 1966
hisF*	histidine F	histidine	VII	-	no	-	-	M. Berlyn, 1966
hisG*	histidine G (PR-ATP pyrophos-phorylase)	histidine	II	-	no	-	-	M. Berlyn, 1966
hisH*	histidine H	histidine	VIII	13	yes	-	-	M. Berlyn, 1966
hisI*	histidine I	histidine	VIII R	-	no	-	-	M. Berlyn, 1966
his122*	histidine 122	histidine	VII	-	no	-	U.V.	Pees, 1966
hxA*	hypoxanthine A	uric acid/allantoin/ allantoate/urea/ ammonium	V	1	yes	bi1	diethyl sulfate	Darlington & Scazzocchio, unpublished
hxB*	hypoxanthine B	uric acid/allantoin/ allantoate/urea/ ammonium	VII	13	no	bi1	diethyl sulfate	Darlington & Scazzocchio, unpublished
ile1*	isoleucine 1	isoleucine	VII	-	no	-	U.V.	Pees, 1966
lu	leucine	leucine	I L	-	yes	bi1	U.V.	Forbes, 1959
lys1	lysine 1	lysine	VI	2	yes	w1	x-rays	Pontecorvo et al, 1953
				8	no	-	U.V.	Pees, 1966
lys5	lysine 5	lysine	V	-	yes	bi1	U.V.	Kafer, 1958
				16	no	-	U.V.	"
lys7*	lysine 7	lysine	VII	6	no	-	U.V.	Pees, 1966 & 1965
lys10*	lysine 10	lysine	V	-	no	-	U.V.	Pees, 1966 & 1965
lys51*	lysine 51	lysine	I R	-	no	-	U.V.	Pees, 1966 & 1965
meth1	methionine 1	methionine	IV L	-	yes	bi1	U.V.	Kafer, 1958
meth2	methionine 2	methionine	III L	-	yes	bi1	U.V.	Forbes, 1959
meth3	methionine 3	methionine	V	-	yes	y; pyro4	U.V.	Roberts, unpublished
ni3	nitrite 3	nitrite	II R	-	yes	bi1; w3	U.V.	Kafer, 1958
ni50*	nitrite 50	nitrite/proline/ arginine/ammonium	VIII R	-	yes	bi1	U.V.	Dorn & Rivera, 1965
ni51*	nitrite 51	proline/arginine/ ammonium	VIII R	-	yes	bi1; phen3	spontaneous	Dorn & Rivera, 1965
				52	no	bi1; phen3	spontaneous	Dorn & Rivera, 1965

TABLE 1—Continued

Symbol	Designation	Phenotype	Linkage Group	Allelic Mutants†	Available From FGSC††	Origin of Mutant: Strain	Origin of Mutant: Mode	References
	NUTRITIONAL	Growth response to						
nic2	nicotinic 2	nicotinic acid/ anthranilic acid	V	-	yes	wild type	x-rays	Pontecorvo et al, 1953 & Käfer, 1958
nic8	nicotinic 8	nicotinic acid/ anthranilic acid/ tryptophan	VII	-	yes	bi1	U.V.	Pontecorvo et al, 1953 & Käfer, 1958
nic10	nicotinic 10	nicotinic acid/ anthranilic acid	VI	-	yes	bi1; Acr1 w3	U.V.	" Käfer, 1958
orn4	ornithine 4	ornithine/arginine	IV R	-	yes	bi1	U.V.	Pontecorvo et al, 1953 & Käfer, 1958
orn7	ornithine 7	ornithine/arginine	VIII R	8	no	bi1	U.V.	Forbes, 1959
				9	yes	bi1	U.V.	Forbes, 1959
				20	yes	bi1	U.V.	Dorn & Rivera, 1965
paba1	p-aminobenzoic acid 1	p-aminobenzoic acid	I R	-	yes	bi1	x-rays	Roper, 1953, Siddiqi, 1962 & Putrament, 1964
				2,3	no	bi1	U.V.	Roper, 1953, Siddiqi, 1962 & Putrament, 1964
				4,5	no	bi1	x-rays	Roper, 1953, Siddiqi, 1962 & Putrament, 1964
				6	yes	bi1	U.V.	Roper, 1953, Siddiqi, 1962 & Putrament, 1964
paba22	p-aminobenzoic acid 22	p-aminobenzoic acid	IV R	-	yes	bi1	U.V.	Siddiqi, unpublished
				21	no	bi1	U.V.	Siddiqi, unpublished
panto	pantothenic acid	pantothenic acid	III R	-	no	y; thi1	x-rays	Pontecorvo et al, 1953
phen2	phenyl-alanine 2	phenylalanine/ phenylpyruvic acid	III L	-	yes	bi1	U.V.	" Käfer, 1958
				3	yes	-	-	Pontecorvo, unpublished
pro1	proline 1	arginine/proline	I R	2,5	yes	bi1	U.V.	Forbes, 1956
				6,7,8	no	bi1	U.V.	Forbes, 1956
pro3	proline 3	arginine/proline	I R	4	no	bi1	U.V.	Forbes, 1956
pu	putrescine	putrescine/spermidine	II R	-	yes	bi1; w3	U.V.	Sneath, 1955
pyro4	pyridoxine 4	pyridoxine	IV R	-	yes	bi1	U.V.	" Käfer, 1958
				1,2	no	bi1	x-rays	" Käfer, 1958
				5	no	bi1	U.V.	" Käfer, 1958
				6,7,8	no	bi1	U.V.	C. Martin-Smith, unpublished
				9,10	no	bi1; Acr1 w3	U.V.	C. Martin-Smith, unpublished
ribo1	riboflavin 1	riboflavin	I L	-	yes	bi1	U.V.	Pontecorvo & Käfer, 1958
ribo2	riboflavin 2	riboflavin	VIII R	-	yes	bi1; Acr1 w3	U.V.	" Käfer, 1958
				4	no	bi1; Acr1 w3	U.V.	" Käfer, 1958
ribo5	riboflavin 5	riboflavin	V	-	yes	y; pyro4	U.V.	Forbes & Sundaram, unpublished
ribo6	riboflavin 6	riboflavin	II R	-	yes	bi1; w3	U.V.	Forbes & Sundaram, unpublished
s1	sulfite 1	sulfite	III R	4	yes	bi1	U.V.	" Käfer, 1958
				2	no	bi1	U.V.	" Käfer, 1958
				5,6,8,9	no	bi1; w3	U.V.	" Käfer, 1958
s3	sulfite 3	sulfite	VI	-	yes	bi1	U.V.	" Käfer, 1958
				10,11	no	bi1; w3	U.V.	" Käfer, 1958
s12 (=s0)	sulfite 12	sulfite	III R	-	yes	wild type	nitrogen mustard	Pontecorvo et al, 1953
				7	no	bi1; w3	U.V.	Pontecorvo et al, 1953
s50*	thiosulfate 50	cysteic acid/ cysteine/thiosulfate/ methionine	VIII R	-	yes	bi1	U.V.	Dorn & Rivera, 1965

TABLE 1—Continued

Located mutants of Aspergillus nidulans

Symbol	Designation	Phenotype	Linkage Group	Allelic Mutants†	Available From FGSC††	Origin of Mutant: Strain	Origin of Mutant: Mode	Reference
	NUTRITIONAL	Growth response to						
thi4	thiazole	aneurin/4-methyl-5-hydroxyethyl-thiazole	II R	-	yes	bi1	U.V.	" Kafer, 1958
				1	no	y	x-rays	
trypA*	tryptophan A (anth. synthetase)	tryptophan/indole/ anthranilic acid	II	69	yes	paba1 y	U.V.	Roberts, 1967 & Hutter & Demoss, 1967
				10 alleles	no	paba1 y	U.V.	
				21 alleles	no	bi1; Acr1 w3; nic8	U.V.	
trypB*	tryptophan B (tryp. synthetase)	tryptophan	I	403	yes	paba1 y	U.V.	
				18 alleles	no	paba1 y	U.V.	
				19 alleles	no	bi1; Acr1 w3; nic8	U.V.	
trypC*	tryptophan C (PRA isomerase InGP synthetase anth. synthetase)	tryptophan/indole	VIII R	801	yes	paba1 y	U.V.	
				12 alleles	no	paba1 y	U.V.	
				46 alleles	no	bi1; Acr1 w3; nic8	U.V.	
trypD*	tryptophan D (PR transferase)	tryptophan/indole	II	432	yes	paba1 y	U.V.	
				2 alleles	no	paba1 y	U.V.	
				16 alleles	no	bi1; Acr1 w3; nic8	U.V.	
uY*	urea Y	ammonium	VII	5	yes	bi1	diethyl sulfate	Darlington & Scazzocchio, unpublished
uaX*	uric acid X	allantoin/ allantoate/urea/ ammonium	VI	1	yes	bi1	diethyl sulfate	
				10	no	bi1	diethyl sulfate	
	CARBON SOURCE	Fails to grow on						
fr1	fructose 1	fructose	IV R	-	yes	y; pyro4	U.V.	Roberts, 1963
gal1	galactose 1 (not inducible kinase or transferase)	galactose	III L	6,15,17,23, 24,27,29,30, 32,35,36	yes	bi1; w3	U.V.	Roberts, 1963 & 1964
gal3	galactose 3	galactose	II	-	yes	bi1; w3	U.V.	
gal4	galactose 4	galactose	VIII	-	no	bi1; w3	U.V.	
				7	yes	bi1; w3	U.V.	
gal5	galactose 5 (transferase)	galactose	I L	8,10,13, 14,19,33	yes	bi1; w3	U.V.	
gal9	galactose 9 (kinase)	galactose	III L	-	yes	bi1; w3	U.V.	
lac1	lactose 1	lactose	VI	2,4	yes	y; pyro4	U.V.	Roberts, 1963
				6,7	no	bi1; w3	U.V.	
lac3	lactose 3	lactose	II R	-	no	bi1; w3	U.V.	
mal1	maltose 1	maltose	VII	-	yes	y; pyro4	U.V.	
				2	no	bi1; w3	U.V.	
sb3	sorbitol 3	sorbitol	VI	-	yes	bi1; w3	U.V.	

TABLE 1—Continued

Symbol	Designation	Phenotype	Linkage Group	Allelic Mutants†	Available From FGSC††	Origin of Mutant: Strain	Origin of Mutant: Mode	Reference
	MISCELLANEOUS	Reduced ability to cleave						
pacA	acid phosphatase A	α-napthylphosphate at pH 4.8	IV	1	yes	bi1 rA1	U.V.	
pacB	acid phosphatase B	α-napthylphosphate at pH 4.8	VIII R	4	no	bi1	U.V.	
pacC	acid phosphatase C	α-napthylphosphate at pH 4.8	VI	5	yes	bi1	U.V.	
palA	alkaline phosphatase A	α-napthylphosphate at pH 8.2	III L	1	yes	bi1 rA1	U.V.	
				2,3,12,14	no	bi1 rA1	U.V.	
palB	alkaline phosphatase B	α-napthylphosphate at pH 8.2	VIII R	7	yes	bi1 rA1	U.V.	
				5,9,10,13	no	bi1 rA1	U.V.	
palC	alkaline phosphatase C	α-napthylphosphate at pH 8.2	IV R	4	yes	bi1 rA1	U.V.	
				6	no	bi1 rA1	U.V.	Dorn, 1965a
palD	alkaline phosphatase D	α-napthylphosphate at pH 8.2	VII	8	yes	bi1 rA1	U.V.	
palE	alkaline phosphatase E	α-napthylphosphate at pH 8.2	VIII R	11	yes	bi1 rA1	U.V.	
palF	alkaline phosphatase F	α-napthylphosphate at pH 8.2	VII	15	yes	bi1 rA1	U.V.	
palcA	alkaline-acid phosphatase A	α-napthylphosphate at pH 4.8 & 8.2	II R	1	yes	bi1 rA1	U.V.	
				2	yes	bi1	U.V.	
palcB	alkaline-acid phosphatase B	α-napthylphosphate at pH 4.8 & 8.2	III L	3	no	bi1	U.V.	
palcC	alkaline-acid phosphatase C	α-napthylphosphate at pH 4.8 & 8.2	VIII R	4	no	bi1	U.V.	
		Enhanced ability to cleave						
rA	phosphatase enhanced	α-napthylphosphate at pH 8.2	I L	1,2,3	no	bi1	U.V.	Dorn, 1965a
rB*	phosphatase enhanced	α-napthylphosphate at pH 4.8	II R	50	no	bi1	U.V.	Dorn & Rivera, 1965
rC*	phosphatase enhanced	α-napthylphosphate at pH 4.8	VIII R	51	no	bi1	U.V.	Dorn & Rivera, 1965
		Suppressed mutants						
su1ad20	suppressor 1 of ad20	ad20	I L	-	yes	ad20; pyro4	spontaneous	Pritchard, 1955
su1paba22	suppressor 1 of paba22	paba22	IV R	4	no	bi1; paba22	spontaneous	Luig, 1962
suApalB7	suppressor A of palB7	palB7	VIII R	1	no	bi1; palB7	spontaneous	Dorn, 1965a
suBpalB7	suppressor B of palB7	palB7	VI	2	no	bi1; palB7	spontaneous	Dorn, 1965a
suCpalF15	suppressor C of palF15	palF15	V	6	no	bi1; palF15	spontaneous	Dorn, unpublished
suDpalA1	suppressor D of palA1	palA1	I	2	no	bi1; palA1	spontaneous	Dorn & Rivera 1965
su5palA1	suppressor 5 of palA1	palA1	VIII R	-	no	bi1; palA1	spontaneous	Dorn, 1965b
Su1pro	Suppressor 1 of proline, dominant	pro 1-4, pro7	III R	-	no	pro1 paba1 y X pro7 bi1	Spontaneous	Forbes, unpublished
Su4pro	Suppressor 4 of proline, dominant	pro 1-5	III	-	yes	pro5 bi1	Spontaneous	Forbes, unpublished

TABLE 1—Continued

Located mutants of Aspergillus nidulans

Symbol	Designation	Phenotype	Linkage Group	Allelic Mutants†	Available From FGSC††	Origin of Mutant: Strain	Origin of Mutant: Mode	Reference
	MISCELLANEOUS							
ts	temperature sensitive	grows at 25°C but not at 37°C	VIII	-	yes	-	-	Forbes, unpublished
tsA	temperature sensitive A	grows at 25°C but not at 37°C	II R	25	no	bi1	U.V.	Forbes & Sinha, 1966
tsB	temperature sensitive B	grows at 25°C but not at 37°C	VI	5	no	bi1	U.V.	Forbes & Sinha, 1966
tsC	temperature sensitive C	grows at 25°C but not at 37°C	II R	17	no	bi1	U.V.	Forbes & Sinha, 1966
uvs1*	UV-sensitive 1	-	I R	-	no	-	U.V.	G. Jansen, unpublished

* These mutants did not originate from the Aspergillus Center at The University, Glasgow, Scotland.
† The numbers under the "Allelic mutants" column represent the isolation numbers and are to be appended to the symbol concerned, i.e.—*bl2*, *bl3*, *bl4*.
†† Fungal Genetics Stock Center, Department of Biological Sciences, Dartmouth College, Hanover, New Hampshire 03755.

TABLE 2

Centromere location

Linkage group	Method	Location	Reference
I	Tetrad analysis	Between *ad14* and *pro3*	STRICKLAND 1958
II	Tetrad analysis	Between *w3* and *an2*	STRICKLAND 1958
IV	Tetrad analysis	18 units right of *meth1*	STRICKLAND 1958
VIII	Mitotic recombination	Between *fw and orn7*	DORN, unpublished

TABLE 3

Mutant strains of Aspergillus nidulans*

Loci for each strain are listed in order of linkage groups and arms, beginning with I left, insofar as the order is known; linkage groups are separated by semicolons.

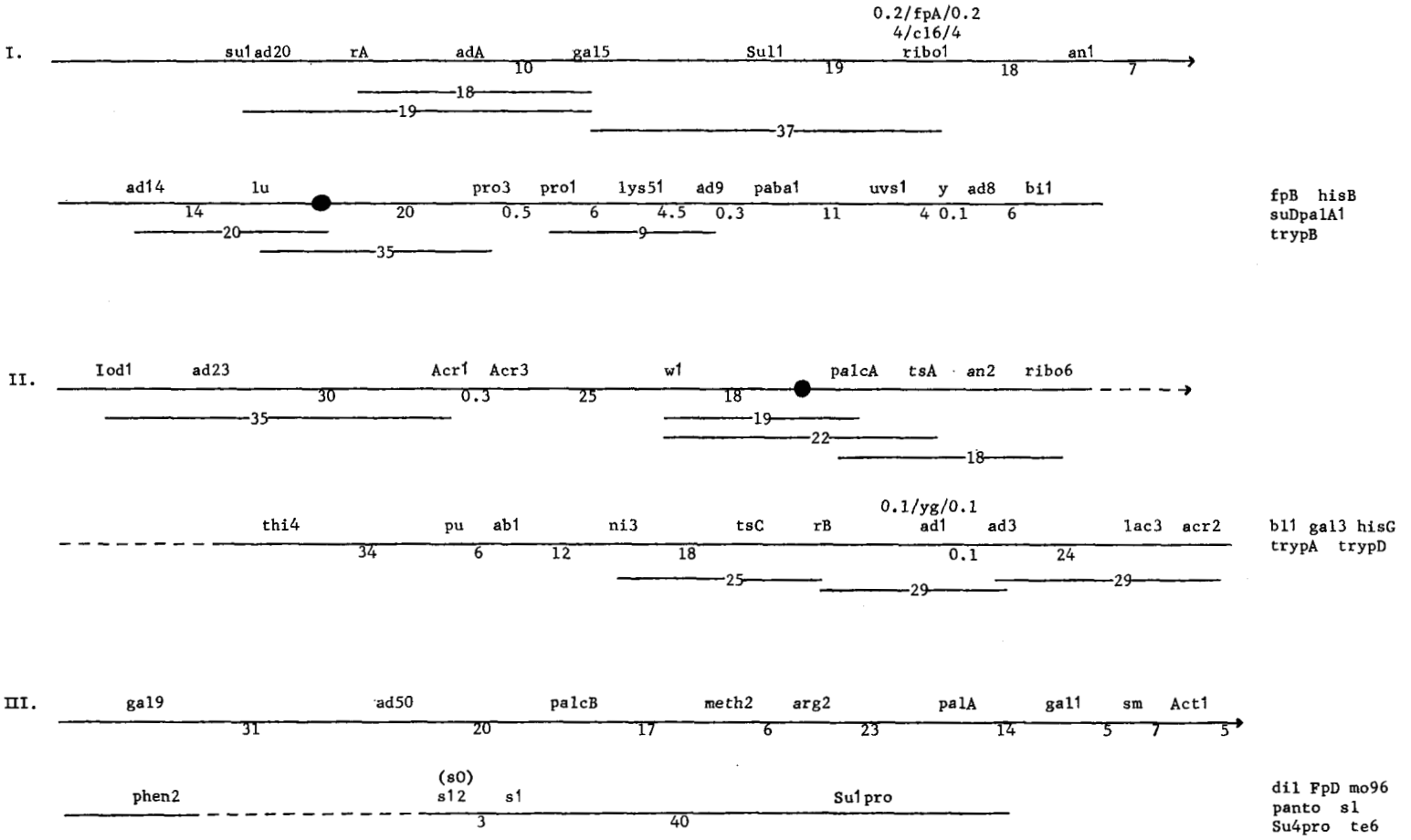
Symbols: C–cross; DE–diethyl sulfate; none–no translocation; S–spontaneous; T–translocation; T?–derived from strains with translocation, or irradiated (UV or X) strains or descendant from such strains and not tested; UV–ultraviolet; X–X-ray; βp–β-propiolactone; α-may contain *su1 ad20*.

FGSC No.	Genotype	Translocations	Origin
38	*w1*; *lys1* (*ve*+)	T?	X of *w1*; (*ve*+)
39	*bi1*; *w3 pu*	T(I;III;VIII) T(VI; VII)	UV of *bi1*; *w3*
216	*adA* (*AM55*)	T?	UV of *ve*
217	*adB* (*AM57*) *ve*	T?	UV of *ve*
230	*y*; *w2*; *arg1*; *ve*+	T?	C of *bi1*; *arg1* × *y*; *w2 ad1*; *s12*; *ve*+
231	*ribo1 y*; *Act1 nic8*	T?	UV of *ribo1 y*; *nic8*
232	*y*; *ad3*; *s1 mo96*	T?	βp of *y*; *ad3*; *s1*
233	*bi1 w3 cys2* (=*s12*)	T(III;VIII) T(VI; VII)	UV of *bi1*; *w3*
235	*paba1 y trypA69*	T?	UV of *paba1 y*
236	*trypB403 paba1 y*	T?	UV of *paba1 y*

TABLE 3—(Continued)

FGSC No.	Genotype	Translocations	Origin
237	*paba1 y*; *trypC801*	T?	UV of *paba1 y*
238	*paba1 y trypD432*	T?	UV of *paba1 y*
239	*bi1*; *ad23 Acr1 w3*; *nic8*	none	C of *pro1 paba1 y*; *ad23 w3*; (*ve*+) × *bi1*; *Acr1*; *phen2*; *lys5*; *s3*; *nic8*
240	*bi1*	none	C of *y bi1* × ++
241	*bi1*; *pacA1*	T?	UV of *rA1 bi1*
242	*bi1*; *pacC5*	none	UV of *bi1*
243	*bi1*; *palA1*	T?	UV of *rA1 bi1*
244	*bi1*; *palB7*	T?	UV of *rA1 bi1*
245	*bi1*; *palD8*	T?	UV of *rA1 bi1*
246	*bi1*; *palE11*	T?	UV of *rA1 bi1*
247	*bi1*; *palF15*	T?	UV of *rA1 bi1*
248	*bi1*; *palcA1*	T?	UV of *rA1 bi1*
249	*bi1*; *s50*	none	UV of *bi1*
250	*y*; *fr1 palC4 paba22 pyro4*	T?	UV of *rA1 bi1*
253	*bi1*; *Iod w3*; *nic8*		C of ?
254	*bi1*; *Acr1 w3 ab1 ni3 ad3*	T?	C of *bi1*; *ab1* × *ribo1 bi1*; *Acr1 w3 thi4 ni3 ad3*
255	*w3*; *pyro4 facC102*	T?	S in *w3*; *pyro4*
256	*paba1*; *w3*; *arg3 facB101 ribo2*	T?	C of *bi1*; *arg3* × *paba1*; *w3*; *facB101 ribo2*
257	*bi1*; *w*; *Acr1*; *nic8*; *his38*	T?	C of ?
258	*nic2 hxA1 facA303 ribo5*	T?	C of ?
259	*bi1*; *ad1*; *s12*; *pyro4*	T?	C of *bi1*; *pyro4* × *y*; *w2 ad1*; *s12*
260	*bi1*; *phen3*; *ni51*	none	S in *bi1*; *phen3*
261	*bi1*; *Acr1 w3 an2*	T?	UV of *bi1*; *Acr1 w3*
262	*bi1*; *uY5*	T?	DE of *bi1*
263	*bi1*; *orn20*	none	UV of *bi1*
264	*bi1*; *uaX1*	T?	DE of *bi1*
265	*bi1*; *pu1*	T	UV of *bi1*; *w3*
266	*bi1*; *ni50*	none	UV of *bi1*
267	*fpB37 an1 y ad20*; *w2*	T?	C of *ribo1 bi1 fpB37* × *an1 y ad20*; *w2*
268	*y*; *w2 thi4 ni3 ad3 bl1*	T?	C of *y*; *w2 bl1*; *s12* × *ribo1 bi1*; *Acr1 thi4 ni3 ab1 ad3*
269	*paba1*; *fw facB101 ribo2 ga17 ts*	T?	C of ?
270	*bi1*; *yg*	none	UV of *bi1*
271	*Sul1*; *ad3*; *di1*	T?	C of *Sul1*; *Acr1 ad3*; *s1* × *y*; *dil*; *pyro4*
272	*y*; *pyro4*; *meth3*	T?	UV of *y*; *pyro4*
273	*ad17 paba1 y*; *FpD11*	T?	C of *ribo1 bi1*; *FpD11* × *ribo1 ad17 paba1 y*
274	*y lu*	T?	C of *pro1 y* × *α gal5 an1 lu bi1*
275	*fpA1 ad14 paba1 y*	T?	C of *fpA1 bi1* × *ribo1 paba1 ad14 y*
276	*y*; *fr1 paba22*; *pyro4*	T?	C of *bi1*; *paba22* × *y*; *fr1 pyro4*
277	*bi1 y*; *Acr1*; *hisA10*; *ribo2*	T?	C of ?
278	*y bi1*; *Acr1*; *ribo2 hisH13*	T?	C of ?
279	*y*; *pyro4*; *aaX1*	T?	C of ?

* This list contains recent additions to the Fungal Genetics Stock Center, Dartmouth College. See BARRATT *et al.* (1965) for the basic list of mutant strains.


I.
su1 ad20 rA adA ga15 Su11 0.2/fpA/0.2 4/c16/4 ribo1 an1
10 19 18 7
18
19
37
ad14 lu pro3 pro1 lys51 ad9 paba1 uvs1 y ad8 bi1
14 20 0.5 6 4.5 0.3 11 4 0.1 6
20
9
35
fpB hisB
suDpalA1
trypB
II.
Iod1 ad23 Acr1 Acr3 w1 palcA tsA an2 ribo6
30 0.3 25 18
35
19
22
18
thi4 pu ab1 ni3 tsC rB 0.1/yg/0.1 ad1 ad3 lac3 acr2
34 6 12 18 0.1 24
25
29
29
b11 ga13 hisG
trypA trypD
III.
ga19 ad50 palcB meth2 arg2 palA ga11 sm Act1
31 20 17 6 23 14 5 7 5
phen2 (s0) s12 s1 Su1pro
3 40
di1 FpD mo96
panto s1
Su4pro te6

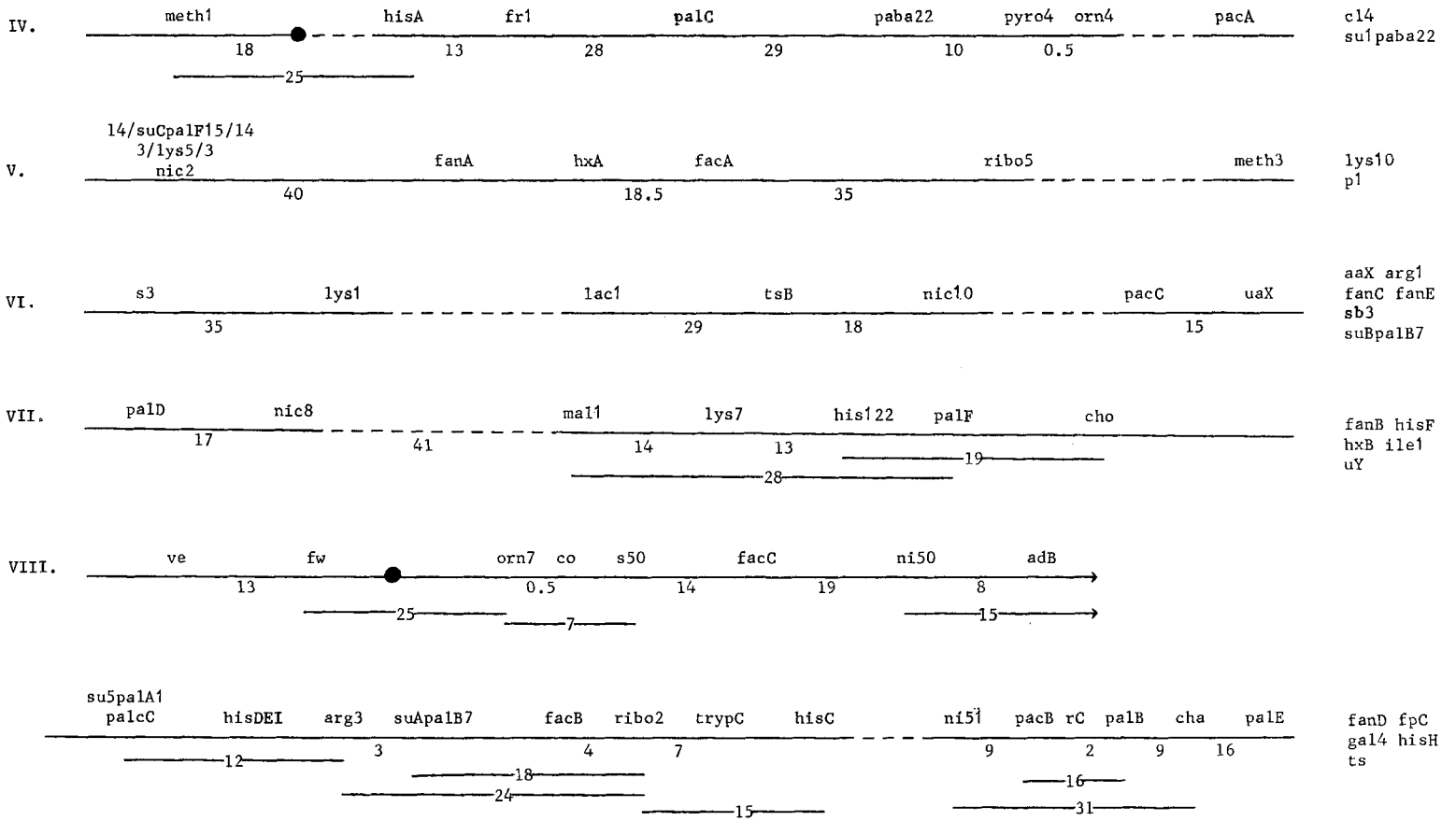


FIGURE 1.—Linkage map of *Aspergillus nidulans*. The linkage distances, given in percent meiotic recombination, are derived from a variety of sources and, hence, should only be considered as approximate values. Mutants placed to the right of a linkage group indicate that they have been assigned to that group by mitotic analysis but have not been further mapped.