

### Advancement

#### BMS 13.0-14.0 Manua

Introduction **Advance** Advance by Plot Within Plot Selections No Plant ID With Plant ID

Related

## Introduction

Advancement and crossing are ways to create new germplasm (GIDs) using the BMS pedigree management (see more Germplasm & Genealogy). Germplasm must reside within a study to be advanced or crossed. Advancement is generally through maintenance or derivative breeding methods, and is expected to result in offspring less than or equal to the parent(s) in terms of genetic diversity. Crossing is generally preformed though generative methods, and the offspring are expected to be more genetically diversity than the individual parent(s).

# Advance

Advances can be made two ways, by plot or within plot selections. A breeder will chose to advance germplasm for a variety of reasons. Examples include:

- Advance F1 generation to create GIDs for F2 offspring
- Advance plants of interest to create GIDs for the offspring or clones
- Advance inbred lines to create GIDs for bulked seeds
- · Advance a bag of seed to create GIDs for individual seeds/seedlings

### Advance by Plot

The following example every plot will be advanced, such as for a seed bulk.

Open a study measurements tab. Select Advance Study from the Actions button dropdown menu.

BREEDING ACTIVITIES	< 🖪 SY_COWPEA				Site Admin My I	Programs ? ᆽ admin
Manage Germplasm Manage Studies Manage Samples	MANAGE STUDIES © Example1 Save ► BASIC DETAILS					Return to Manage Studies
<ul> <li>INFORMATION MANAGEMENT</li> <li>STATISTICAL ANALYSIS</li> <li>PROGRAM ADMINISTRATION</li> </ul>	Settings     Germplasm & Checks     Envi <ul> <li>Define Measurement Details</li> <li></li></ul>	ironments E	xperimental Design	Measurements Add	I	Save Study Design and planning options Crossing options Field map options Data collection options Bits fund options
	Name	Desc	arge 100 * st	Input Variables	Advance study Advance sampled plants	Advance study options Close study Delete study
	ENTRY_TYPE	GID	DESIGNATION	ENTR	Show	PLOT_NO
	Test entry	5017	BMS-1	1		1
	Test entry	5018	BMS-2	2		2
	Test entry	5019	BMS-3	3		3
	Test entry	5020	BMS-4	4		4

Select which of the study instances (locations in this case) to advance. Continue.



• Choose a breeding method and Finish. Derivative and maintenance breeding methods are filtered by default since these are the most common for advancements. All plots are selected by default.

BREEDING ACTIVITIES	< 🔁 SY_COW	PEA		Site Admin	My Programs	? 契 admin 🝷
Manage Germplasm	¥ Example1	Save			Return t	o Manage Studies
Manage Studies	► BASIC DETAILS	Advance study			×	Actions
Manage Samples	Settings Germplasm	* indicates a mandatory field				
► INFORMATION MANAGEMENT	▼ Define Measureme	METHODS				
STATISTICAL ANALYSIS	🖞 TRAITS 🔞	Breeding Method is the same for each advance	Seed increase bulk - NBK	<b>•</b>	0	
PROGRAM ADMINISTRATION	Name		<ul> <li>Derivative and Maintenance</li> <li>All methods</li> <li>Show only favorite methods</li> </ul>	methods Manage Metho	ods	
	Deasurements	BULKS				
	Select Environment: 1	All plots are selected				Description :::
	ENTRY_TYPE	LOCATION DETAILS				
	Test entry	LOCATION_NAME				
	Test entry	Antarctica - (ATA)				
	Test entry	Marshall Islands Territory - (US68)				
	Test entry					
	Test entry	Ba	ck Finish			
	lest entry					

• Review the advanced lines and select Finish.

BREEDING ACTIVITIES	SY_COWPEA						Site Admin	My Programs 💡 ᆽ admin 👻
Manage Germplasm	MANAGE STUDIES 0	_						
Manage Studies	📽 Example1 Save	Advance st	udy			2		Return to Manage Studies
Manage Samples	► BASIC DETAILS	REVIEW AD	VANCED LINE	S				Actions
► INFORMATION MANAGEMENT	Settings Germplasm & Checks Environments Experim	✓ Advance	List Entries			Actions		
<ul> <li>STATISTICAL ANALYSIS</li> </ul>	Define Measurement Details	Total Entries:	50 Selected: 0					
► PROGRAM ADMINISTRATION		ENTRY_NO	DESIGNATION	CROSS GID	SEED_SOURCE	TRIAL_INSTANCE RE		
	TRAITS @	□ 1	BMS-1:201808	Pen	ing Example1:Antarctica:201808:1:	1		
	Name	2	BMS-2:201808	Pen	ing Example1:Antarctica:201808:2:	1		
		3	BMS-3:201808	Pen	ing Example1:Antarctica:201808:3:	1		
		4	BMS-4:201808	Pen	ing Example1:Antarctica:201808:4:	1		
		5	BMS-5:201808	Pen	ing Example1:Antarctica:201808:5:	1		
		6	BMS-6:201808	Pen	ing Example1:Antarctica:201808:6:	1		
	Select Environment: 1 - Antarctica * Records per page:	7	BMS-7:201808	Pen	ing Example1:Antarctica:201808:7:	1		Show Categorical Description
	ENTRY_TYPE GI	8	BMS-8:201808	Pen	ing Example1:Antarctica:201808:8:	1	PLOT_NO	
	Test entry 50	9	BMS-9:201808	Pen	ing Example1:Antarctica:201808:9:	1	1	
	Test entry 50	0 10	BMS-10:201808	Pen	ing Example1:Antarctica:201808:10:	1	2	
	Test entry 50	0 11	BMS-11:201808	Pen	ing Example1:Antarctica:201808:11:	1	3	
	Test entry 50	12	BMS-12:201808	Pen	ing Example1:Antarctica:201808:12:	1	4	
	Test entry 50	0 13	BMS-13:201808	Pen	ing Example1:Antarctica:201808:13:	1	5	
	Test entry 50.	14	BMS-14-201808	Pen	ing Example1:Antarctica:201808:14:	1	6	
	Test entry 50.	0.15	BMS-15-201808	Pero	ing Example1:Antarctica:201808:15:	1	7	
	Test entry 50	0.15	DMC 46-201000	Dee			8	
	Test entry 50.	0 10	DIVIS-10:201808	Pen	ing Example CAntarctica:201808:10:		9	
	Test entry 50.	Sel	ect All				10	
	Test entry 50	2					11	
	Test entry 50	2			Back Finish		12	
	Test entry 50						13	

Notice that the pending lines have been automatically named. For example the designation, BMS-1-201808, is a concatenation of the parent line, BMS-1, and the year and month of creation. This is the default naming convention associated with the breeding method, Seed increase bulk. See your system administrator if you would like to change the default naming conventions.

• Specify the folder where the list will be saved. Name the list and add optional information. Save.



### Within Plot Selections

Within plots selections are made based on phenotypic or genotypic criteria. To make within plot selections, the study needs a <u>Selection Variate</u> with <u>selections recorded</u>.

#### **No Plant ID**

Selection and advance anonymous plants within a plot.

• From the Actions menu choose Advance Study. In this example, number of plants selected (NPSEL) is a selection variate. A single plant from each plot with disease resistance (zero or one scores for mosaic virus severity) have been selected for advancement.

BREEDING ACTIVITIES		EA					Site Admin My Pr	ograms ? ᆽ admin 🗸	
Manage Germplasm	BASIC DETAILS							Actions	
Manage Studies	Settings Germplasm &	Checks Environments	Experimental	Design Measurements				Save Study	
Manage Samples  INFORMATION MANAGEMENT  STATISTICAL ANALYSIS	▼ Define Measuremen		Design and planning options > Crossing options > Field map options > Data collection options > Plant level options >						
PROGRAM ADMINISTRATION	Name	Description	Advance study	Advance study options					
	BECMVSey_Est_0tod Blackeye cowpea mosaic virus severity -BY- Blackeye cowpea mosaic virus - Method -IN- 0-5 visual score							Close study Delete study	
	Select All								
	1 Measurements								
	Records per page: 10	Showing 1 to 50 of	Show C	ategorical Description					
	TRIAL_INSTANCE	ENTRY_TYPE	GID	DESIGNATION	ENTRY_NO	PLOT_NO	BECMVSev_Est_0to4	NPSEL	
	1	т	5042	BMS-1:201808	1	1	1	1	
	1	т	5043	BMS-2:201808	2	2	2		
	1	т	5044	BMS-3:201808	3	3	2		
	1	т	5045	BMS-4:201808	4	4	1	1	
	1	т	5046	BMS-5:201808	5	5	2		
	1	т	5047	BMS-6:201808	6	6	2		
	1	т	5048	BMS-7:201808	7	7	1	1	
	1	т	5049	BMS-8:201808	8	8	3		
	1	т	5050	BMS-9:201808	9	9	4		
	1	т	5051	BMS-10:201808	10	10	4		
	1	т	5052	BMS-11:201808	11	11	0	1	
					10	10			

• Select which of the study instances (location in this case) to advance. Continue.

BREEDING ACTIVITIES	< 🖪 SY_COWPE	A		Site Admin	My Programs	? 喿 admin 🝷
Manage Germplasm	► BASIC DETAILS					Actions
Manage Studies	Settings Germplasm &	Checks	Advance study	×		
Manage Samples	Define Measurement	: Details	* indicates a mandatory field			
INFORMATION MANAGEMENT	TRAITS O					
STATISTICAL ANALYSIS			10 •			
PROGRAM ADMINISTRATION	Name	Descri	Search:			
	BECMVSev_Est_0to4	Blacke	LOCATION_NAME			
	Select All Remove	mosar	Shetland Islands - (UKW3)			
			Showing 1 to 1 of 1 entries			
	Measurements		< 1 >			
	Select Environment: 1 - S	hetland I	☑ Select All		ow Categorical I	Description
	ENTRY_TYPE	GID	Cancel Continue		04 NPSE	L
	Test entry	5042	DIVIS-1.201606 1		1	
				0		

• Choose a breeding method. Derivative and maintenance breeding methods are filtered by default since these are the

most common for advancements. Deselect 'All plots are selected'. Choose the selection variate that defines the number of lines advanced from eah plot. Finish.

BREEDING ACTIVITIES	< 🔁 SY_COW	PEA	Site Ad	Imin My Prop	grams 😯 契 a	idmin 👻
Manage Germplasm	► BASIC DETAILS				Action	IS
Manage Studies	Settings Germplasm	Advance study		1	×	
Manage Samples		* indicates a mandatory field				
► INFORMATION MANAGEMENT	Denne Measurenne					
STATISTICAL ANALYSIS	TRAITS 🕜	METHODS				
► PROGRAM ADMINISTRATION	Name	Breeding Method is the same for each advance	Single plant selection - DSP	· 0		
	BECMVSev_Est_0to		<ul> <li>Derivative and Maintenance methods</li> <li>All methods</li> </ul>	s		
	Select All Remov		Show only favorite methods Manag	e Methods		
		LINES				
	E Measurements	Same number of lines is selected for each plot				
	Select Environment: 1	Choose a variate that defines the number of lines selected from each plot	NPSEL	,	• I Description	
	ENTRY_TYPE				EL	
	Test entry	LOCATION DETAILS				
	Test entry	LOCATION_NAME				
	Test entry	Shetland Islands - (UKW3)				
	Test entry					
	Test entry	Back	Finish			
	Test entry	5048 BMS-7:201808 7	7 1		1	

• Review the advanced lines and select Finish.

▼ BREEDING ACTIVITIES	< 🖪 SY_COWPEA										Site Admin	My Programs 💡 喿 admin 👻
Manage Germplasm	BASIC DETAILS											Actions
Manage Studies Manage Samples	Settings Germplasm & Che	ecks Environments	Experime	Advance stu REVIEW ADV	idy ANCED LINES					×		_
INFORMATION MANAGEMENT	TRAITS @			<ul> <li>Advance L</li> <li>Total Entries: 1</li> </ul>	IST ENTRIES					Actions		
<ul> <li>STATISTICAL ANALYSIS</li> </ul>	e nouis e			rotal entries. I	io Selected. o	_				_		
► PROGRAM ADMINISTRATION	Name	Description		ENTRY_NO	DESIGNATION	CROSS	GID	SEED_SOURCE	TRIAL_INSTANCE	REP_NO		
	BECMVSev_Est_0to4	Blackeye cowpea mos	aic virus se	1	BMS-1:201808-1		Pending	Example 2:Shetland Islands:201808:1:	1			
	Select All Remove			2	BMS-4:201808-1		Pending	Example 2:Shetland Islands:201808:4:	1			
				3	BMS-7:201808-1		Pending	Example 2:Shetland Islands:201808:7:	1			
	1 Measurements			4	BMS-11:201808-1		Pending	Example 2:Shetland Islands:201808:11:	1			
	Select Environment: 1 - Shet	land Islands * Rocco	de por pa	5	BMS-12:201808-1		Pending	Example 2:Shetland Islands:201808:12:	1			
		CID NECO	os per paj	6	BMS-13:201808-1		Pending	Example 2:Shetland Islands:201808:13:	1			Show Categorical Description
	ENTRY_TYPE	GID	DESIGN	7	BMS-15:201808-1		Pending	Example 2:Shetland Islands:201808:15:	1	co-	4	NPSEL
	Test entry		BMS-112	8	BMS-16:201808-1		Pending	Example 2:Shetland Islands:201808:16:	1			
	Test entry	5043	BMS-22	9	BMS-19:201808-1		Pending	Example 2:Shetland Islands:201808:19:	1			
	Test entry	5044	DMS-3-2	10	BMS-24:201808-1		Pending	Example 2:Shetland Islands:201808:24:	1			1
	Test entry		DMC 5-2	11	BMS-6:201808-1		Pending	Example 2:Shetland Islands:201808:31:	1			
	Test entry		DMS-6-2	12	BMS-11:201808-1		Pending	Example 2:Shetland Islands:201808:36:	1			
	Test entry	5048	RMS.7-2	13	BMS-12:201808-1		Pending	Example 2:Shetland Islands:201808:37:	1			1
	Test entry		BMS-8:2	14	BMS-16:201808-1		Pending	Example 2:Shetland Islands:201808:41:	1			
	Test entry		BMS-9-2	15	BMS-17:201808-1		Pending	Example 2:Shetland Islands:201808:42:	1			
	Test entry		BMS-10:	16	BMS-19:201808-1		Pending	Example 2:Shetland Islands:201808:44:	1			
	Test entry		BMS-11:	Sele	et All							1
	Test entry	5053	BMS-12:							- 1		1
	Test entry	5054	BMS-13:					Back Sigirb				1
	Test entry	5055	BMS-14:			_	_			_		

Notice that the pending lines have been automatically named. For example the designation, BMS-1-201808-1, is a concatenation of the parent line, BMS-1-201808, and the plant sequence number, 1). This is the default naming convention associated with the breeding method, single plant selection. See your system administrator if you would like to change the default naming conventions.

• Specify the folder where the list will be saved. Name the list and add optional information. Save.

BREEDING ACTIVITIES	< 🔁 SY_COWF	PEA			Site Admin	My Programs	? 契 admin 👻
Manage Germplasm	► BASIC DETAILS						Actions
Manage Studies Manage Samples • INFORMATION MANAGEMENT • STATISTICAL ANALYSIS • PROGRAM ADMINISTRATION	Settings Germplasm  Define Measurem  TRAITS @ Name  Define Set op op	Save List As List Location Crop lists Crop mists New Folder VID Manual Source Samplasem	<del>6</del> 6 6	List Details * indicates a mandatory fie List Name:* List Owner: List Description:	ld Single Plant Selection Admin Admin	¥	Actions
	Select All Removements Select Environment:  ENTRY_TYPE Test entry	<ul> <li>Cample Compleant</li> <li>Seed Bulk 201808</li> </ul>	Cance	List Type:* List Date:* Notes:	HARVEST LIST 2018-08-17	<b>v</b>	Description ##

The advance list can now be viewed in the associated nursery. The stock list can now be generated to record the harvest. (See <u>Add Inventory After Crossing & Advancement</u>).

BREEDING ACTIVITIES     Manage Germplasm		SY_COWPEA	ES 0						Site Admin My F	Programs	<b>? 🎗 a</b> c	lmin 👻
Manage Studies Manage Samples	Exam BASIC	I <b>ple 2</b> DETAILS	Save							Return to M	anage Studie	25
INFORMATION MANAGEMENT	Settings	Germplasm & Che	cks Environments	Experimental D	esign	Measurement	s Im	ported	l Crosses: [2018 F1s] 🛛 🗶			_
<ul> <li>STATISTICAL ANALYSIS</li> <li>PROGRAM ADMINISTRATION</li> </ul>	Cross Li	st: 2018 F1s ries: 6 Selected: 0	Notes:							Vie	w List Details	5
	ENTRY	NO DESIGNATION	CROSS	FEMALE PARENT	FGID	MALE PARENT	MGID	GID	SEED_SOURCE	Generate S Save Parer	itock List It List	DUPLIC
	1	IB1	BMS-1:201808/BMS-9	BMS-1:201808	5042	BMS-9	5025	5092	Example 2:Shetland Islands:201808:1:/Example1:Antar	ctica:201808:9	-	
	2	IB2	BMS-1:201808/BMS- 11:201808	BMS-1:201808	5042	BMS-11:201808	5052	5093	Example 2:Shetland Islands:20180 2:Shetland Islands:201808:11:	8:1:/Example	-	
	3	IB3	BMS-2:201808/BMS- 12:201808	BMS-2:201808	5043	BMS-12:201808	5053	5094	Example 2:Shetland Islands:20180 2:Shetland Islands:201808:12:	8:2:/Example	-	
	4	IB4	BMS-3:201808/BMS- 12:201808	BMS-3:201808	5044	BMS-12:201808	5053	5095	Example 2:Shetland Islands:20180 2:Shetland Islands:201808:12:	8:3:/Example		
	5	IB5	BMS-4:201808/BMS- 14:201808	BMS-4:201808	5045	BMS-14:201808	5055	5096	Example 2:Shetland Islands:20180 2:Shetland Islands:201808:14:	8:4:/Example	-	
	6	IB6	BMS-5:201808/BMS- 15:201808	BMS-5:201808	5046	BMS-15:201808	5056	5097	Example 2:Shetland Islands:20180 2:Shetland Islands:201808:15:	8:5:/Example	-	

#### With Plant ID

Select and advance plants with their own observation number from a plot.

• After creating a plant sub-observation dataset,

# **Related**

- <u>Germplasm & Geneaology</u>
   <u>Manage Inventory</u>
- <u>Crossing</u>