

# CLC Genomics Workbench Premiumを利用した ASV解析とPERMANOVA解析

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## 次世代シーケンス解析用ソフトウェア

### ◆ リシーケンシング解析

- ・ リファレンスゲノムへのマッピング
- ・ 変異検出

### ◆ トランスクリプトミクス解析

- ・ RNA-seq解析
- ・ small RNA解析

### ◆ エピゲノミクス解析

- ・ ChIP-seq解析
- ・ バイサルファイトシーケンス解析

### ◆ De Novo シーケンス解析

- ・ De Novo Assembly
- ・ BLAST解析

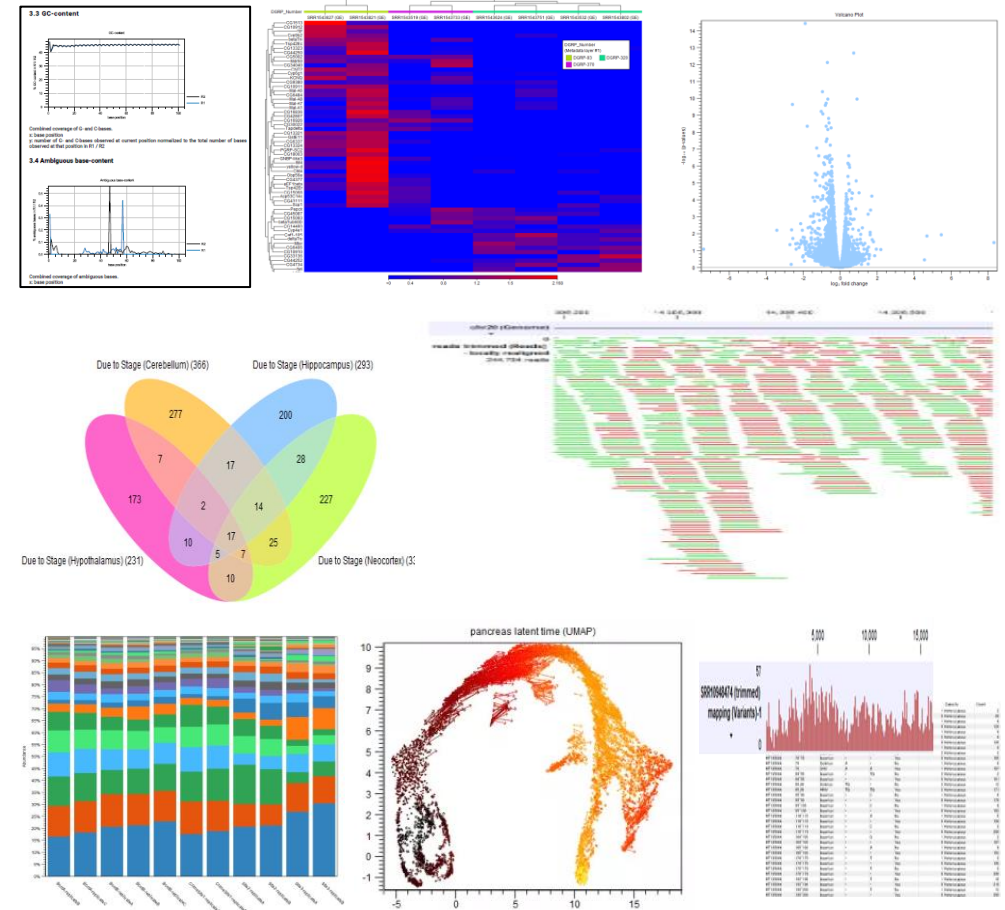
### ◆ 菌叢解析

### ◆ ゲノムフィニッシング解析

### ◆ シングルセル解析

### ◆ 超高速変異解析

} Premium版 限定機能



# データのダウンロード

The screenshot displays the CLC Genomics Workbench 23.0.5 interface. The main window shows a table of SRA data for study SRP431526. The table includes columns for Run accession, Study accession, Scientific name, Download size (MB), Paired status, Read orientation, Average length, Spots, and PubMed. A right-hand sidebar is open to the 'Search for Sequences in SRA...' dialog, where various search criteria are checked, including Run accession, Experiment accession, Study accession, Sample accession, Scientific name, Download size (MB), Paired, Read orientation, Average length, Spots, and PubMed. Below the search criteria, the 'SRA Preview' section shows the title '16s rRNA of soil microcosm' and an abstract: 'This work tests the effects of PFAS and various substrate provision treatments on soil microbiology of four diverse soil types.'

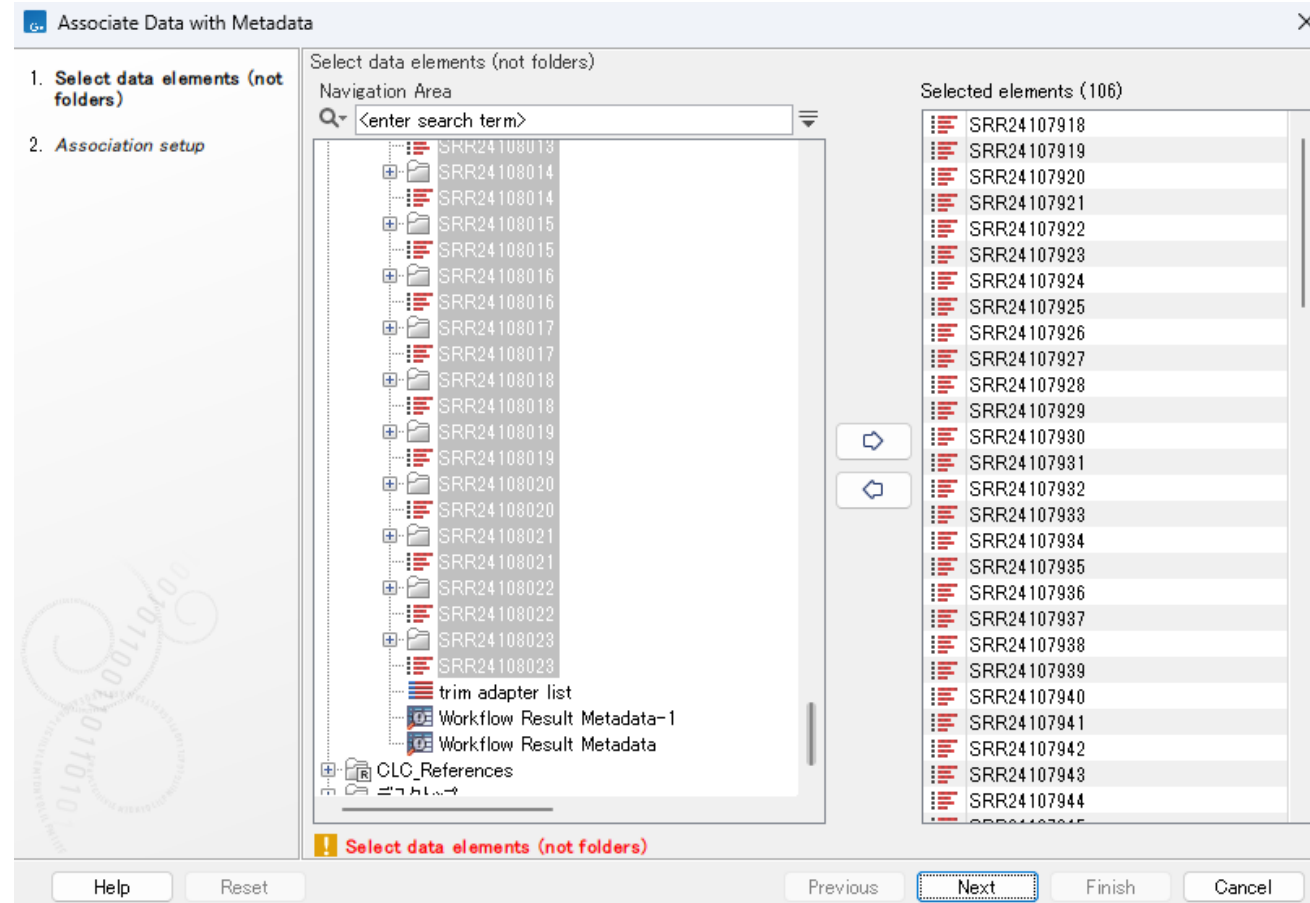
#	Run accession	Study accession	Scientific name	Download size (MB)	Paired	Read orientation	Average length	Spots	PubMed
1	SRR24107957	SRP431526	soil metagenome	25	Yes	Unknown	501	83,284	
2	SRR24107956	SRP431526	soil metagenome	30	Yes	Unknown	501	121,705	
3	SRR24107955	SRP431526	soil metagenome	31	Yes	Unknown	501	103,719	
4	SRR24107954	SRP431526	soil metagenome	25	Yes	Unknown	501	88,741	
5	SRR24107953	SRP431526	soil metagenome	36	Yes	Unknown	501	125,053	
6	SRR24107952	SRP431526	soil metagenome	29	Yes	Unknown	501	100,492	
7	SRR24107951	SRP431526	soil metagenome	36	Yes	Unknown	501	123,179	
8	SRR24107950	SRP431526	soil metagenome	26	Yes	Unknown	501	93,691	
9	SRR24107949	SRP431526	soil metagenome	49	Yes	Unknown	501	164,280	
10	SRR24107948	SRP431526	soil metagenome	32	Yes	Unknown	501	109,212	
11	SRR24107957	SRP431526	soil metagenome	30	Yes	Unknown	501	101,582	
12	SRR24107956	SRP431526	soil metagenome	29	Yes	Unknown	501	97,627	
13	SRR24107955	SRP431526	soil metagenome	26	Yes	Unknown	501	80,775	
14	SRR24107954	SRP431526	soil metagenome	20	Yes	Unknown	501	59,691	
15	SRR24107953	SRP431526	soil metagenome	22	Yes	Unknown	501	74,967	
16	SRR24107952	SRP431526	soil metagenome	19	Yes	Unknown	501	66,747	
17	SRR24107951	SRP431526	soil metagenome	20	Yes	Unknown	501	66,670	
18	SRR24107950	SRP431526	soil metagenome	22	Yes	Unknown	501	76,602	
19	SRR24107949	SRP431526	soil metagenome	19	Yes	Unknown	501	54,519	
20	SRR24107948	SRP431526	soil metagenome	31	Yes	Unknown	501	107,277	
21	SRR24107947	SRP431526	soil metagenome	27	Yes	Unknown	501	92,744	
22	SRR24107946	SRP431526	soil metagenome	23	Yes	Unknown	501	77,484	
23	SRR24107945	SRP431526	soil metagenome	29	Yes	Unknown	501	99,065	
24	SRR24107944	SRP431526	soil metagenome	30	Yes	Unknown	501	105,199	
25	SRR24107943	SRP431526	soil metagenome	20	Yes	Unknown	501	71,088	
26	SRR24107942	SRP431526	soil metagenome	26	Yes	Unknown	501	86,591	
27	SRR24107940	SRP431526	soil metagenome	25	Yes	Unknown	501	81,187	
28	SRR24107941	SRP431526	soil metagenome	21	Yes	Unknown	501	73,919	
29	SRR24107939	SRP431526	soil metagenome	27	Yes	Unknown	501	94,781	
30	SRR24107938	SRP431526	soil metagenome	31	Yes	Unknown	501	106,126	
31	SRR24107937	SRP431526	soil metagenome	24	Yes	Unknown	501	83,706	
32	SRR24107936	SRP431526	soil metagenome	29	Yes	Unknown	501	99,066	
33	SRR24107935	SRP431526	soil metagenome	26	Yes	Unknown	501	89,892	
34	SRR24107933	SRP431526	soil metagenome	26	Yes	Unknown	501	96,219	
35	SRR24107934	SRP431526	soil metagenome	38	Yes	Unknown	501	129,045	
36	SRR24107932	SRP431526	soil metagenome	36	Yes	Unknown	501	121,925	
37	SRR24107931	SRP431526	soil metagenome	24	Yes	Unknown	501	85,605	
38	SRR24107930	SRP431526	soil metagenome	30	Yes	Unknown	501	101,079	
39	SRR24107929	SRP431526	soil metagenome	29	Yes	Unknown	501	99,762	
40	SRR24107928	SRP431526	soil metagenome	30	Yes	Unknown	501	104,160	
41	SRR24107927	SRP431526	soil metagenome	27	Yes	Unknown	501	94,382	
42	SRR24107926	SRP431526	soil metagenome	30	Yes	Unknown	501	103,341	
43	SRR24107925	SRP431526	soil metagenome	34	Yes	Unknown	501	111,886	
44	SRR24107922	SRP431526	soil metagenome	19	Yes	Unknown	501	62,936	
45	SRR24107924	SRP431526	soil metagenome	24	Yes	Unknown	501	81,467	
46	SRR24107923	SRP431526	soil metagenome	1	Yes	Unknown	500	3,897	
47	SRR24107921	SRP431526	soil metagenome	37	Yes	Unknown	501	127,661	
48	SRR24107920	SRP431526	soil metagenome	31	Yes	Unknown	501	108,483	
49	SRR24107919	SRP431526	soil metagenome	29	Yes	Unknown	501	80,652	

SRAダウンロード機能を使用し、配列データとメタデータをダウンロードします。  
今回は異なる環境中の土壌に由来するメタゲノムデータを利用し、解析を行います。

# 配列とメタデータの紐づけ

The screenshot displays the CLC Genomics Workbench 23.0.5 interface. The main window shows a metadata table with 106 rows and 10 columns. The columns are: Run Accession, Experiment Accession, Project Accession, Sample Accession, Submission Acc., BioProject, BioSample, Center, and Center Proj... Design. The table contains data for various samples, including accession numbers and associated identifiers. On the left, there is a navigation area with a search bar and a tree view of project files. On the right, there is a 'Metadata Table Settings' panel with options to show or hide columns. The bottom of the interface features a toolbar with buttons for 'Edit Table...', 'Find Associated Data', 'Associate Data...', 'Additional Filtering...', and 'Create New Metadata Table...'. The 'Associate Data...' button is highlighted, indicating the next step in the process.

ダウンロードしたメタデータを開き、“Associate Data”をクリックします。



配列データを指定します。

Associate Data with Metadata

1. Select data elements (not folders)

2. **Association setup**

Association setup

Matching scheme

Exact - data element names must match a key exactly to be associated

Prefix - data elements with names starting with a matching key will be associated

Suffix - data elements with names ending with a matching key will be associated

Role assignment

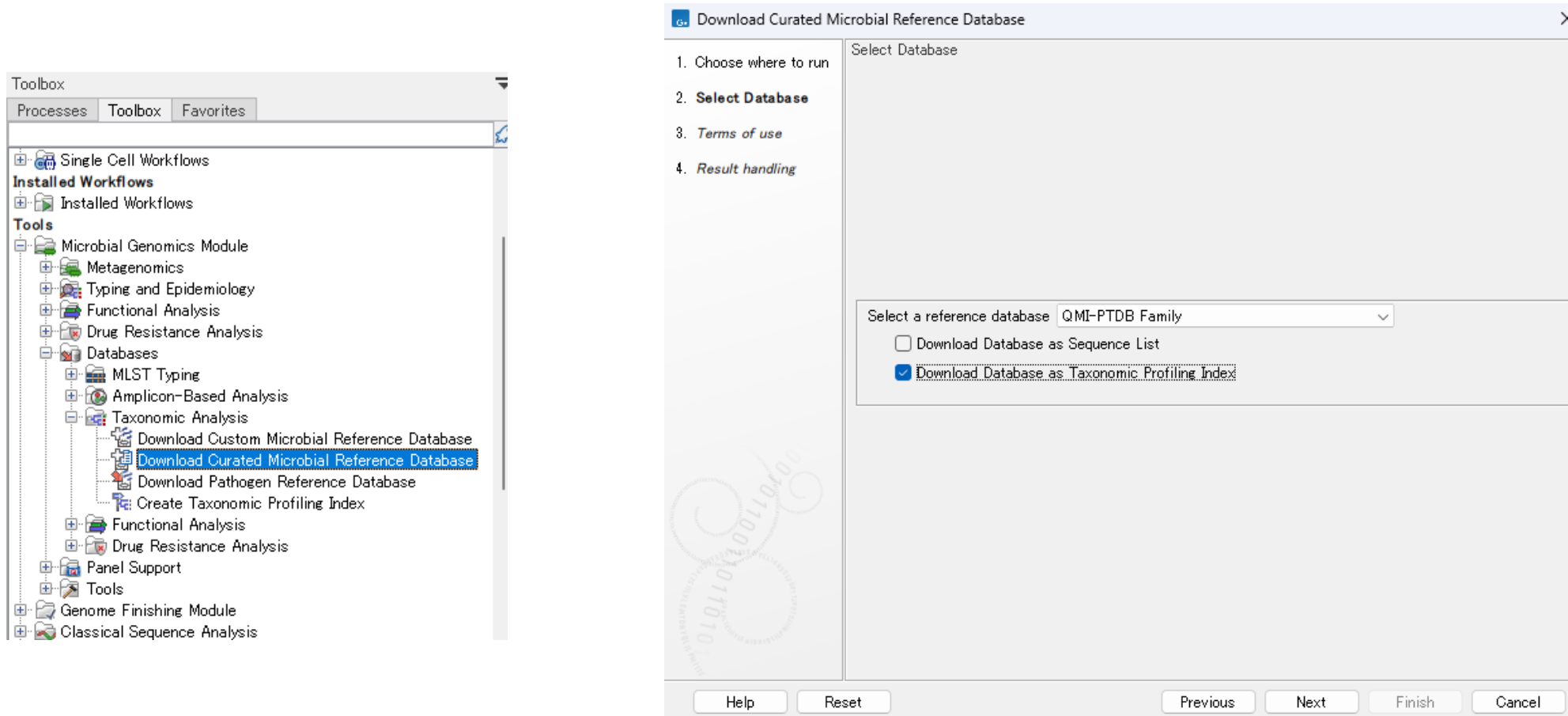
Role to assign: Sample data

Data association preview

Key	Element
SRR24107918	SRR24107918
SRR24107919	SRR24107919
SRR24107920	SRR24107920
SRR24107921	SRR24107921
SRR24107922	SRR24107922
SRR24107923	SRR24107923
SRR24107924	SRR24107924
SRR24107925	SRR24107925
SRR24107926	SRR24107926
SRR24107927	SRR24107927
SRR24107928	SRR24107928
SRR24107929	SRR24107929
SRR24107930	SRR24107930
SRR24107931	SRR24107931
SRR24107932	SRR24107932
SRR24107933	SRR24107933
SRR24107934	SRR24107934

Help Reset Previous Next Finish Cancel

メタデータ中のキーカラムと配列データ名を、  
完全一致、前方一致、後方一致のいずれかで紐づけます。



分類に使用するデータベースをダウンロードします。  
“Download Database as Taxonomic Profiling Index”にチェックを入れます。

# アダプター（プライマー）リストの作成

CLC Genomics Workbench 23.0.5 - <New Workspace> - Evaluation 72 days remaining

File Edit View Connections Utilities Download Toolbox Help

Rows: 106 Metadata

Run Accession	Experiment Accession	Project Accession	Sample Accession	Submission Accession	BioProject	BioSample	Center	Center Proj...	Design
SRR24107941	SRX19907706	SRP431526	SRS17261418	SRA1617461	PRJNA953437	SAMN24116310	Arizona State University		DNA was extracted from 250
SRR24107969	SRX19907684	SRP431526	SRS17261397	SRA1617461	PRJNA953437	SAMN24116307	Arizona State University		DNA was extracted from 250
SRR24107960	SRX19907693	SRP431526	SRS17261406	SRA1617461	PRJNA953437	SAMN24116315	Arizona State University		DNA was extracted from 250
SRR24107973	SRX19907680	SRP431526	SRS17261393	SRA1617461	PRJNA953437	SAMN24116303	Arizona State University		DNA was extracted from 250
SRR24107948	SRX19907705	SRP431526	SRS17261419	SRA1617461	PRJNA953437	SAMN24116317	Arizona State University		DNA was extracted from 250
SRR24107970	SRX19907683	SRP431526	SRS17261395	SRA1617461	PRJNA953437	SAMN24116306	Arizona State University		DNA was extracted from 250
SRR24107949	SRX19907704	SRP431526	SRS17261417	SRA1617461	PRJNA953437	SAMN24116316	Arizona State University		DNA was extracted from 250
SRR24107972	SRX19907681	SRP431526	SRS17261394	SRA1617461	PRJNA953437	SAMN24116304	Arizona State University		DNA was extracted from 250
SRR24107961	SRX19907692	SRP431526	SRS17261405	SRA1617461	PRJNA953437	SAMN24116314	Arizona State University		DNA was extracted from 250
SRR24107971	SRX19907682	SRP431526	SRS17261395	SRA1617461	PRJNA953437	SAMN24116305	Arizona State University		DNA was extracted from 250
SRR24107945	SRX19907708	SRP431526	SRS17261421	SRA1617461	PRJNA953437	SAMN24116319	Arizona State University		DNA was extracted from 250
SRR24107946	SRX19907707	SRP431526	SRS17261420	SRA1617461	PRJNA953437	SAMN24116324	Arizona State University		DNA was extracted from 250
SRR24107967	SRX19907686	SRP431526	SRS17261399	SRA1617461	PRJNA953437	SAMN24116323	Arizona State University		DNA was extracted from 250
SRR24107943	SRX19907710	SRP431526	SRS17261423	SRA1617461	PRJNA953437	SAMN24116321	Arizona State University		DNA was extracted from 250
SRR24107955	SRX19907698	SRP431526	SRS17261411	SRA1617461	PRJNA953437	SAMN24116333	Arizona State University		DNA was extracted from 250
SRR24107954	SRX19907699	SRP431526	SRS17261412	SRA1617461	PRJNA953437	SAMN24116334	Arizona State University		DNA was extracted from 250
SRR24107977	SRX19907676	SRP431526	SRS17261399	SRA1617461	PRJNA953437	SAMN24116358	Arizona State University		DNA was extracted from 250
SRR24107953	SRX19907700	SRP431526	SRS17261413	SRA1617461	PRJNA953437	SAMN24116365	Arizona State University		DNA was extracted from 250
SRR24107959	SRX19907684	SRP431526	SRS17261407	SRA1617461	PRJNA953437	SAMN24116359	Arizona State University		DNA was extracted from 250
SRR24107952	SRX19907701	SRP431526	SRS17261414	SRA1617461	PRJNA953437	SAMN24116366	Arizona State University		DNA was extracted from 250
SRR24107950	SRX19907695	SRP431526	SRS17261408	SRA1617461	PRJNA953437	SAMN24116360	Arizona State University		DNA was extracted from 250
SRR24107951	SRX19907702	SRP431526	SRS17261415	SRA1617461	PRJNA953437	SAMN24116367	Arizona State University		DNA was extracted from 250
SRR24107957	SRX19907696	SRP431526	SRS17261409	SRA1617461	PRJNA953437	SAMN24116361	Arizona State University		DNA was extracted from 250
SRR24107950	SRX19907703	SRP431526	SRS17261416	SRA1617461	PRJNA953437	SAMN24116368	Arizona State University		DNA was extracted from 250
SRR24107956	SRX19907697	SRP431526	SRS17261419	SRA1617461	PRJNA953437	SAMN24116362	Arizona State University		DNA was extracted from 250
SRR24107942	SRX19907711	SRP431526	SRS17261424	SRA1617461	PRJNA953437	SAMN24116322	Arizona State University		DNA was extracted from 250
SRR24107944	SRX19907709	SRP431526	SRS17261422	SRA1617461	PRJNA953437	SAMN24116320	Arizona State University		DNA was extracted from 250
SRR24107941	SRX19907712	SRP431526	SRS17261426	SRA1617461	PRJNA953437	SAMN24116323	Arizona State University		DNA was extracted from 250
SRR24107940	SRX19907713	SRP431526	SRS17261425	SRA1617461	PRJNA953437	SAMN24116324	Arizona State University		DNA was extracted from 250
SRR24107921	SRX19907732	SRP431526	SRS17261445	SRA1617461	PRJNA953437	SAMN24116344	Arizona State University		DNA was extracted from 250
SRR24107933	SRX19907720	SRP431526	SRS17261432	SRA1617461	PRJNA953437	SAMN24116330	Arizona State University		DNA was extracted from 250
SRR24107939	SRX19907714	SRP431526	SRS17261427	SRA1617461	PRJNA953437	SAMN24116325	Arizona State University		DNA was extracted from 250
SRR24107922	SRX19907731	SRP431526	SRS17261442	SRA1617461	PRJNA953437	SAMN24116340	Arizona State University		DNA was extracted from 250
SRR24107932	SRX19907721	SRP431526	SRS17261434	SRA1617461	PRJNA953437	SAMN24116331	Arizona State University		DNA was extracted from 250
SRR24107938	SRX19907715	SRP431526	SRS17261428	SRA1617461	PRJNA953437	SAMN24116326	Arizona State University		DNA was extracted from 250
SRR24107923	SRX19907730	SRP431526	SRS17261444	SRA1617461	PRJNA953437	SAMN24116339	Arizona State University		DNA was extracted from 250
SRR24107931	SRX19907722	SRP431526	SRS17261435	SRA1617461	PRJNA953437	SAMN24116332	Arizona State University		DNA was extracted from 250
SRR24107937	SRX19907716	SRP431526	SRS17261429	SRA1617461	PRJNA953437	SAMN24116327	Arizona State University		DNA was extracted from 250
SRR24107925	SRX19907728	SRP431526	SRS17261441	SRA1617461	PRJNA953437	SAMN24116341	Arizona State University		DNA was extracted from 250
SRR24107918	SRX19907735	SRP431526	SRS17261448	SRA1617461	PRJNA953437	SAMN24116344	Arizona State University		DNA was extracted from 250
SRR24107930	SRX19907723	SRP431526	SRS17261436	SRA1617461	PRJNA953437	SAMN24116333	Arizona State University		DNA was extracted from 250
SRR24107936	SRX19907717	SRP431526	SRS17261430	SRA1617461	PRJNA953437	SAMN24116328	Arizona State University		DNA was extracted from 250
SRR24107926	SRX19907727	SRP431526	SRS17261440	SRA1617461	PRJNA953437	SAMN24116327	Arizona State University		DNA was extracted from 250
SRR24107919	SRX19907734	SRP431526	SRS17261447	SRA1617461	PRJNA953437	SAMN24116343	Arizona State University		DNA was extracted from 250
SRR24107929	SRX19907724	SRP431526	SRS17261437	SRA1617461	PRJNA953437	SAMN24116334	Arizona State University		DNA was extracted from 250
SRR24107934	SRX19907719	SRP431526	SRS17261433	SRA1617461	PRJNA953437	SAMN24116329	Arizona State University		DNA was extracted from 250
SRR24107927	SRX19907726	SRP431526	SRS17261439	SRA1617461	PRJNA953437	SAMN24116336	Arizona State University		DNA was extracted from 250
SRR24107920	SRX19907733	SRP431526	SRS17261446	SRA1617461	PRJNA953437	SAMN24116342	Arizona State University		DNA was extracted from 250
SRR24107928	SRX19907725	SRP431526	SRS17261438	SRA1617461	PRJNA953437	SAMN24116335	Arizona State University		DNA was extracted from 250
SRR24107962	SRX19907691	SRP431526	SRS17261404	SRA1617461	PRJNA953437	SAMN24116313	Arizona State University		DNA was extracted from 250

212 element(s) are selected

つぎに、配列から除去するアダプター（プライマー）のリストを作成します。

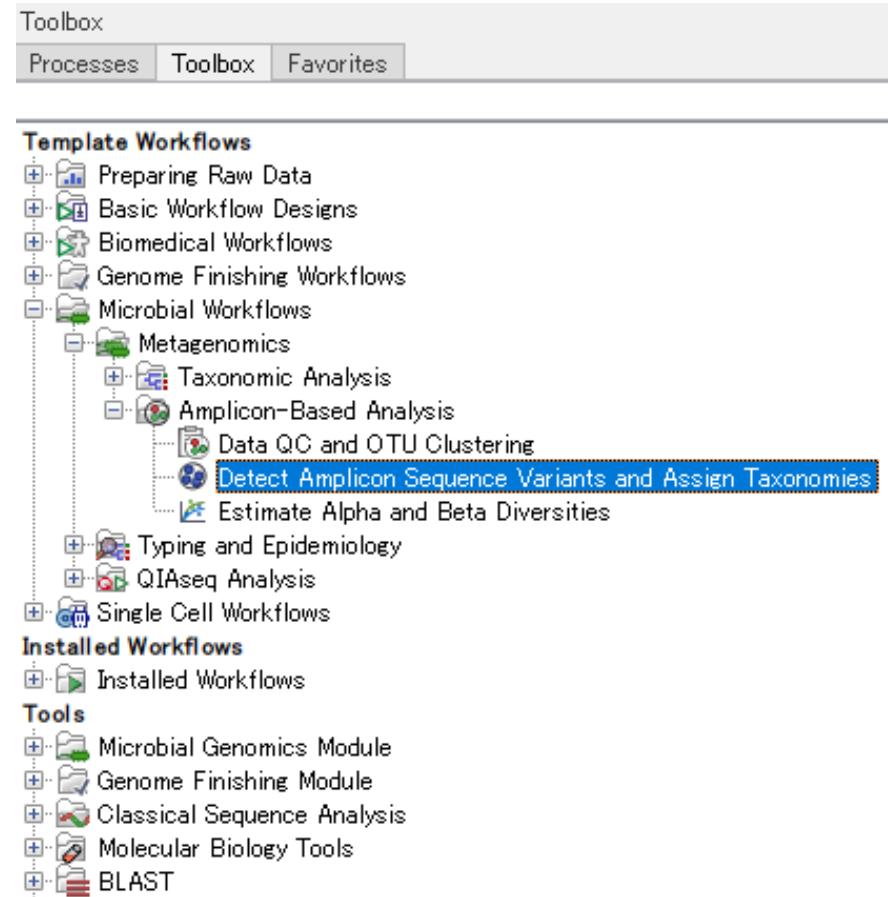


# アダプター（プライマー）リストの作成

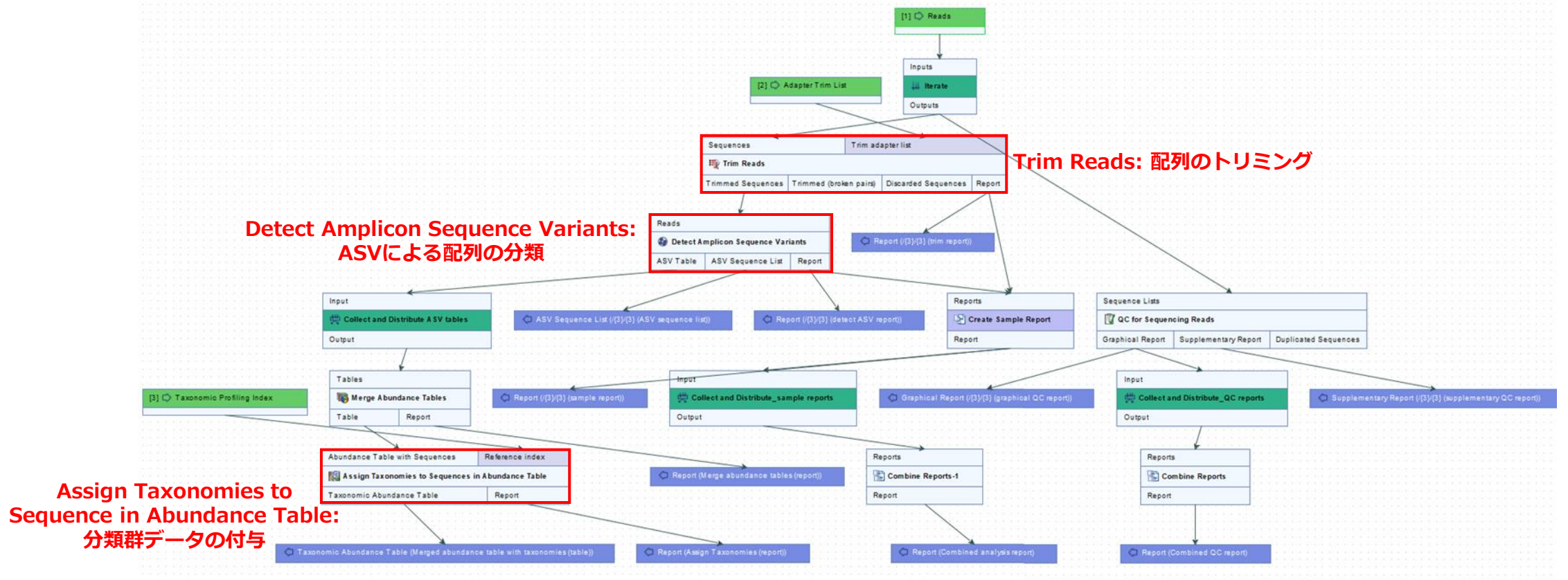
Name	Sequence	Reads	When an adapter is found	For reads without adapters
66f	AATGATACGGCGACACCGAGATCTACACTCTTTCCCTACACGAGGCTCTCCOGATCT	All	Trim 5' end	Keep the read
86f	GATCGGAAGAGCACACGTCTGAACTCCAGTCAC	All	Trim 3' end	Keep the read

“Add Row”をクリックし、プライマーの配列および  
プライマーの位置（5'側、3'側）を一つずつ登録します。

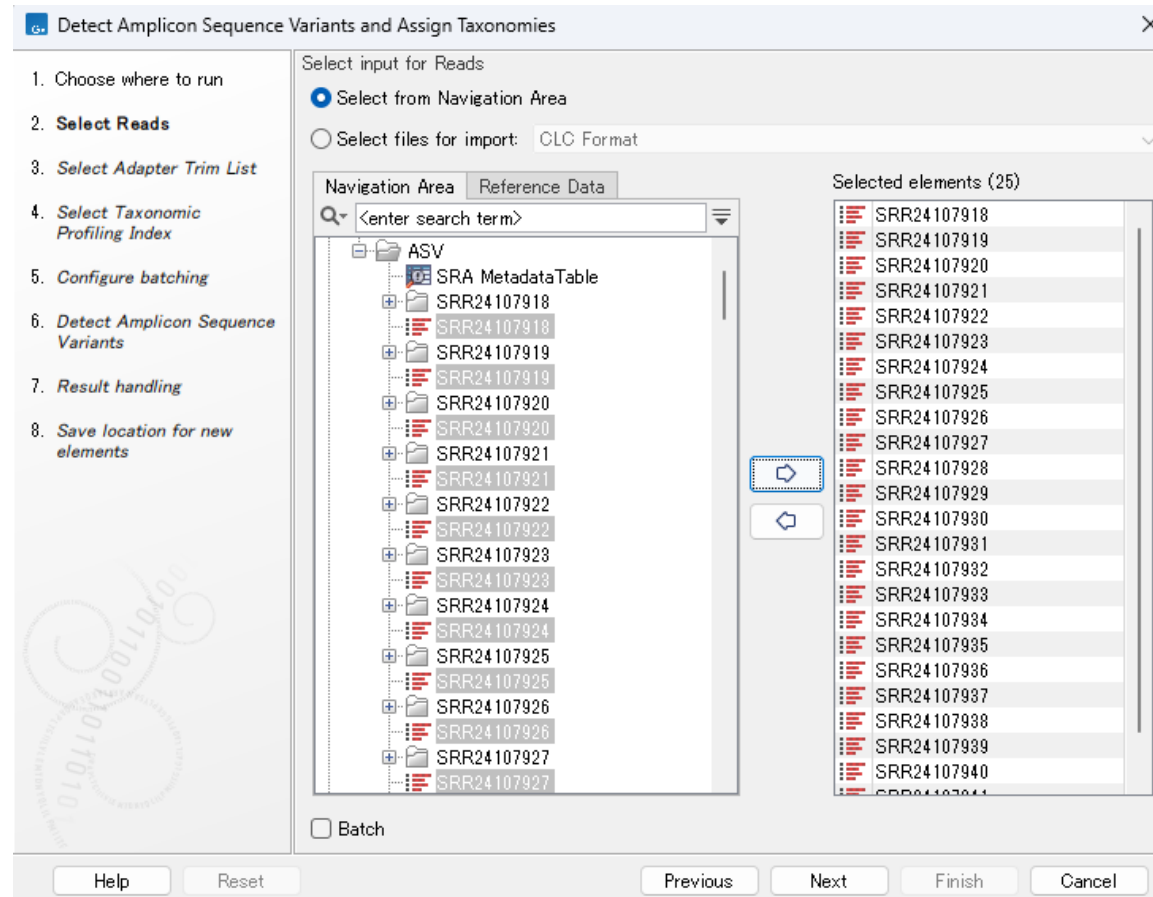
これで準備は終了です。



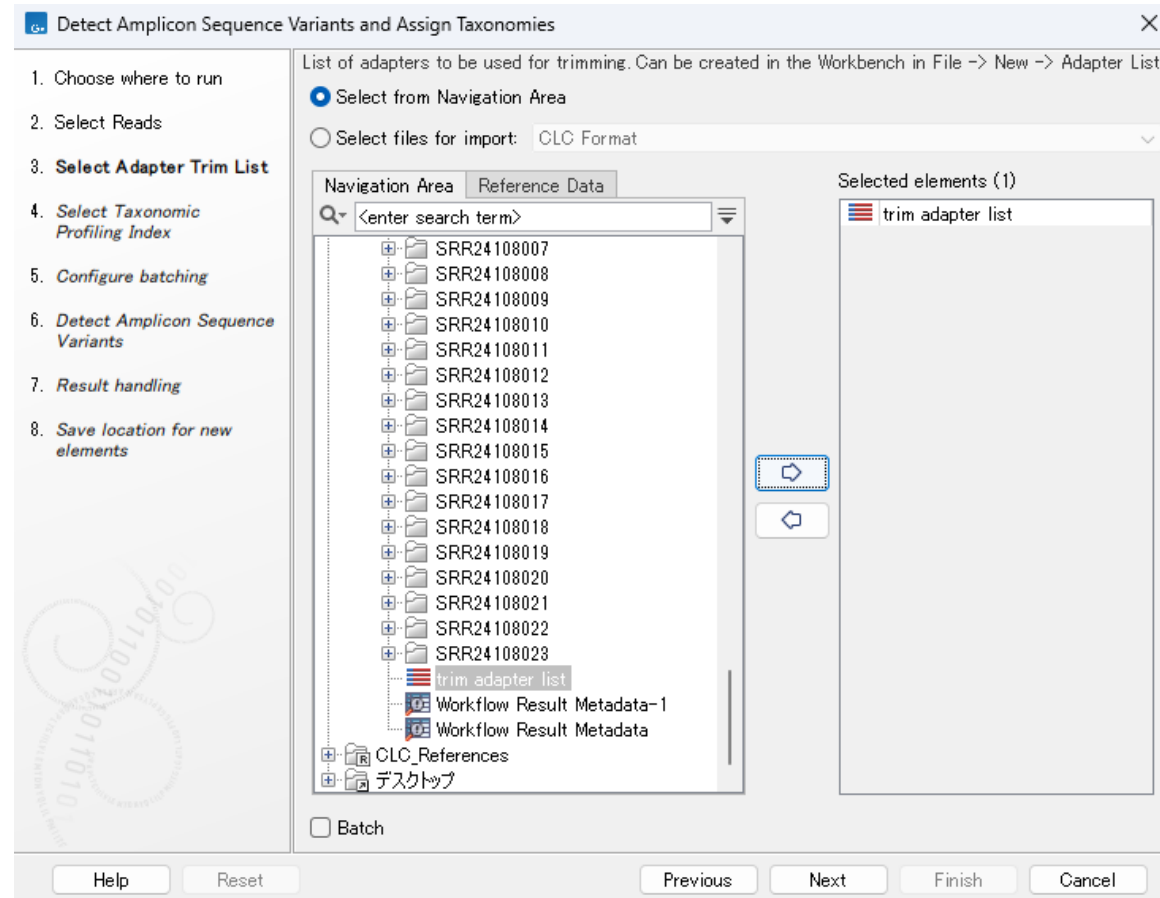
今回は、上記ワークフローを利用し、解析を行います。



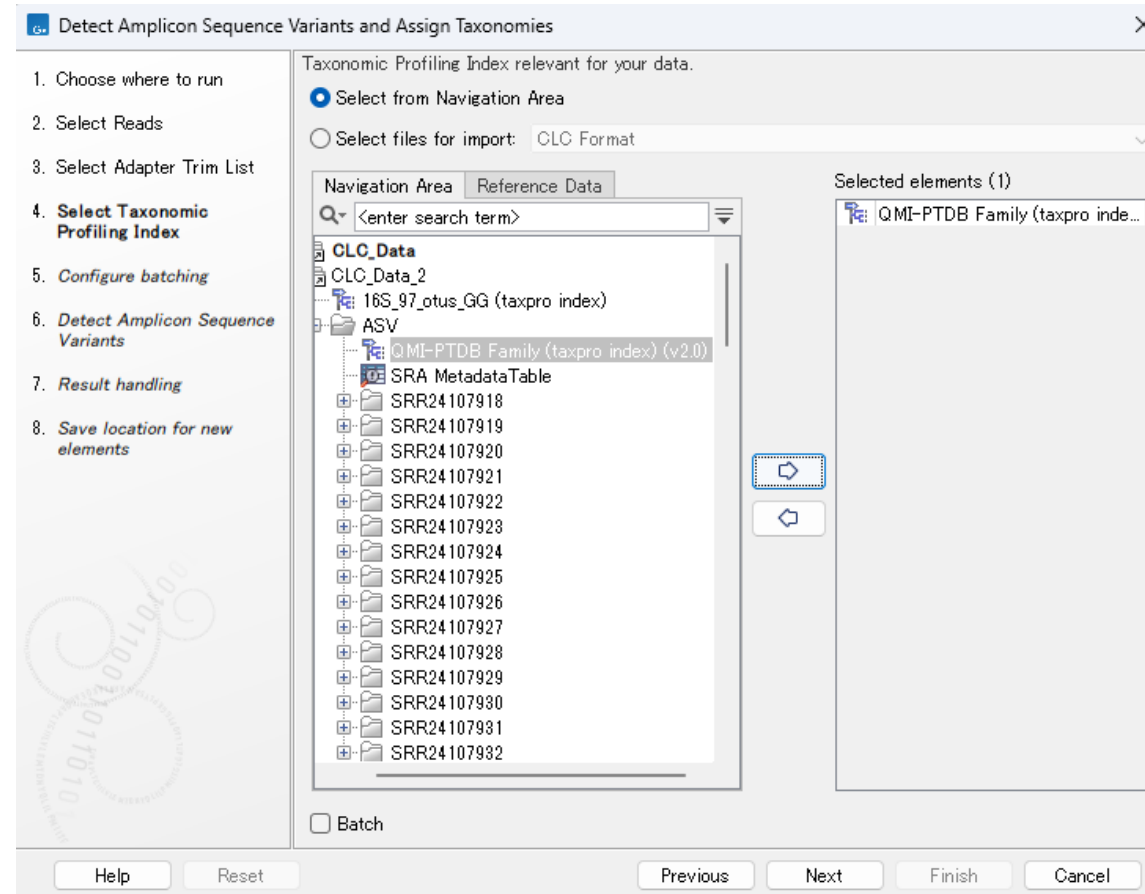
配列のトリミング、QC、ASV解析、分類群データの付与などをまとめて実行できます。



ワークフローを起動し、配列データをすべて指定します。



先ほど用意したアダプターリストを指定します。



ダウンロードしたデータベース（インデックス形式）を指定します。

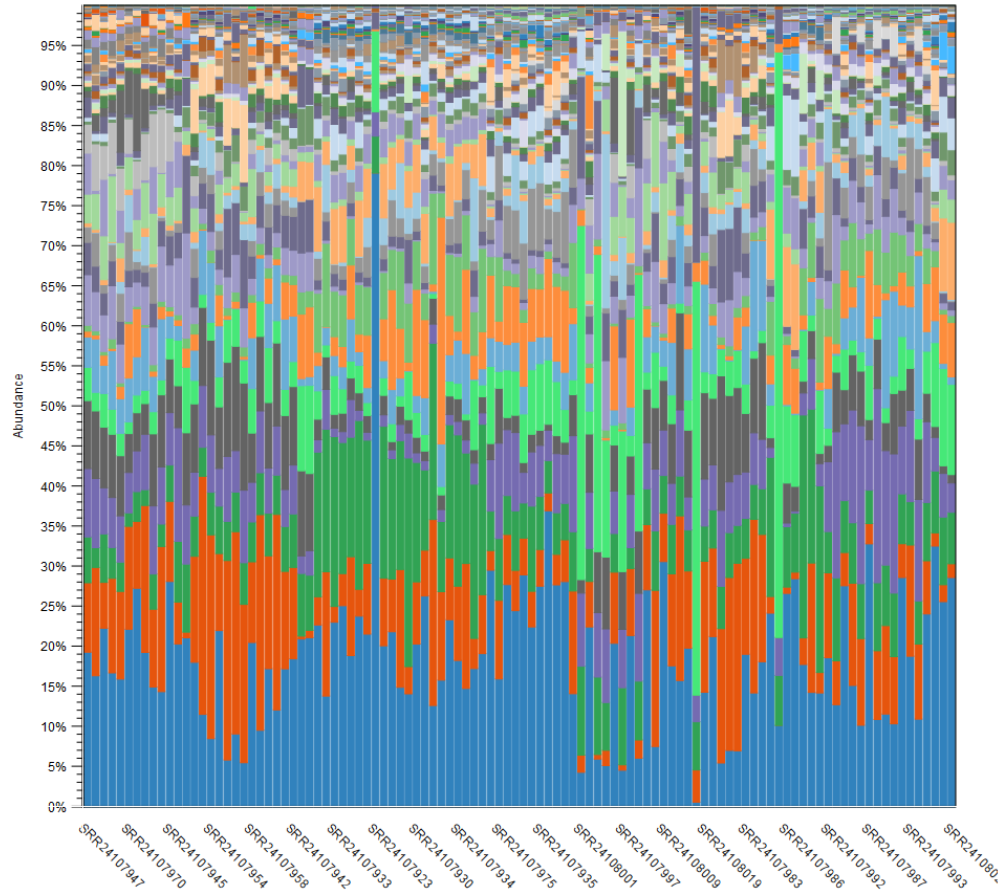
# ワークフローの出力

Merged abundance table with taxonomies (table)

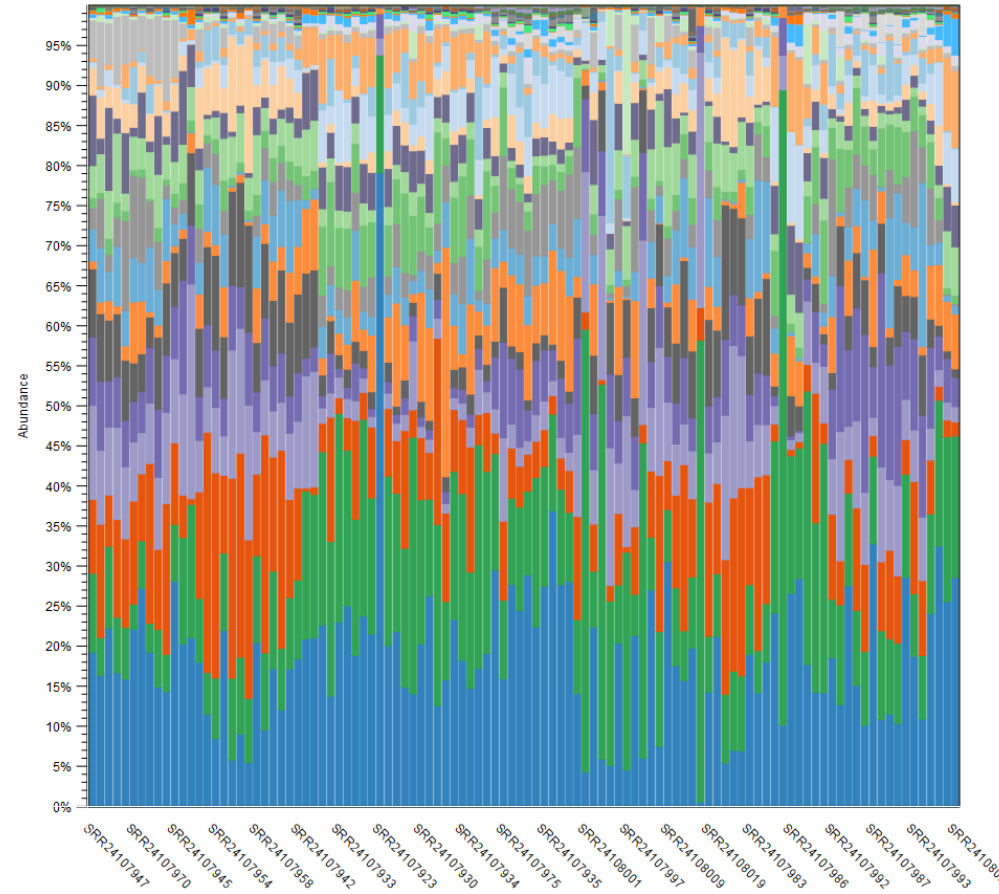
Name	Taxonomy
bfb801a3b7abe4c5a1b5dc7ee6b7c74e	Bacteria; Acidobacteriota; Acidobacteriae; Bryobacteriales; Bryobacteraceae; Bryobacter; Bryobacter aggregatus
ed3d7020f31a64a765244b28d6ca4be7	Archaea; Thermoprotozoa; Nitrososphaeria; Nitrososphaerales; Nitrososphaeraceae; Nitrososphaera; Nitrososphaera evergladensis
6762dc8a8c3b6cc1b714efc86a2c4726	Archaea; Thermoprotozoa; Nitrososphaeria; Nitrososphaerales; Nitrososphaeraceae; Nitrososcosmicus; Nitrososcosmicus oleophilus
ac9290b34cdffdd242c154d85b6c29322	Archaea; Halobacteriota; Methanosarcinia; Methanosarcinales; Methanosarcinaceae; Methanosarcinia; Methanosarcinia acetivorans
fa3c9103d421b38d189870854d8d660f	Bacteria; Chloroflexota; Anaerolineae; Anaerolineales; Anaerolineaceae; Bellilinea; Bellilinea caldifistulae
cd8b569c8bed892dbf68cc91d72cebff	
d309b118f5207fec51df6ff3d44018bf5	Bacteria; Firmicutes; Bacilli; Caldalkalibacillales; Caldalkalibacillaceae; Caldalkalibacillus; Caldalkalibacillus thermarum
fd36a197efabc730ae280e1d1190083a	Bacteria; Firmicutes; Bacilli; Caldalkalibacillales; Caldalkalibacillaceae; Caldalkalibacillus; Caldalkalibacillus thermarum
682ce6d84508229f76d72c1657ab4f46	Bacteria; Firmicutes; A; Clostridia; Acetivibrionales; DSM-27016; Ruminiclostridium; Ruminiclostridium herbifermentans
e718406e51eabbf00d59e521ad4e2d8a	Bacteria; Firmicutes; B; Z-2901; Carboxydotherrmales; Carboxydotherrmaceae; Carboxydotherrma; Carboxydotherrma hydrogenoformans
bc9eca038247c772b0d4746defd7f91	Bacteria; Chloroflexota; Anaerolineae; Anaerolineales; Anaerolineaceae; Bellilinea; Bellilinea caldifistulae
95f9ec1f9902075a44eb77ded5bc0739	
d0cab129762000bfb37a901dfd906afe	Bacteria; Acidobacteriota; Acidobacteriae; Acidobacteriales; Koribacteraceae; Koribacter; Koribacter versatilis_A
8694483ab8ff1a3346a19a7b434830868	Bacteria; Myxococcota; Myxococcia; Myxococcales; Anaeromyxobacteraceae; Anaeromyxobacter; Anaeromyxobacter dehalogenans
521cb25f13a40fbfad2d49d4ff89f082	Bacteria; Acidobacteriota; Acidobacteriae; Bryobacteriales; Paludibaculum; Paludibaculum fermentans
f9ec0eabd565e070aa0ba0a4ae7140b	
52bbd2e5da6a5fd4cb3a1bbdd08d08a	
fd1098cd571337c869bc804919b0f630e	Bacteria; Firmicutes; Bacilli
e195204fdb63f05ad40aad809585e37	Bacteria; Proteobacteria; Alphaproteobacteria; Rhizobiales
4b6e02f85e19ef6cea95094a691abb94	Bacteria; Myxococcota; Myxococcia; Myxococcales; Anaeromyxobacteraceae; Anaeromyxobacter; Anaeromyxobacter dehalogenans
543591fd3ee291ce2d13e552a89f118a	Bacteria; Actinobacteriota; Actinomycetia; Streptomycetales; Streptomycetaceae; Streptacidiphilus; Streptacidiphilus fuscans
326498f238f7e8c2bbb9f7f08c3b325b	Bacteria; Firmicutes; G; UBA4882; UBA10575; UBA10575; Capillibacterium; Capillibacterium thermochitinicola
e007cfa6ea49f0a7a5009b5deff01214b	Bacteria; Firmicutes; Bacilli; Bacillales; Bacillaceae; H; Bacillus; BA; Bacillus; BA abyssalis
a2fd9fd4e43a924f363afd1a928f291e	Bacteria; Proteobacteria; Alphaproteobacteria; Rhizobiales; Rhizobiaceae; Mycoplana; Mycoplana dimorpha
e168d87e770de88e7e8fd0fb6c8b5a	Bacteria; Proteobacteria; Gammaproteobacteria; Steroidobacteriales; Steroidobacteraceae; Povalibacter; Povalibacter uvarum
85fca7d0ba5e9b3a3198961bd9557f18	Archaea; Thermoprotozoa; Nitrososphaeria; Nitrososphaerales; Nitrososphaeraceae; Nitrososphaera; Nitrososphaera evergladensis
e42d6fd4bcbff0c1730d82c4b0b63803	Archaea; Thermoprotozoa; Nitrososphaeria; Nitrososphaerales; Nitrososphaeraceae; Nitrososphaera; Nitrososphaera evergladensis
4cc12bfff898c2d178796b8c50fead9d9	Bacteria; Firmicutes; A; Clostridia; Lachnospirales; Defluviitaleaceae; Defluviitalea; Defluviitalea phaphyphila
abff45ea9ed8095bc9e70ca10c361fca	Archaea; Thermoprotozoa; Nitrososphaeria; Nitrososphaerales; Nitrososphaeraceae; Nitrososphaera; Nitrososphaera evergladensis
4d722f04005c87b3ca428345c3449eea	Bacteria; Myxococcota; Myxococcia; Myxococcales; Anaeromyxobacteraceae; Anaeromyxobacter; Anaeromyxobacter dehalogenans
50db8db7e45c190ca7be6129b4036	Bacteria; Proteobacteria; Gammaproteobacteria; Thiohalobacteriales; Thiohalobacteraceae; Thiohalobacter; Thiohalobacter thiocyanaticus
6aad5db693e011babe87fb94219ab5c	Bacteria; Firmicutes; G; Limnochordia; Limnochordales; Limnochordaceae; Limnochorda; Limnochorda pilosa
e0be3a3f34fbc1fa5c3b2bec3638a95d	Bacteria; Firmicutes; G; UBA4882; UBA10575; UBA10575; Capillibacterium; Capillibacterium thermochitinicola
00725d1b3e46191306e99dac52a6dc7a	
1a11aa6519dff18868eba6d69ba38168	Archaea; Thermoprotozoa; Nitrososphaeria; Nitrososphaerales; Nitrososphaeraceae; Nitrososcosmicus; Nitrososcosmicus oleophilus
e9557744150b615ab44724de3af47d57	Archaea; Thermoprotozoa; Nitrososphaeria; Nitrososphaerales; Nitrososphaeraceae; Nitrososphaera; Nitrososphaera evergladensis
8623a061ae0d69fdbfd03ecb53387739	Bacteria; Proteobacteria; Gammaproteobacteria; Burkholderiales; Rhodocyclaceae; Aromatoleum; Aromatoleum petrolei
2c4b9e439bc339d80716d61bb350470f	Bacteria; Firmicutes; G; UBA4882; UBA8346; UBA8346; Hydrogenispora; Hydrogenispora ethanolica
6f3f86e5c8e2a11b388dbb5ea9fa182d	Bacteria; Proteobacteria; Gammaproteobacteria; Pseudomonadales; Pseudomonadaceae; Pseudomonas; Pseudomonas_A; Pseudomonas_A sp003205815
52e886c187ea363d0fda554350a959d	Bacteria; Actinobacteriota; Thermoleophila; Gaiellales; Gaiellaceae; Gaiella; Gaiella occulta
85c6dec340715039567dd3a94cc0c9dc	Bacteria; Firmicutes; B; Desulfotomaculia; Desulfotomaculales; Desulfotomaculaceae; Desulfotomaculus; Desulfotomaculus palustris
a50ce491061f354b49c3de973d2cb0e7	Bacteria; Firmicutes; G; UBA4882; UBA8346; UBA8346; Hydrogenispora; Hydrogenispora ethanolica
c3a110e485a559d723adccdd2cc7558	Bacteria; Actinobacteriota; Actinomycetia; Streptomycetales; Streptomycetaceae; Streptacidiphilus; Streptacidiphilus fuscans
8562afaf3956423d4eda6d71b8b277d8	Bacteria; Acidobacteriota; Blastocatellia; Pyrimonadales; Pyrimonadaceae; Pyrimononas; Pyrimononas methylaliphatoenes
3ab9af9e9d29ebb1b244558ddab132ed	Archaea; Thermoprotozoa; Nitrososphaeria; Nitrososphaerales; Nitrososphaeraceae; Nitrososcosmicus; Nitrososcosmicus oleophilus
beee0fe3f5e9b24ce49882a5170b326b	Bacteria; Firmicutes; A; Clostridia; Acetivibrionales; DSM-27016; Ruminiclostridium; Ruminiclostridium herbifermentans
5782c18a13e19846c019527c24d6f9e0	Bacteria; Firmicutes; A; Clostridia; Peptostreptococcales; Thermotaleaceae; Geosporobacter; Geosporobacter ferrireducens
25f7edd4f0e476f79b198392956e0734	

データに含まれる分類群に関するリストが作成されます。

## 網レベルのAbundance

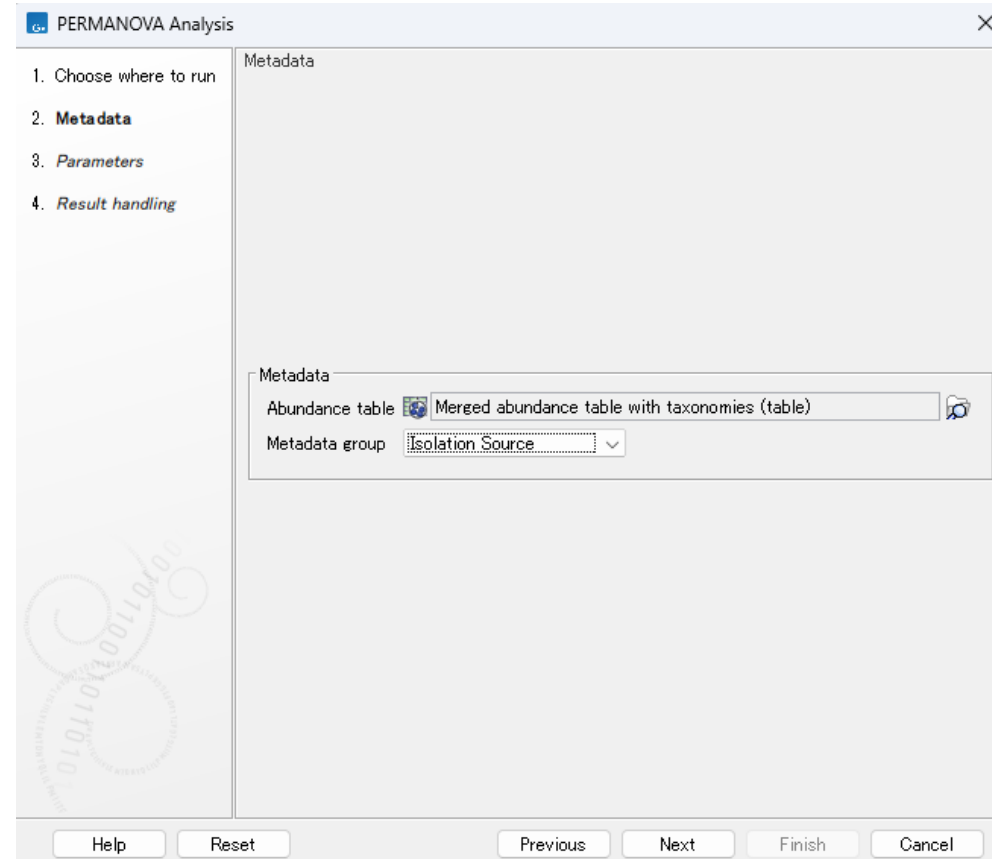
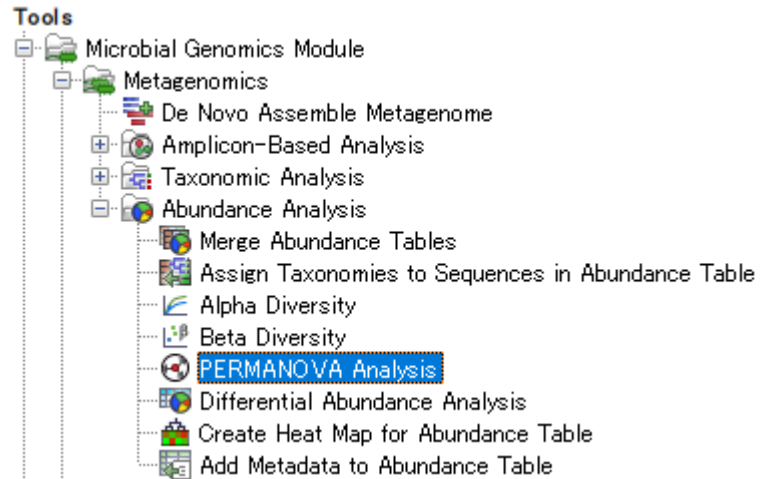


## 門レベルのAbundance



このデータから、バーチャートやサンバースト図の表示も可能です。  
バーチャートでは、分類群のレベルによって表示を切り替えることも可能です。





PERMANOVA Analysisツールで先ほどのデータを選択し、比較を行う基準を指定します。  
今回はサンプルが由来する環境（Isolation Source）間での比較を行います。

PERMANOVA Analysis

1. Choose where to run  
2. Metadata  
3. **Parameters**  
4. Result handling

Parameters

Beta diversity measures

- Bray-Curtis
- Jaccard
- Euclidean

Phylogenetic diversity

Phylogenetic tree: Merged abundance table with taxonomies (table) (Filtered) alignment\_tree

- Unweighted UniFrac
- Weighted UniFrac
- Weighted UniFrac not normalized
- D\_0 UniFrac
- D\_0.5 UniFrac

PERMANOVA parameters

Number of permutations: 99,999

Help Reset Previous Next Finish Cancel

計算方法および系統樹データを指定します。  
系統樹データは、先のワークフローで出力されるデータに含まれています。

## 1 PERMANOVA analysis (Bray-Curtis)

Variable	Groups	Pseudo-f statistic	p-value
Isolation Source	Desert Soil, forest soil, swamp soil, Riparian soil	24.96215	0.00001

Group 1	Group 2	Pseudo-f statistic	p-value	p-value (Bonferroni)
Desert Soil	forest soil	21.62626	0.00001	0.00006
Desert Soil	swamp soil	24.95269	0.00001	0.00006
forest soil	swamp soil	26.27344	0.00001	0.00006
Desert Soil	Riparian soil	24.33763	0.00001	0.00006
forest soil	Riparian soil	25.90952	0.00001	0.00006
swamp soil	Riparian soil	26.31809	0.00001	0.00006

## 2 PERMANOVA analysis (Jaccard)

Variable	Groups	Pseudo-f statistic	p-value
Isolation Source	Desert Soil, forest soil, swamp soil, Riparian soil	13.74230	0.00001

Group 1	Group 2	Pseudo-f statistic	p-value	p-value (Bonferroni)
Desert Soil	forest soil	12.14557	0.00001	0.00006
Desert Soil	swamp soil	13.31787	0.00001	0.00006
forest soil	swamp soil	14.44737	0.00001	0.00006
Desert Soil	Riparian soil	13.32328	0.00001	0.00006
forest soil	Riparian soil	14.55890	0.00001	0.00006
swamp soil	Riparian soil	14.51638	0.00001	0.00006

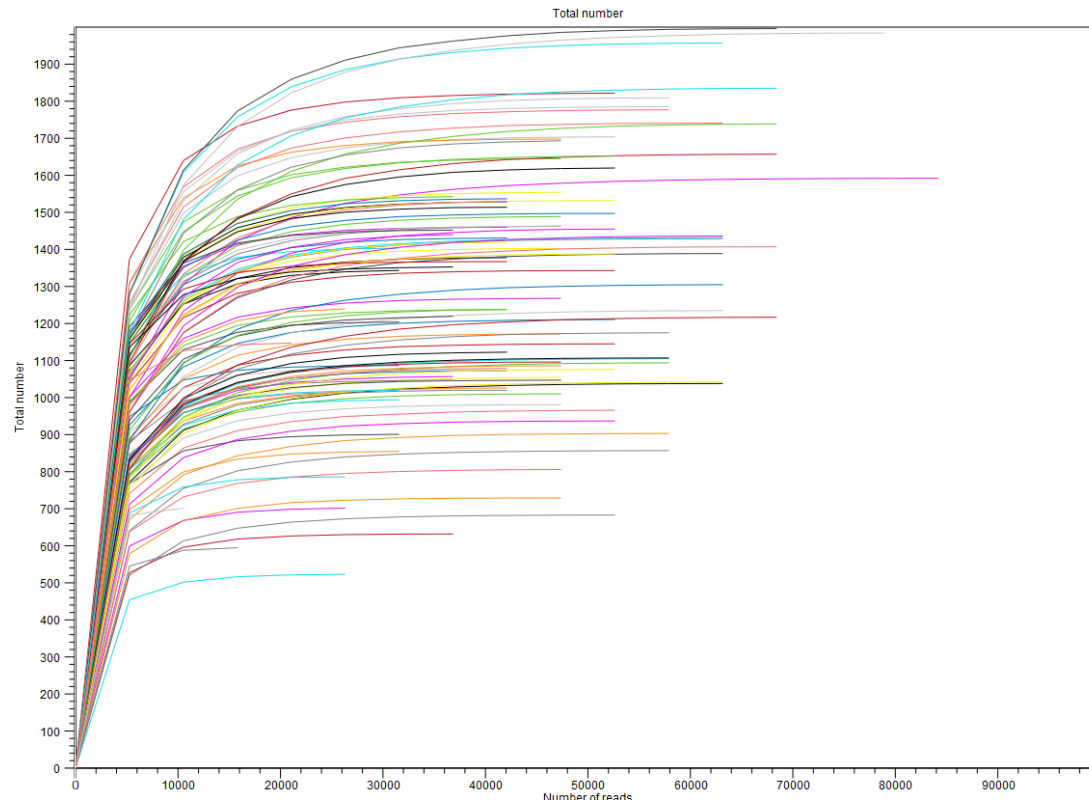
## 3 PERMANOVA analysis (Unweighted UniFrac)

Variable	Groups	Pseudo-f statistic	p-value
Isolation Source	Desert Soil, forest soil, swamp soil, Riparian soil	74.60272	0.00001

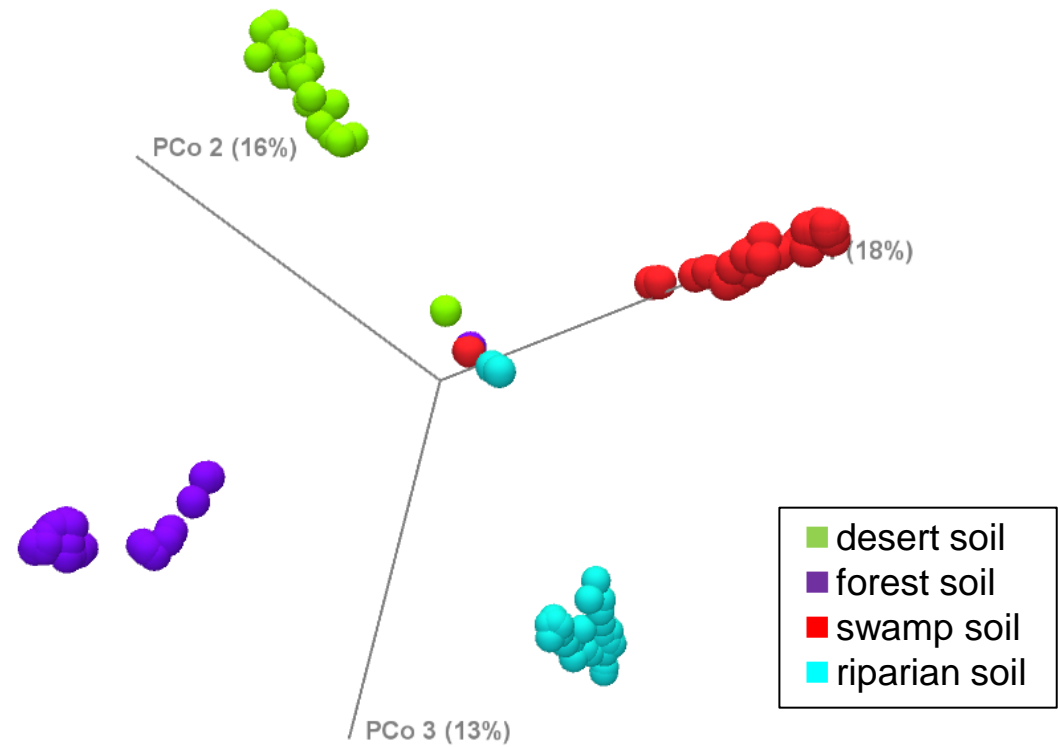
Group 1	Group 2	Pseudo-f statistic	p-value	p-value (Bonferroni)
Desert Soil	forest soil	22.44454	0.00001	0.00006
Desert Soil	swamp soil	63.63533	0.00001	0.00006
forest soil	swamp soil	60.87901	0.00001	0.00006
Desert Soil	Riparian soil	88.31102	0.00001	0.00006
forest soil	Riparian soil	110.04247	0.00001	0.00006
swamp soil	Riparian soil	101.71093	0.00001	0.00006

統計検定の結果が、レポート形式で出力されます。

## アルファ多様性



## ベータ多様性



また、ワークフローで出力されたデータを使用し、アルファ多様性、ベータ多様性に関するプロットもすぐに作成可能です。

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