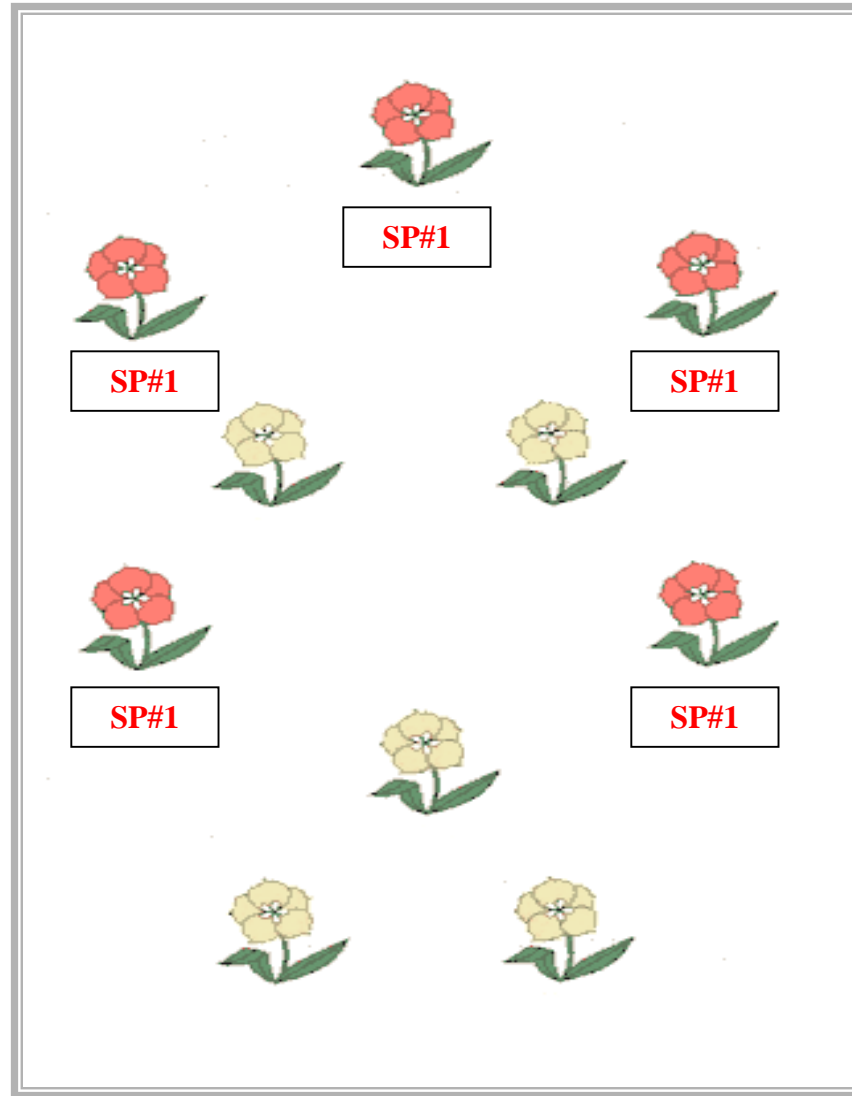


IDEAL SPECIES

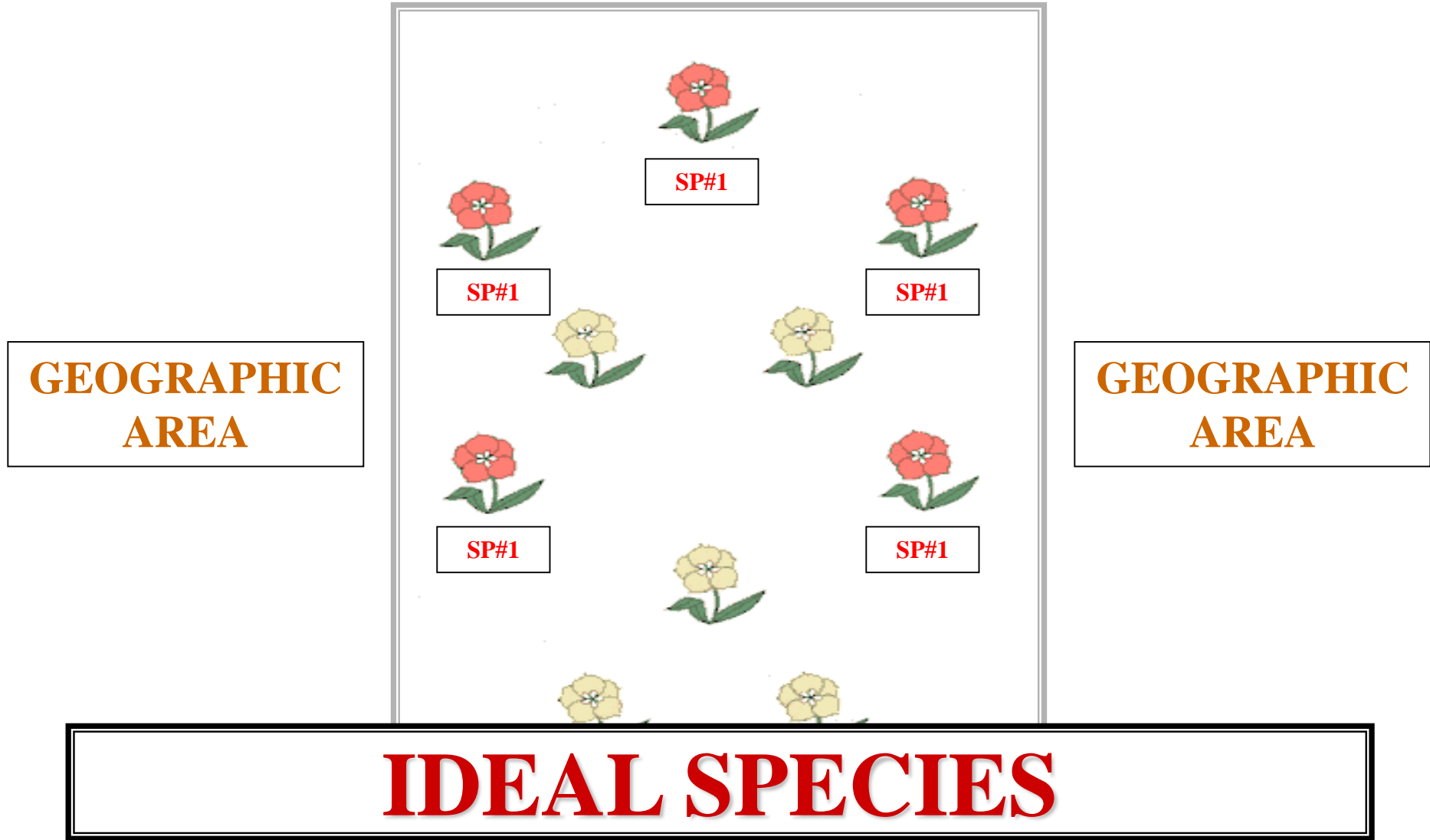
**GEOGRAPHIC
AREA**



**GEOGRAPHIC
AREA**

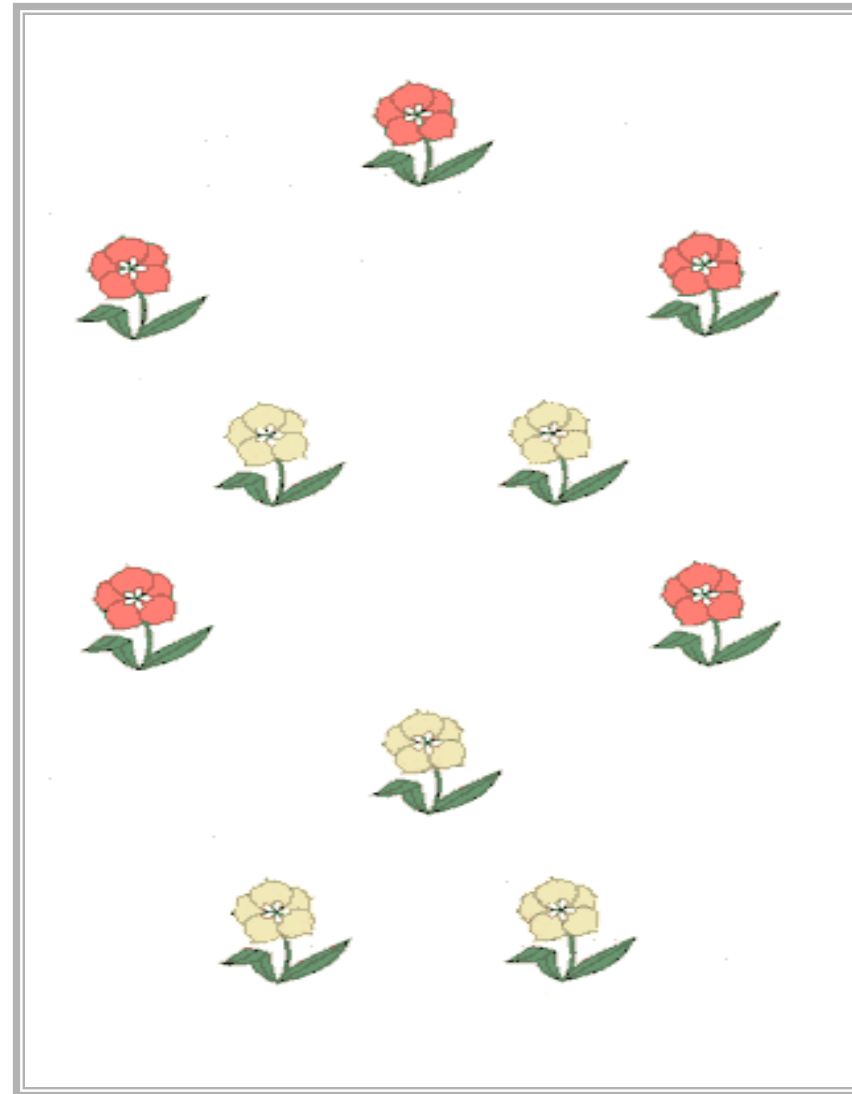
MORPHOLOGICALLY DISTINCT & REPRODUCTIVELY ISOLATED

IDEAL SPECIES



MORPHOLOGICALLY DISTINCT & REPRODUCTIVELY ISOLATED

IDEAL SPECIES

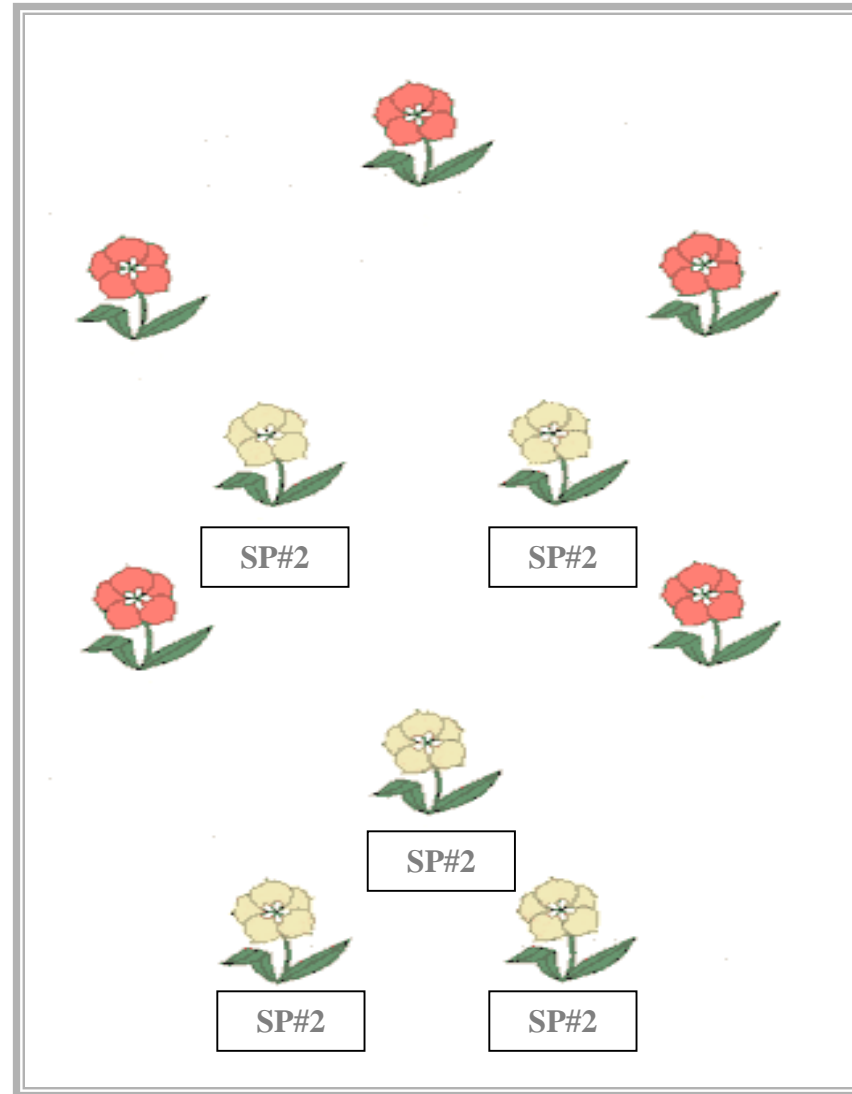


**GEOGRAPHIC
AREA**

**GEOGRAPHIC
AREA**

MORPHOLOGICALLY DISTINCT & REPRODUCTIVELY ISOLATED

IDEAL SPECIES



**GEOGRAPHIC
AREA**

**GEOGRAPHIC
AREA**

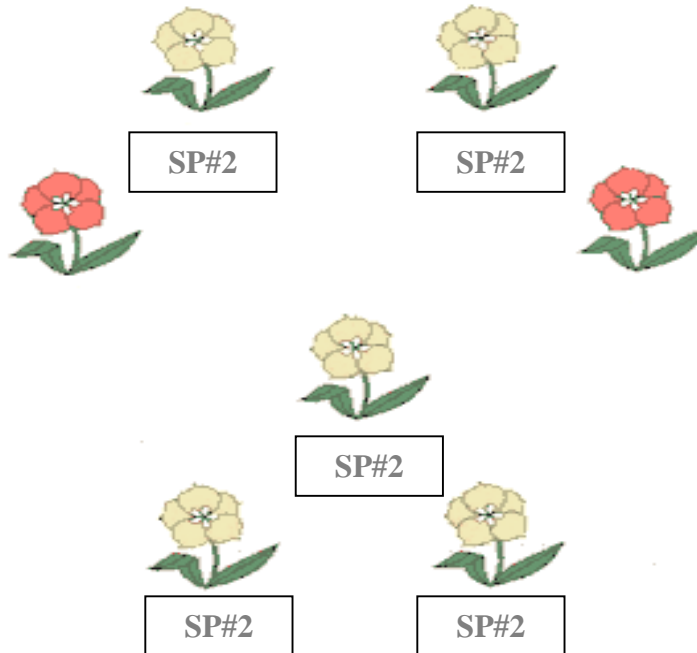
MORPHOLOGICALLY DISTINCT & REPRODUCTIVELY ISOLATED

IDEAL SPECIES



MORPHOLOGICALLY DISTINCT

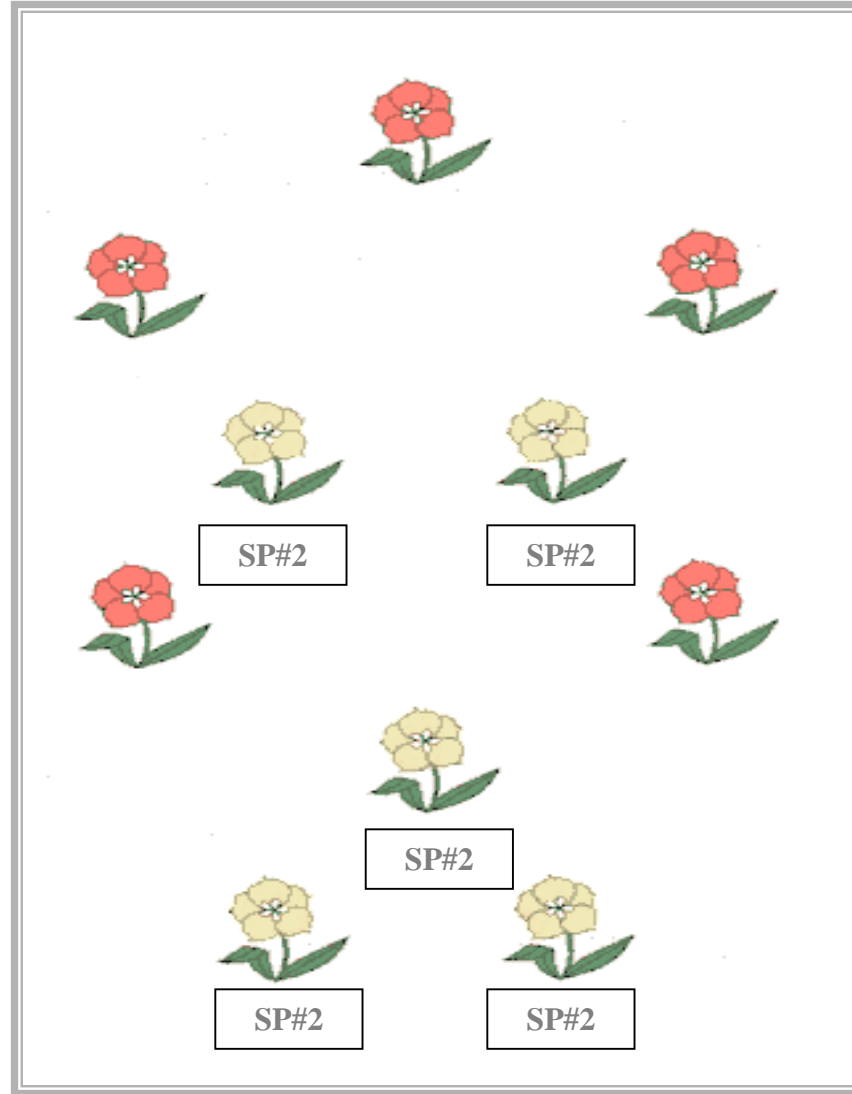
**GEOGRAPHIC
AREA**



**GEOGRAPHIC
AREA**

MORPHOLOGICALLY DISTINCT & REPRODUCTIVELY ISOLATED

IDEAL SPECIES

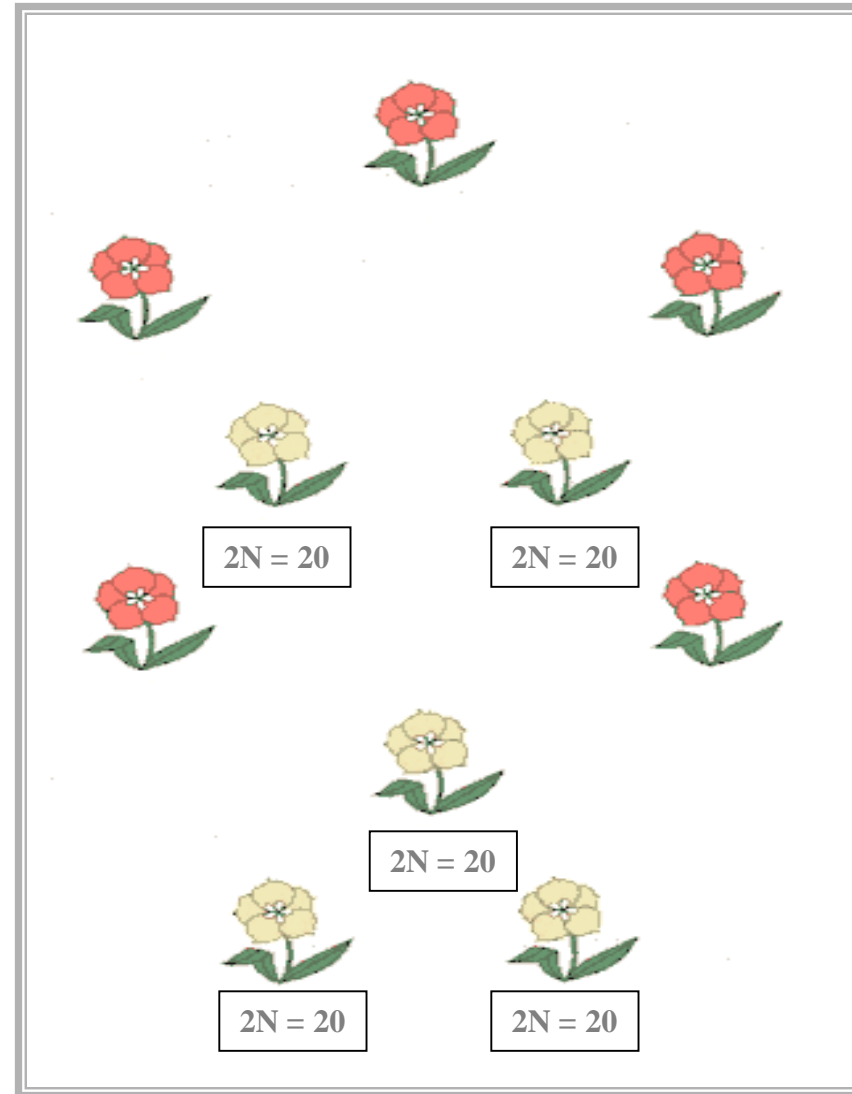


**GEOGRAPHIC
AREA**

**GEOGRAPHIC
AREA**

MORPHOLOGICALLY DISTINCT & REPRODUCTIVELY ISOLATED

IDEAL SPECIES



**GEOGRAPHIC
AREA**

**GEOGRAPHIC
AREA**

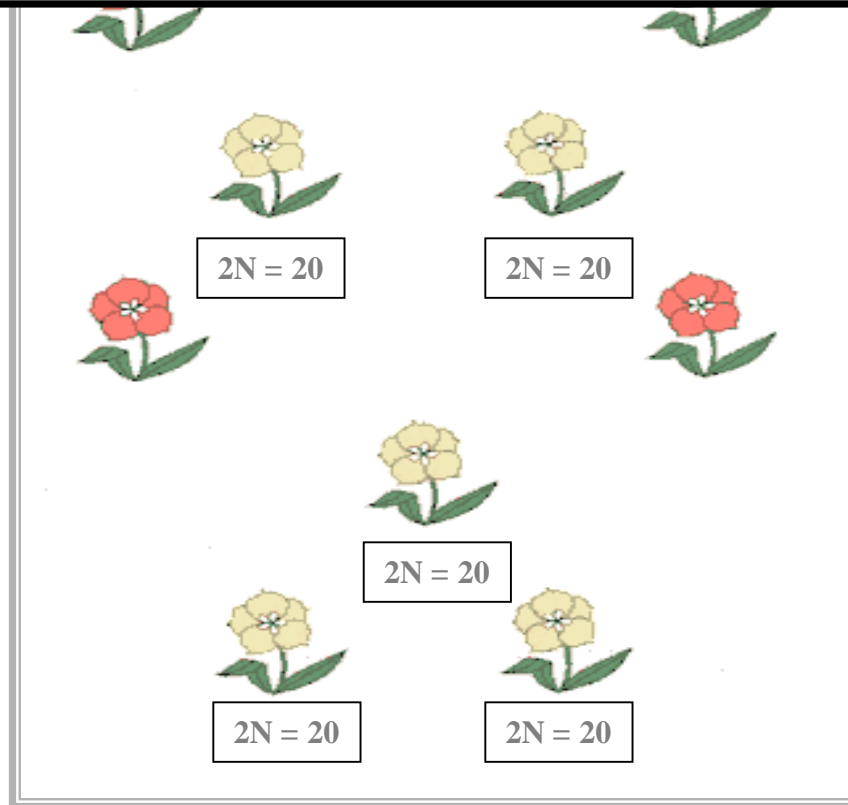
MORPHOLOGICALLY DISTINCT & REPRODUCTIVELY ISOLATED

IDEAL SPECIES



REPRODUCTIVELY ISOLATED

GEOGRAPHIC
AREA



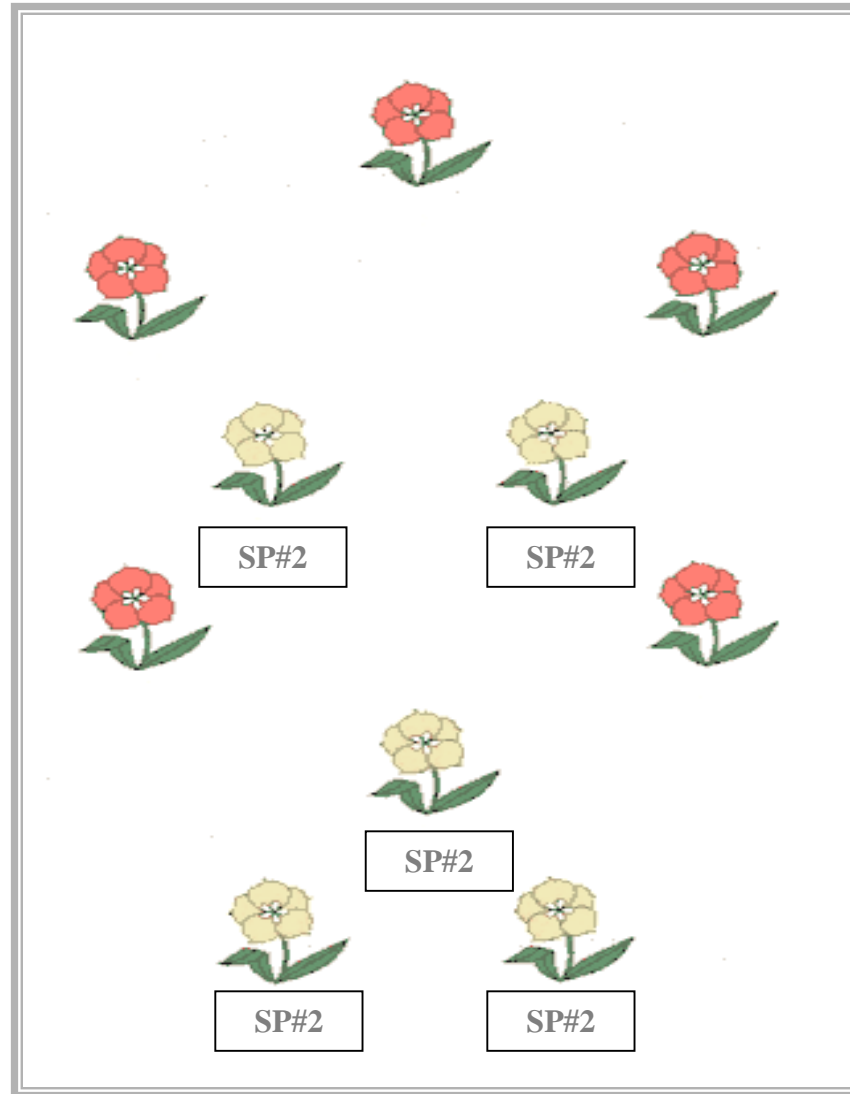
GEOGRAPHIC
AREA

MORPHOLOGICALLY DISTINCT & REPRODUCTIVELY ISOLATED

IDEAL SPECIES



IS



GEOGRAPHIC
AREA

GEOGRAPHIC
AREA

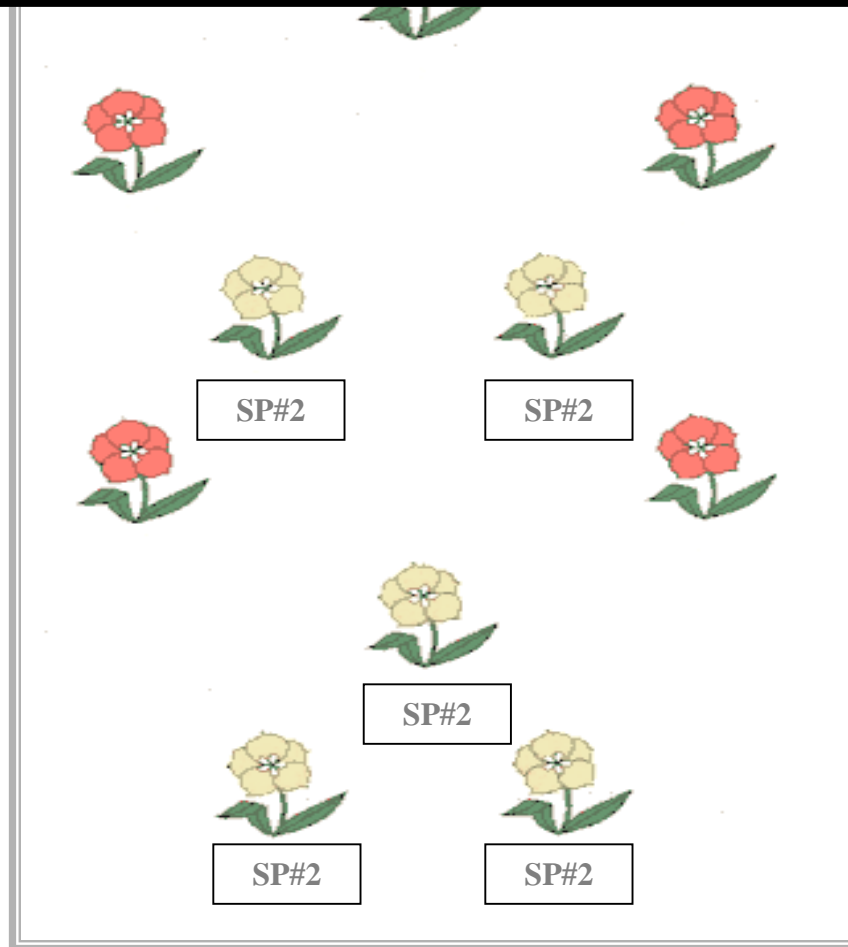
MORPHOLOGICALLY DISTINCT & REPRODUCTIVELY ISOLATED

IDEAL SPECIES



IDEAL SPECIES

**GEOGRAPHIC
AREA**



**GEOGRAPHIC
AREA**

MORPHOLOGICALLY DISTINCT & REPRODUCTIVELY ISOLATED

A lush, dense tropical forest scene with various green plants, including ferns and broad-leafed species. A small orange flower is visible in the middle ground. The text is overlaid in the center in a white, serif font with a drop shadow.

**MOST
PLANT SPECIES
CONFORM AS
IDEAL SPECIES**





MANY
PLANT SPECIES
DO NOT CONFORM AS
IDEAL SPECIES



NON-IDEAL SPECIES

NON-IDEAL SPECIES TYPES

NON-IDEAL SPECIES TYPES

HYBRID-SWARM SPECIES

**NON-IDEAL SPECIES
TYPES**

NON-IDEAL SPECIES TYPES



**HYBRID-SWARM SPECIES
CRYPTIC SPECIES**

**NON-IDEAL SPECIES
TYPES**

**NON-IDEAL
SPECIES**

**HYBRID-SWARM
SPECIES**

**NON-IDEAL
SPECIES**

**HYBRID-SWARM
SPECIES**

HYBRID-SWARM SPECIES



SYMPATRIC POPULATIONS

**HYBRID-SWARM
SPECIES**

HYBRID-SWARM SPECIES



SYMPATRIC POPULATIONS

MORPHOLOGICALLY DISTINCT

HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES



SYMPATRIC POPULATIONS

MORPHOLOGICALLY DISTINCT

BUT REPRODUCTIVELY VIABLE

HYBRID-SWARM SPECIES

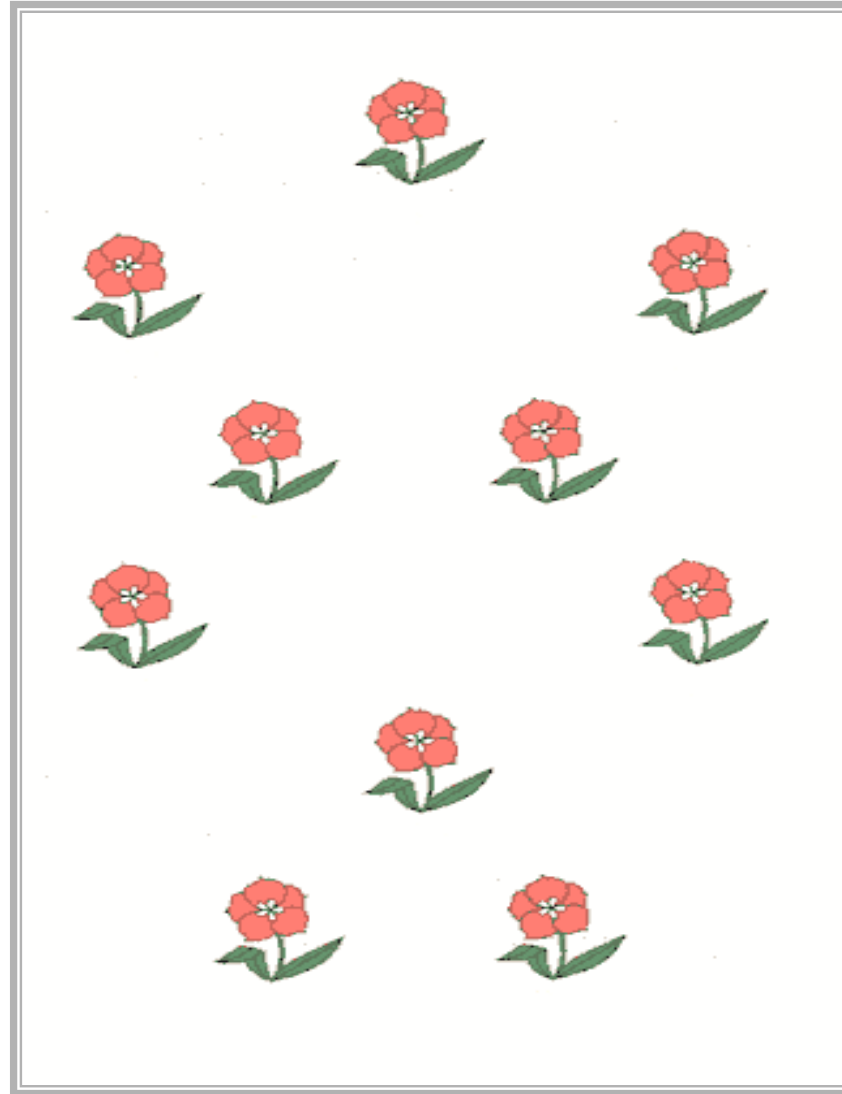


NON-IDEAL SPECIES

HYBRID-SWARM

SPECIES: APPLIED

HYBRID-SWARM SPECIES

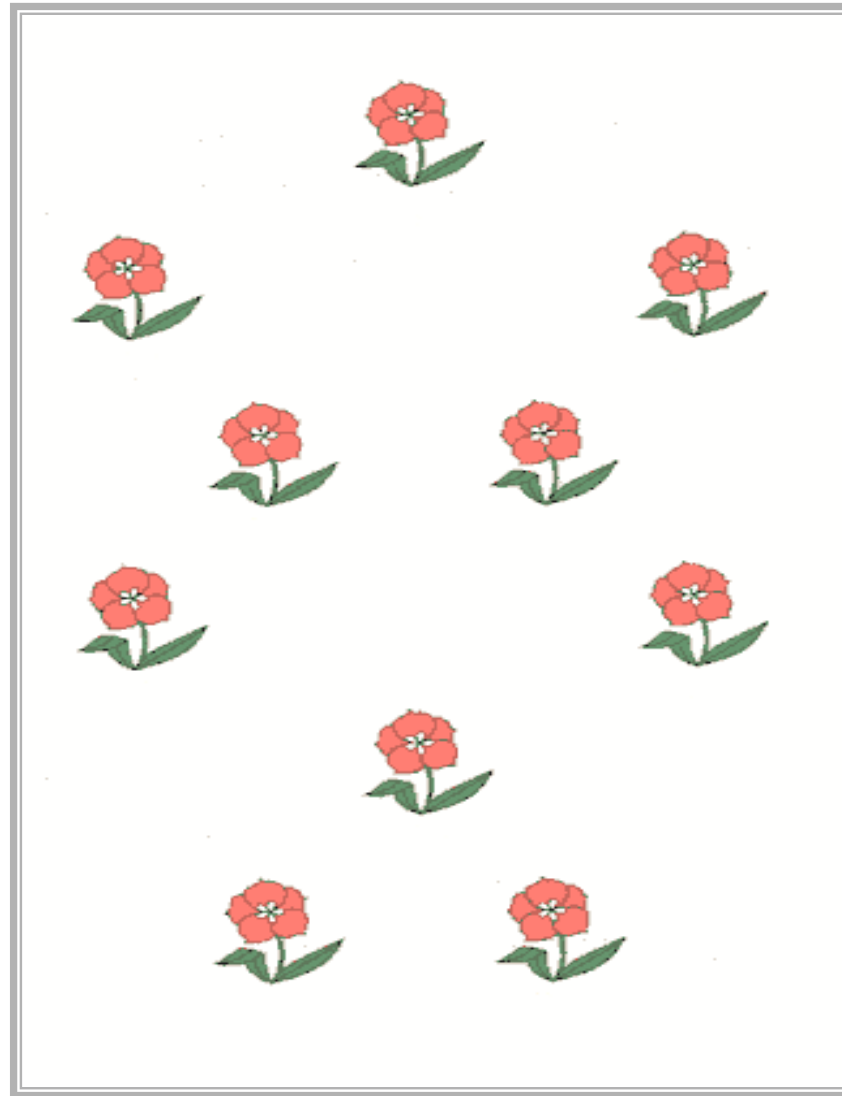


**GEOGRAPHIC
AREA**

**GEOGRAPHIC
AREA**

PARENTAL POPULATION

HYBRID-SWARM SPECIES

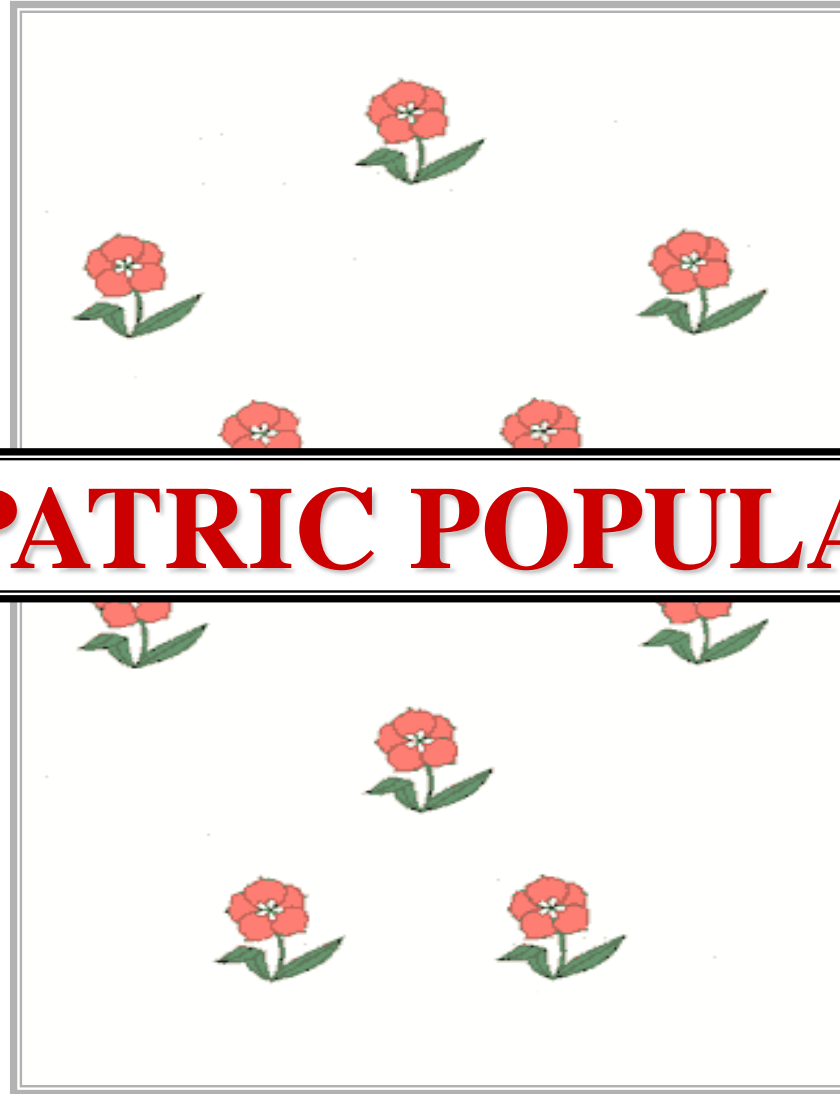


**SAME
GEOGRAPHIC
AREA**

**SAME
GEOGRAPHIC
AREA**

PARENTAL POPULATION

HYBRID-SWARM SPECIES



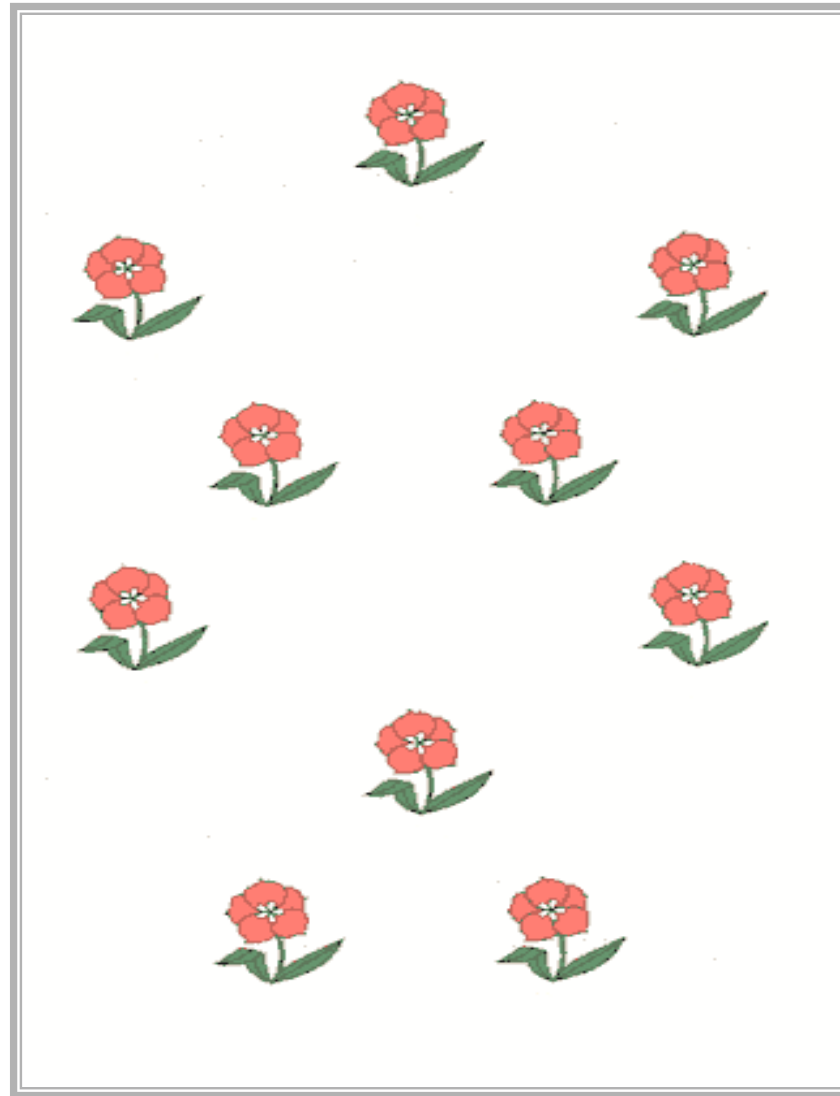
SYMPATRIC POPULATION

PARENTAL POPULATION

HYBRID-SWARM SPECIES



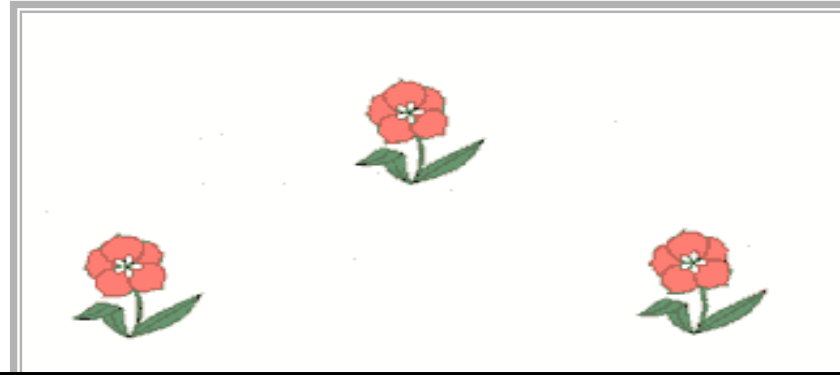
TIME



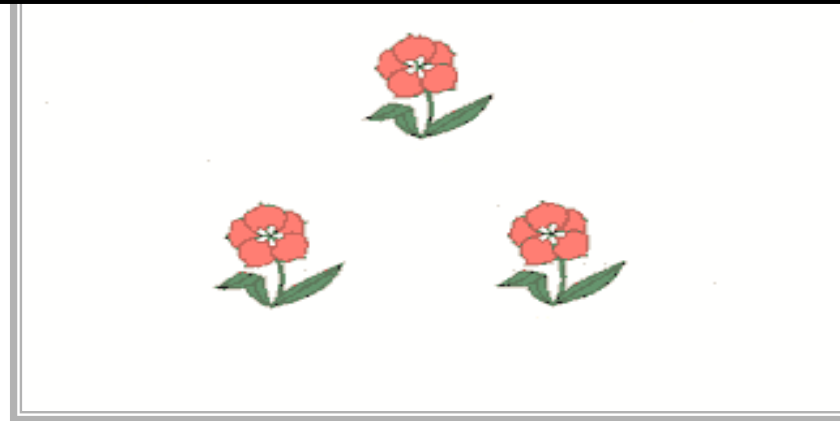
TIME

PARENTAL POPULATION

HYBRID-SWARM SPECIES

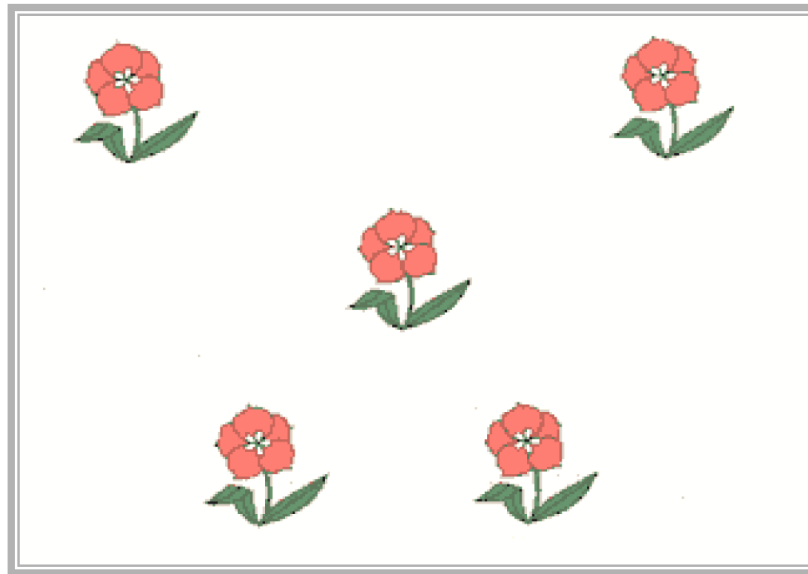


**GEOLOGIC BARRIER
ARISES**



PARENTAL POPULATION

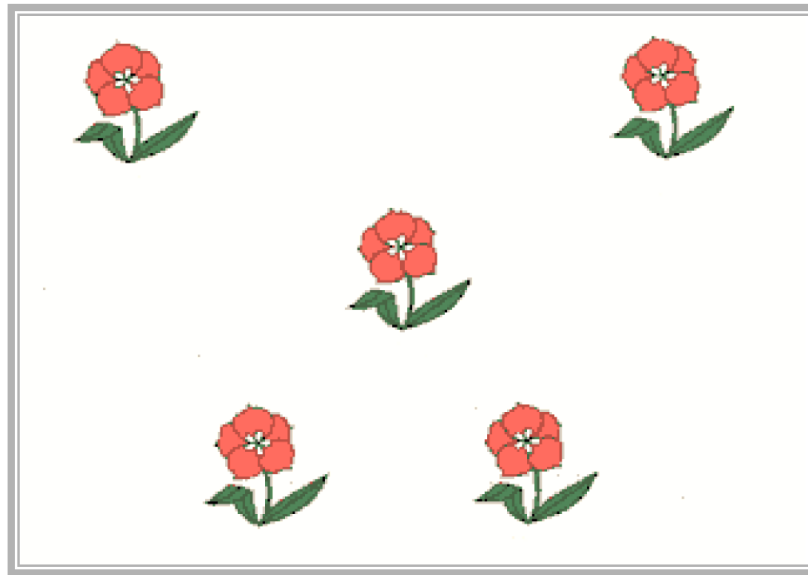
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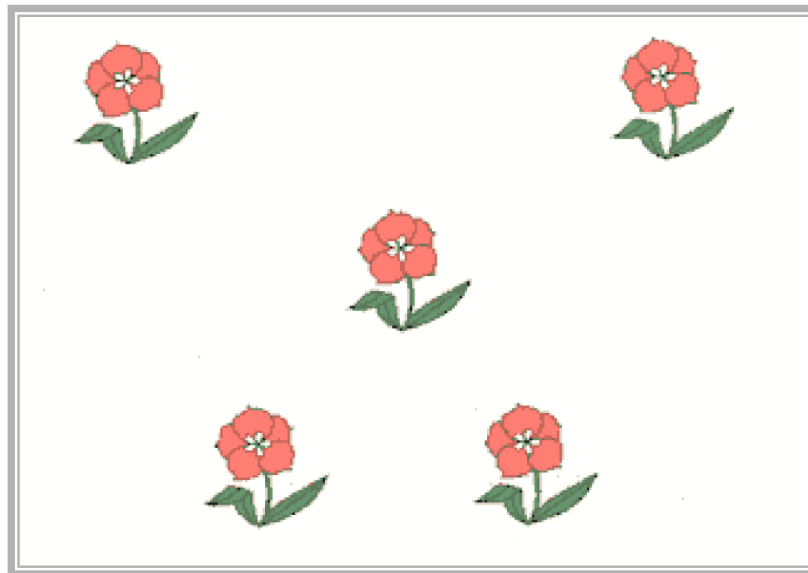
**MOUNTAIN
RANGE**



**MOUNTAIN
RANGE**



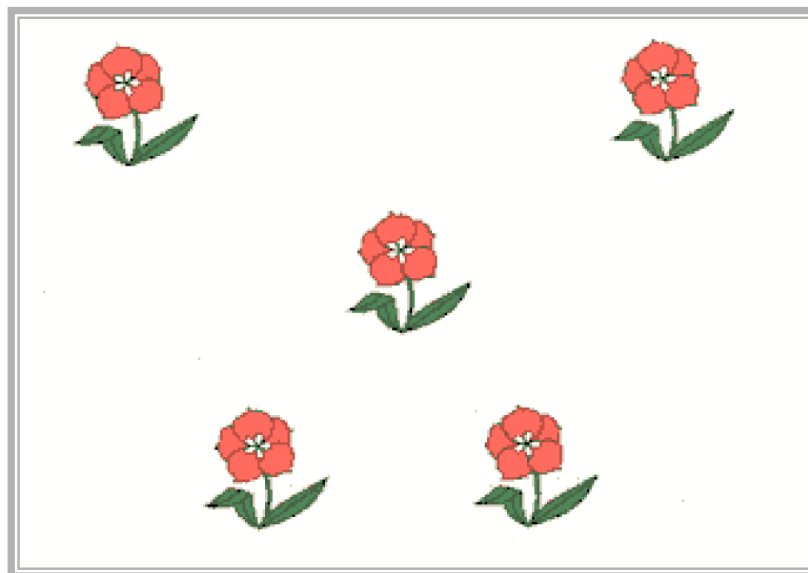
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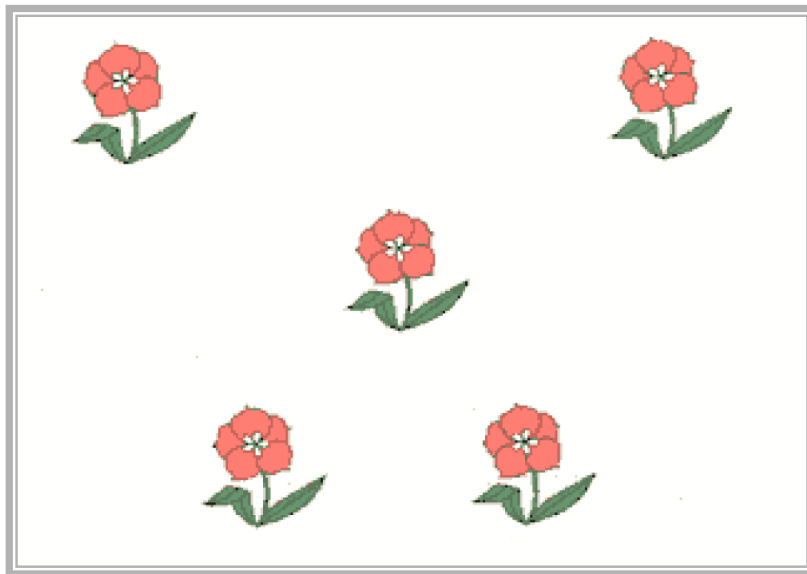


TIME

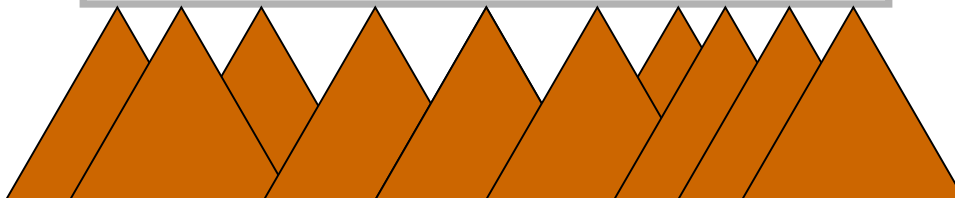


TIME

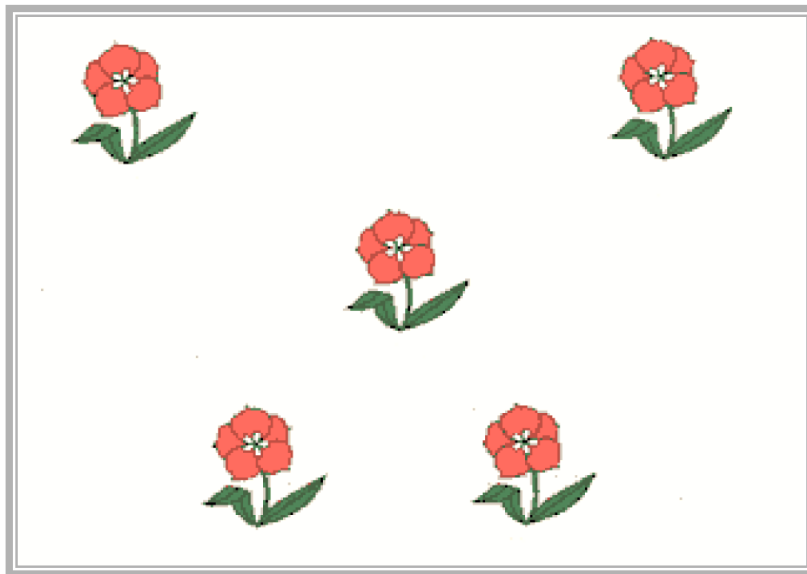




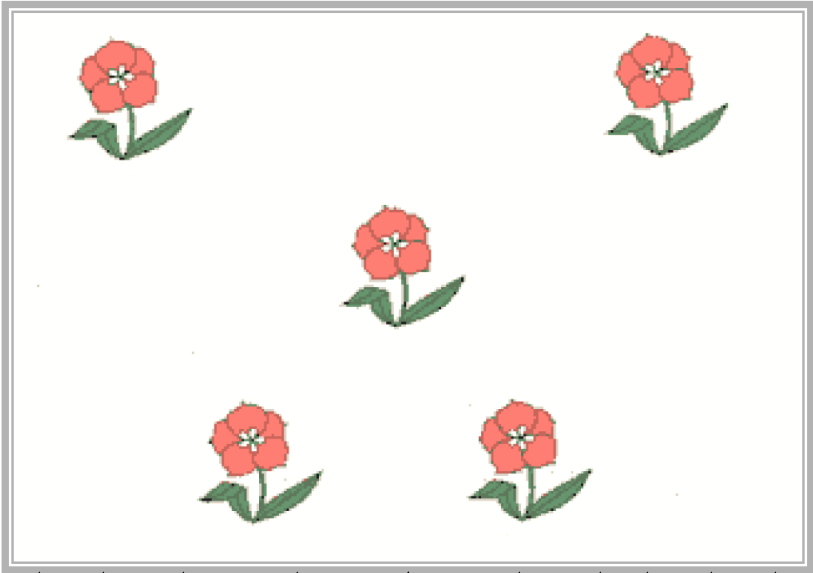
TIME



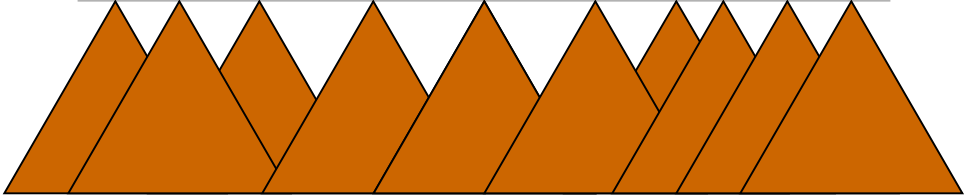
TIME



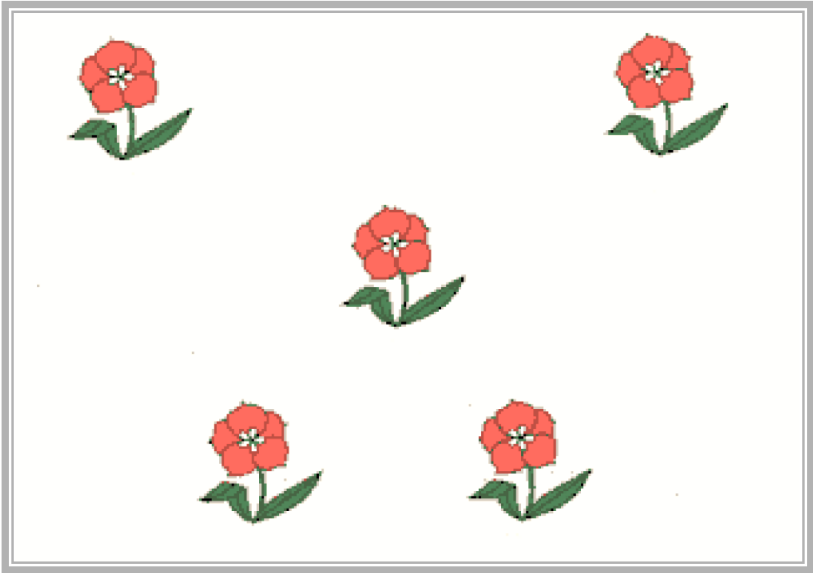
**NORTHERN
POPULATION**



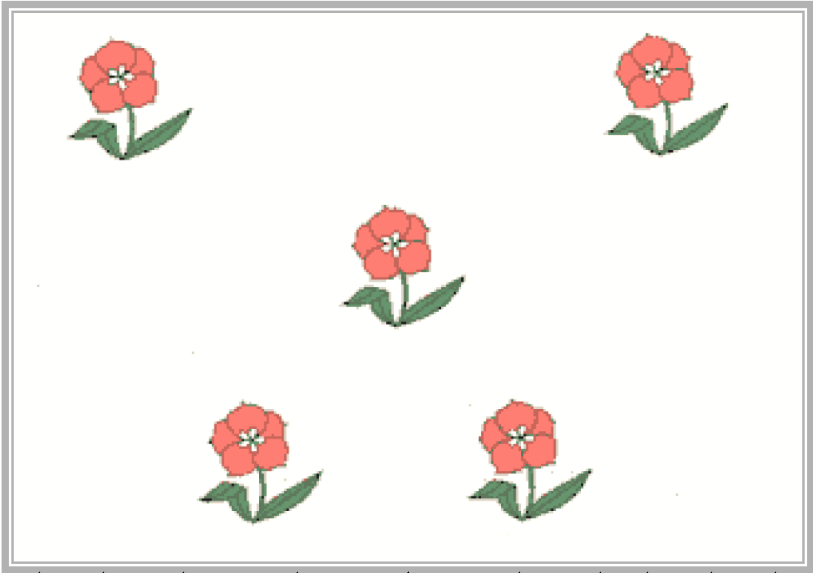
**MOUNTAIN
RANGE**



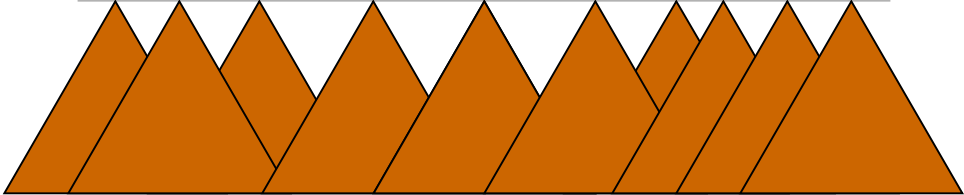
**MOUNTAIN
RANGE**



**NORTHERN
POPULATION**

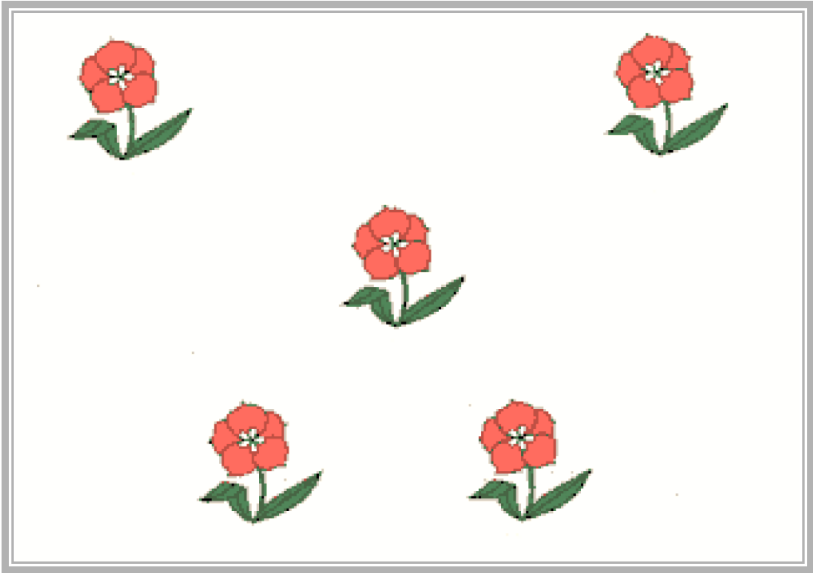


**MOUNTAIN
RANGE**

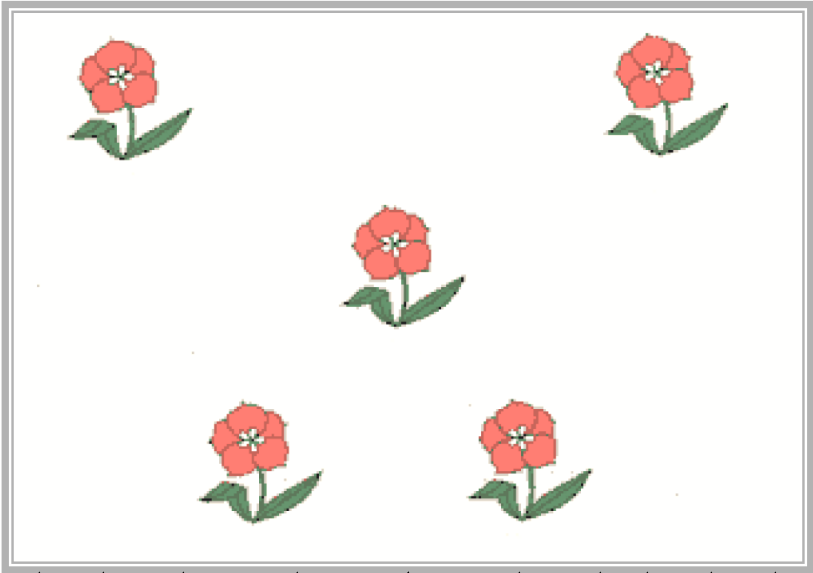


**MOUNTAIN
RANGE**

**SOUTHERN
POPULATION**

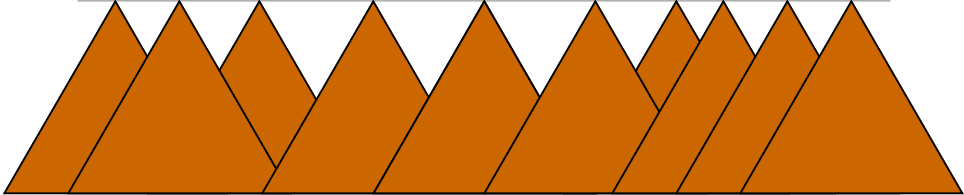


**NORTHERN
POPULATION**



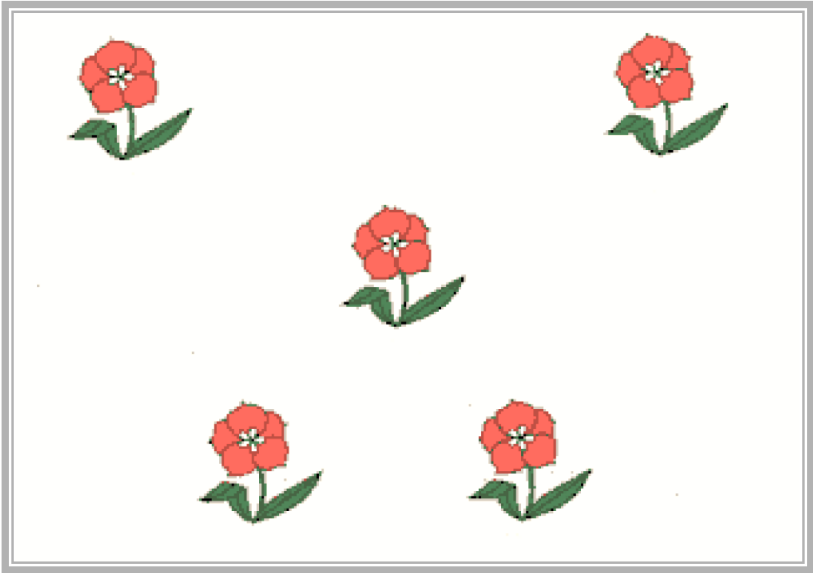
**DIFFERENT
GEOGRAPHIC
AREA**

**MOUNTAIN
RANGE**



**MOUNTAIN
RANGE**

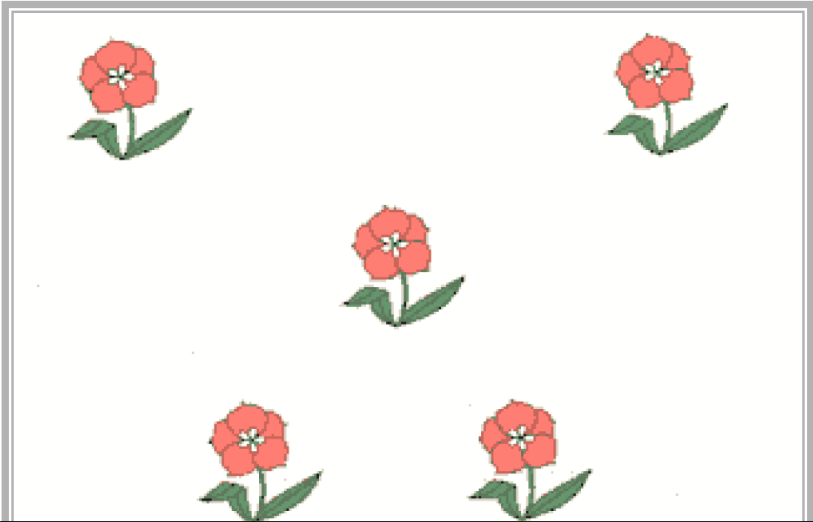
**SOUTHERN
POPULATION**



**DIFFERENT
GEOGRAPHIC
AREA**

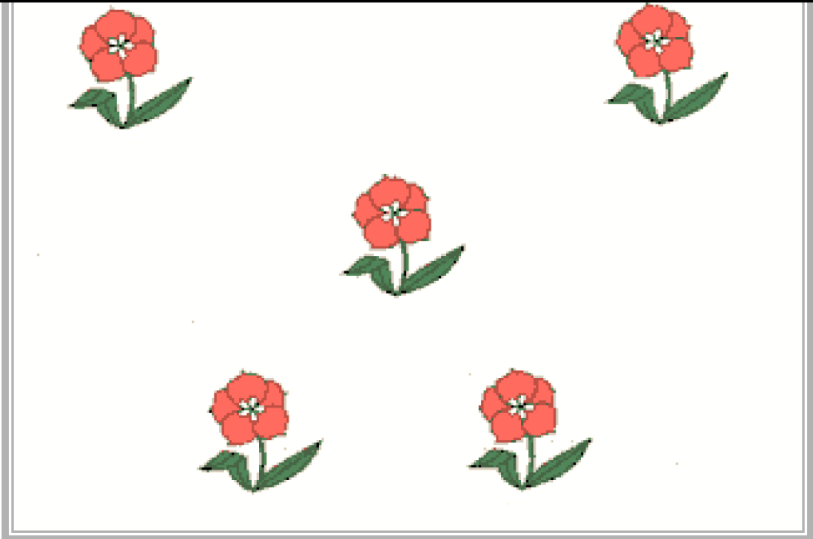


NORTHERN
POPULATION

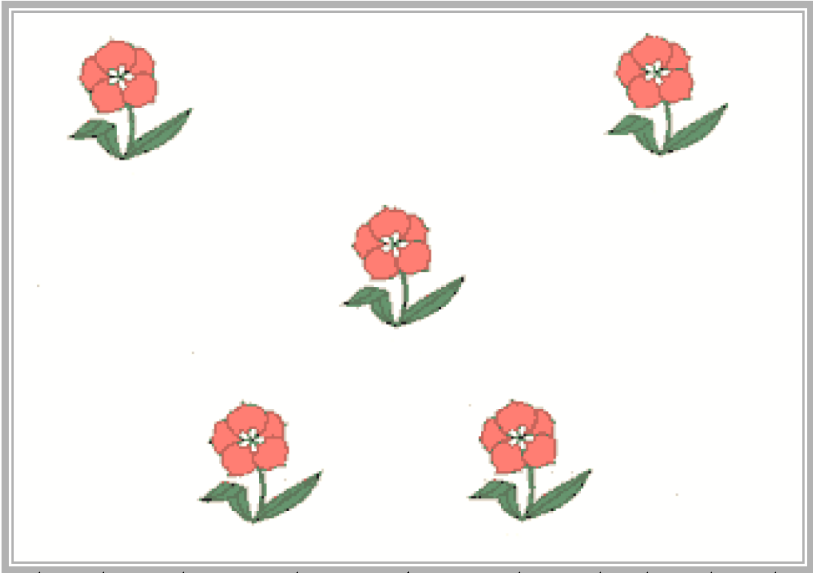


**ALLOPATRIC
POPULATIONS**

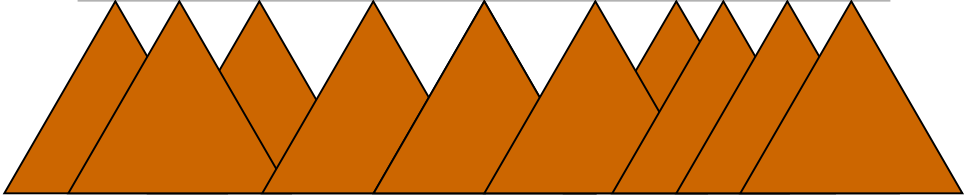
SOUTHERN
POPULATION



**NORTHERN
POPULATION**

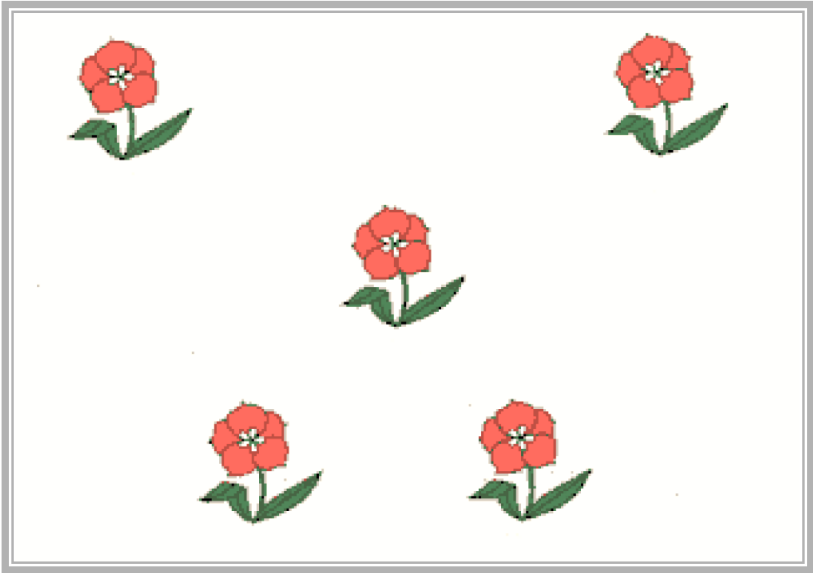


**MOUNTAIN
RANGE**

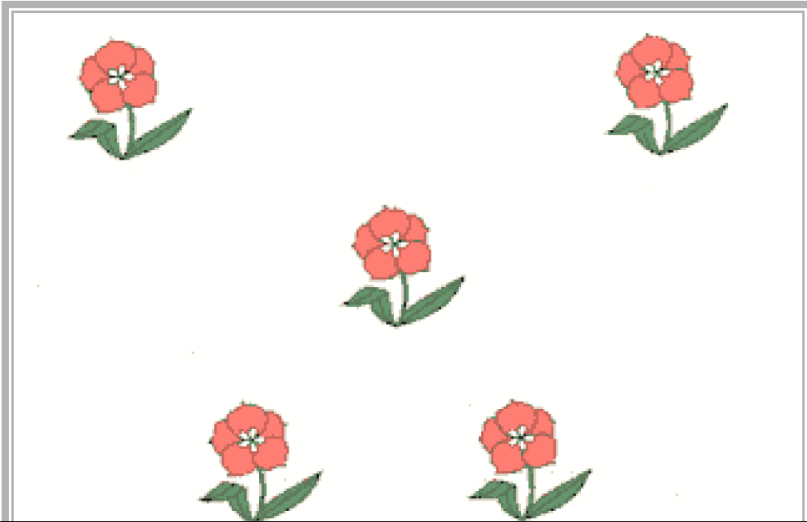


**MOUNTAIN
RANGE**

**SOUTHERN
POPULATION**

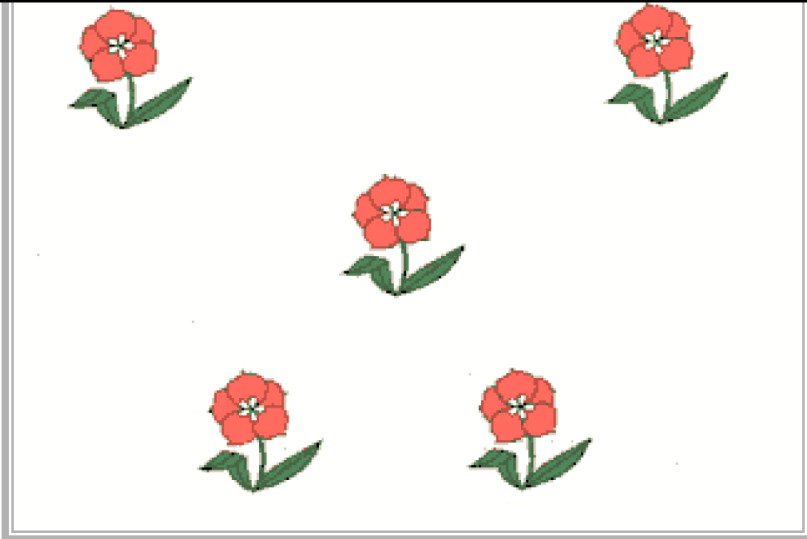


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POPULATION

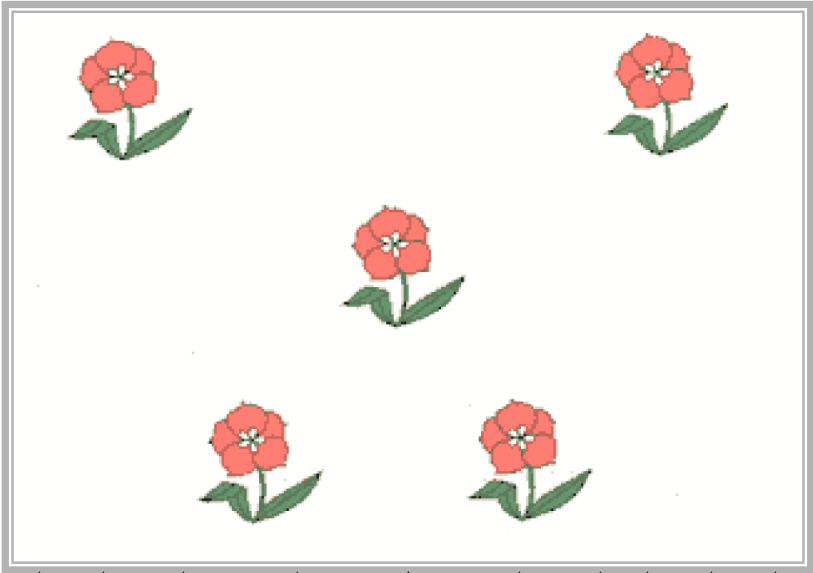


**GEOGRAPHICALLY
ISOLATED**

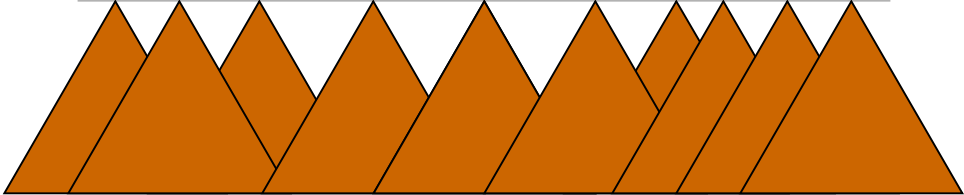
SOUTHERN
POPULATION



NORTHERN
POPULATION

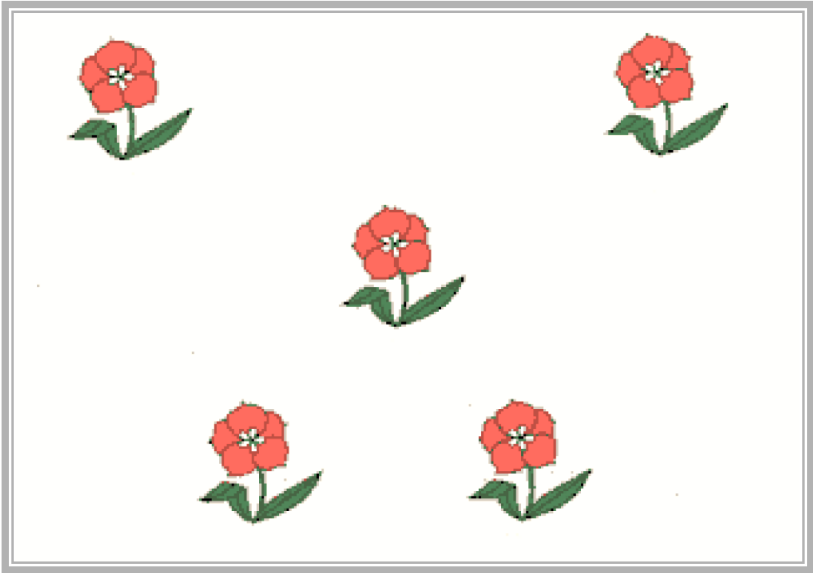


TIME

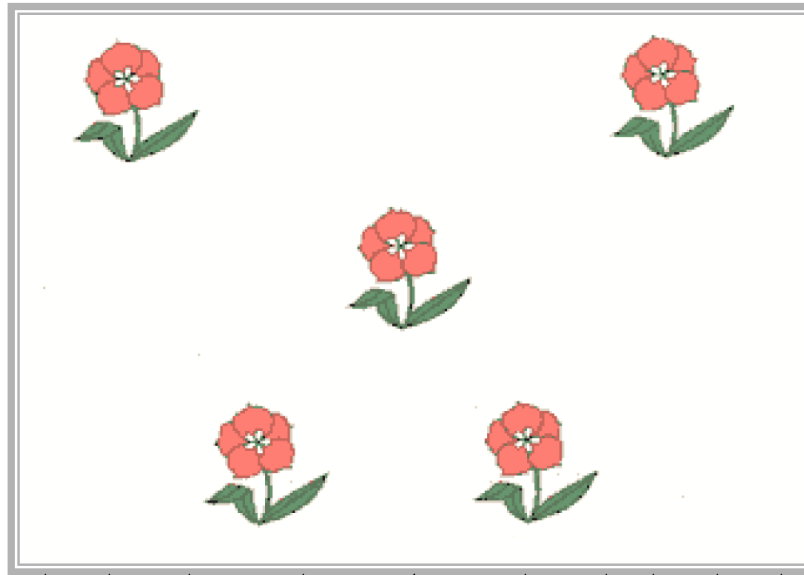


TIME

SOUTHERN
POPULATION



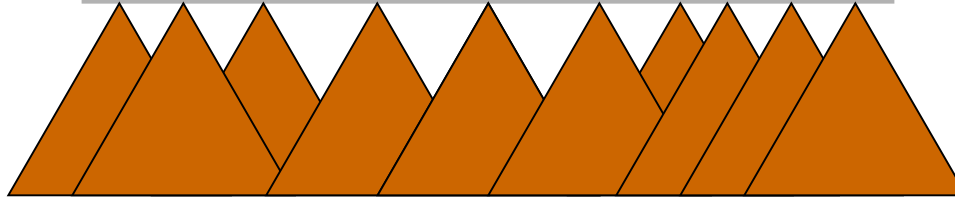
**NORTHERN
POPULATION**



**UNDERGOES
SEPARATE
MUTATIONS
&
SELECTION**

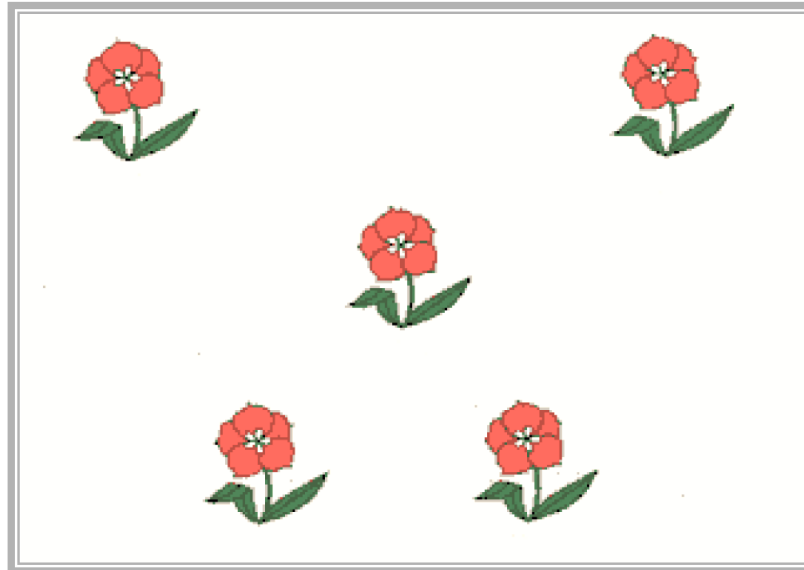
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**MOUNTAIN
RANGE**



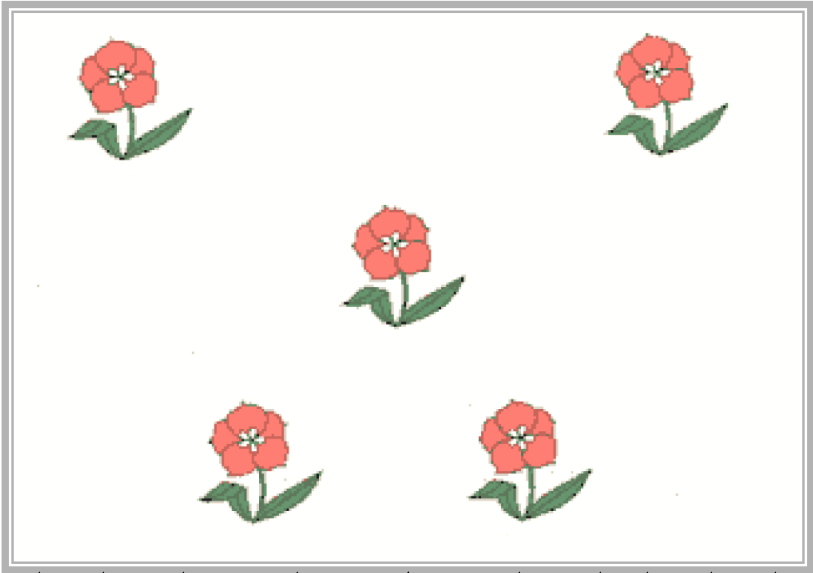
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RANGE**

**SOUTHERN
POPULATION**

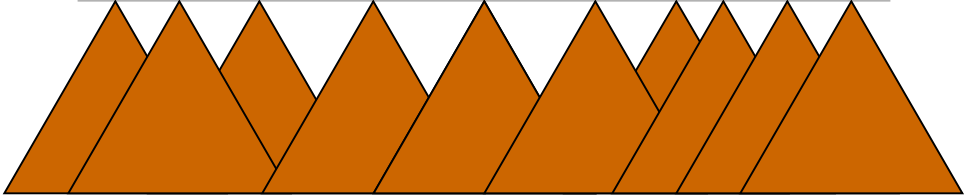


**UNDERGOES
SEPARATE
MUTATIONS
&
SELECTION**

NORTHERN
POPULATION

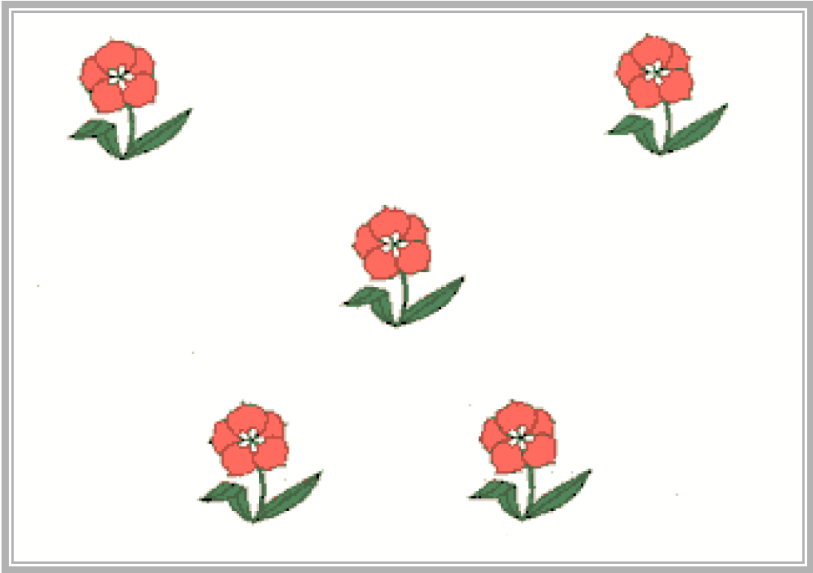


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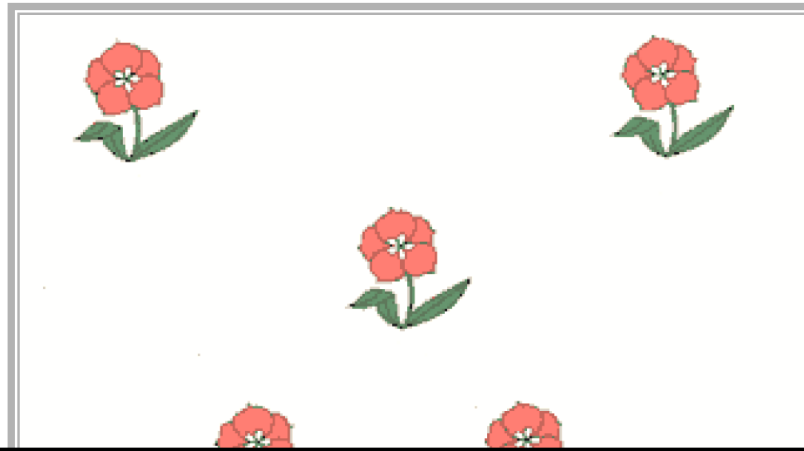


TIME

SOUTHERN
POPULATION

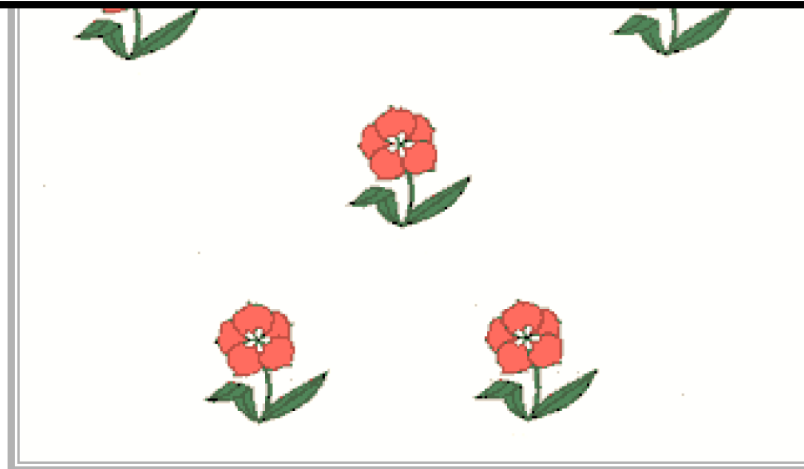


NORTHERN
POPULATION



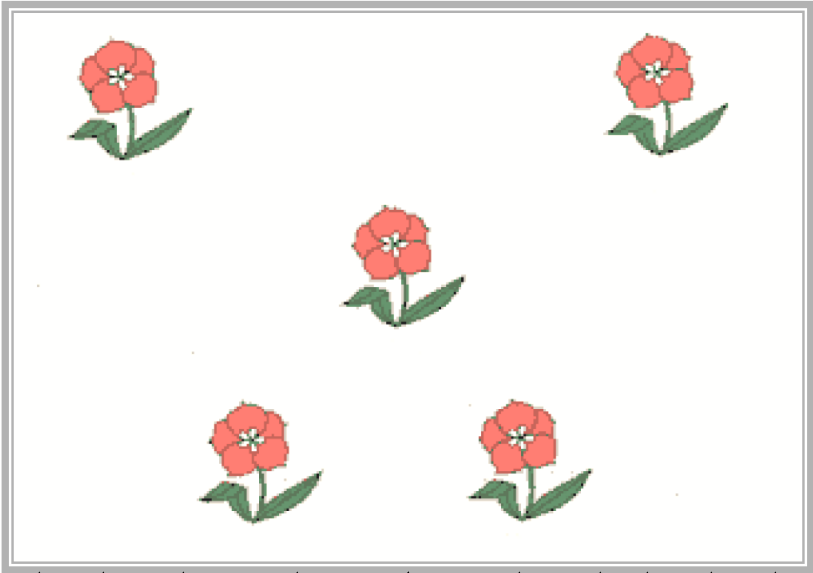
**EVOLVE
MORPHOLOGICAL
CHANGES**

SOUTHERN
POPULATION

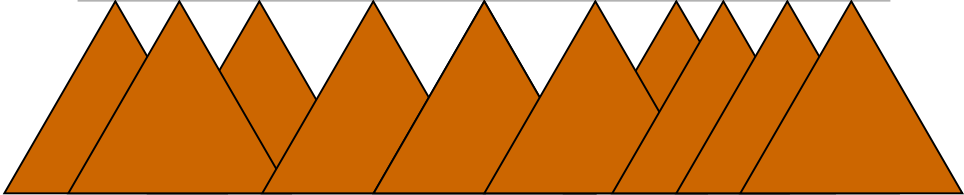




**NORTHERN
POPULATION**

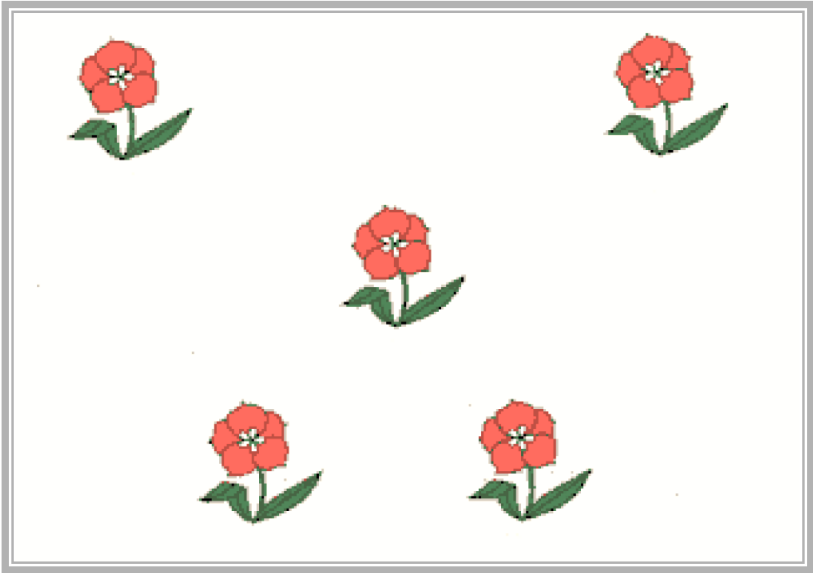


**MOUNTAIN
RANGE**

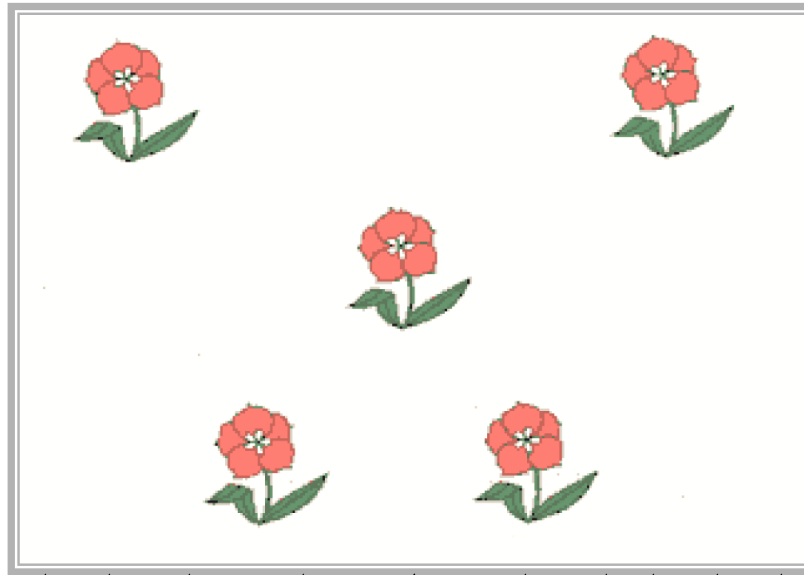


**MOUNTAIN
RANGE**

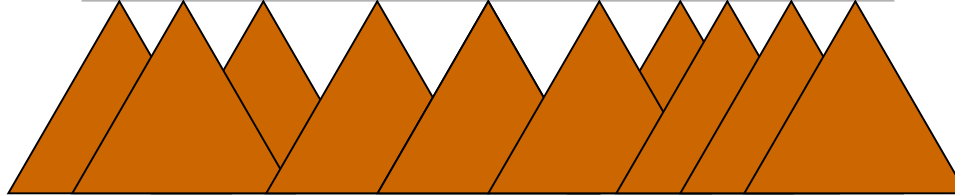
**SOUTHERN
POPULATION**



**NORTHERN
POPULATION**

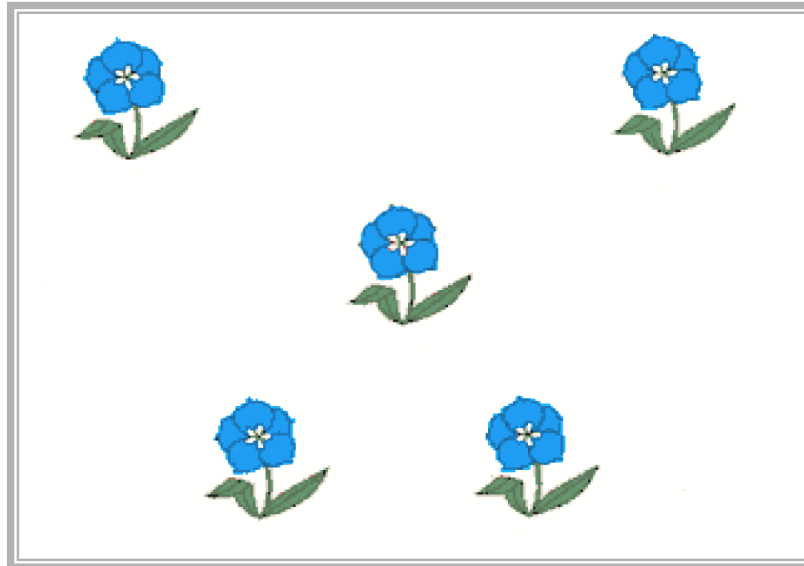


**MOUNTAIN
RANGE**



**MOUNTAIN
RANGE**

**SOUTHERN
POPULATION**



**SOUTHERN
POPULATION
EVOLVES
BLUE
FLOWERS**

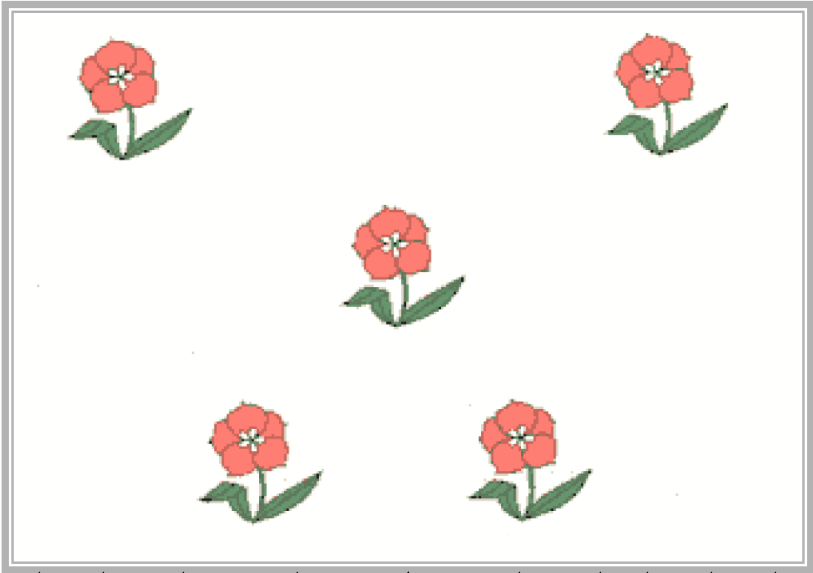


ALLOPATRIC SPECIATION

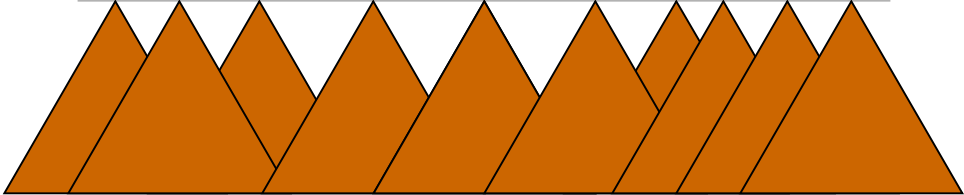
!!!NOTE: CHANGES!!!

ALLOPATRIC SPECIATION

NORTHERN
POPULATION

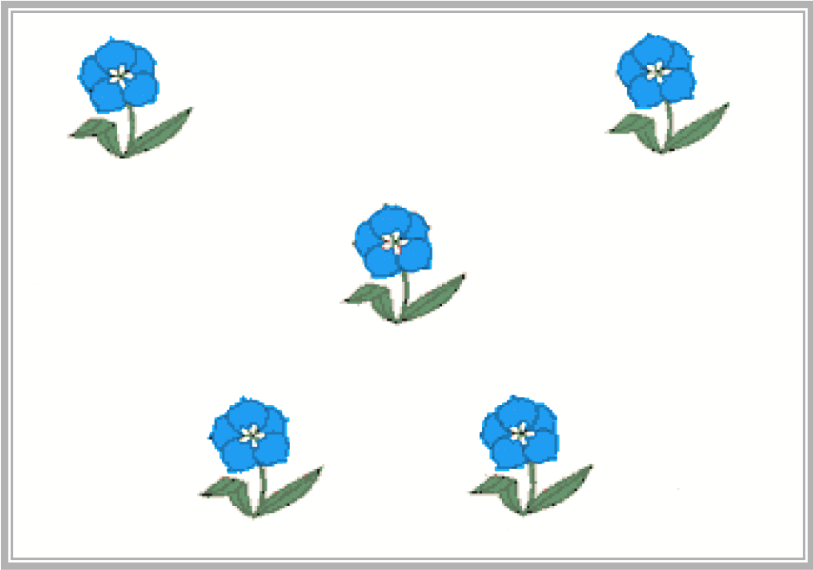


TIME



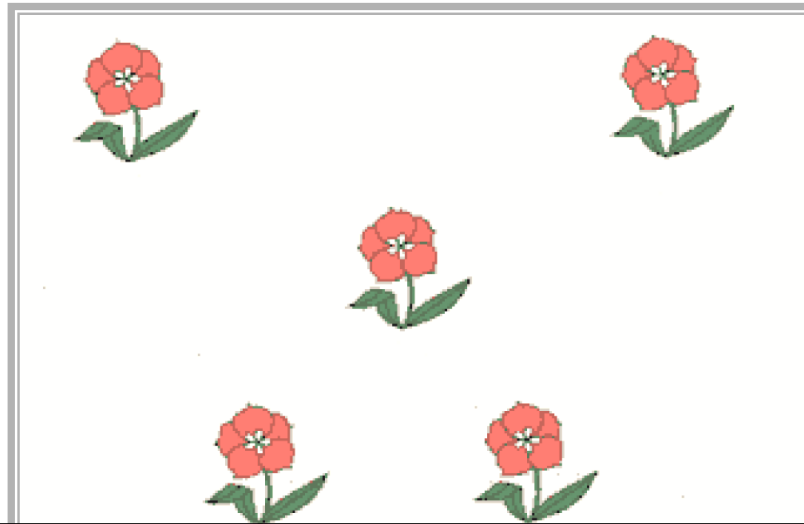
TIME

SOUTHERN
POPULATION



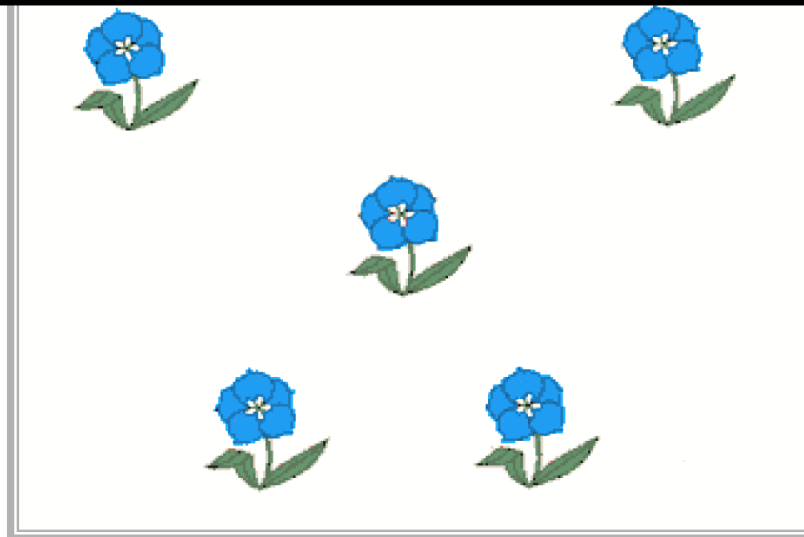


NORTHERN
POPULATION

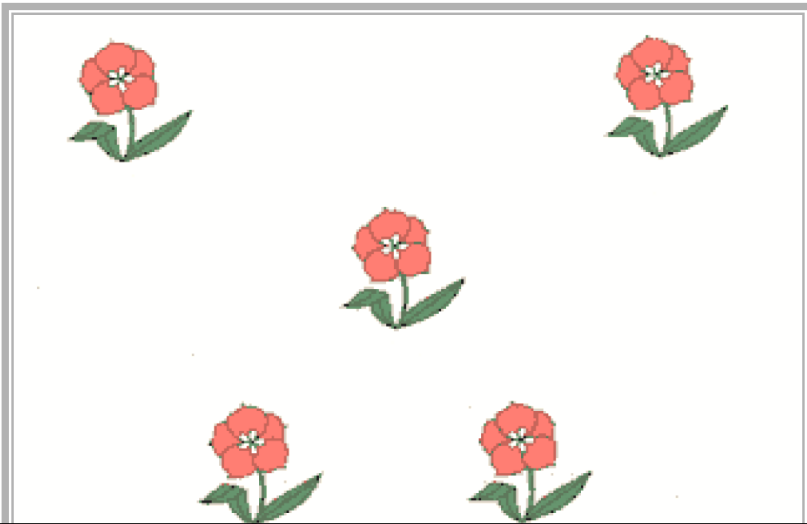


DO NOT EVOLVE
BREEDING BARRIERS

SOUTHERN
POPULATION



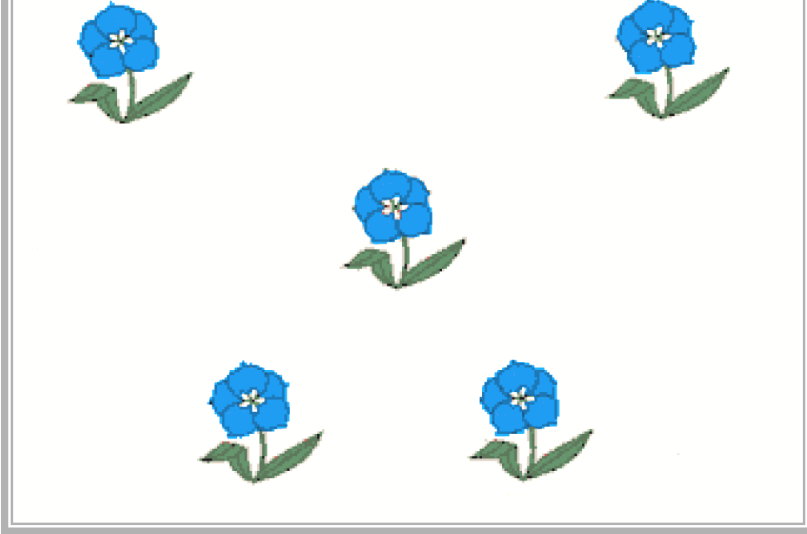
NORTHERN
POPULATION



IDENTICAL
POLLINATION

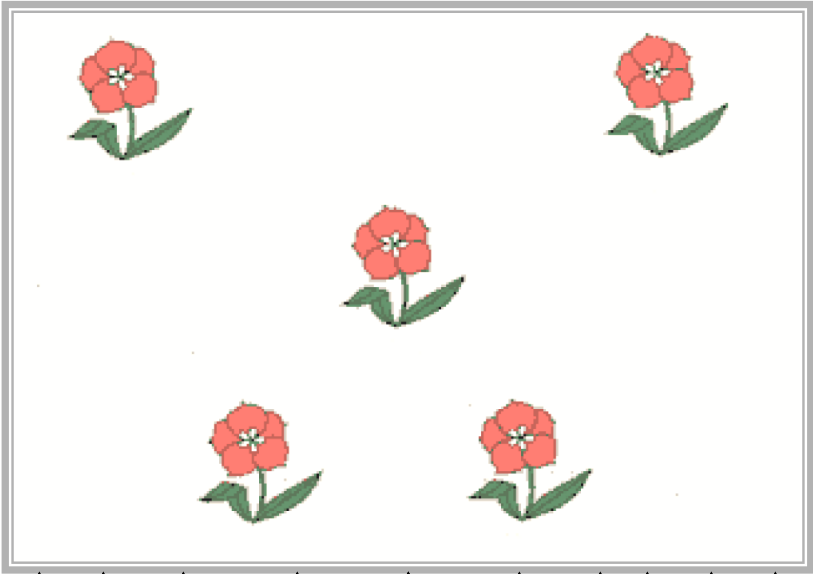
***DO NOT EVOLVE
BREEDING BARRIERS***

SOUTHERN
POPULATION

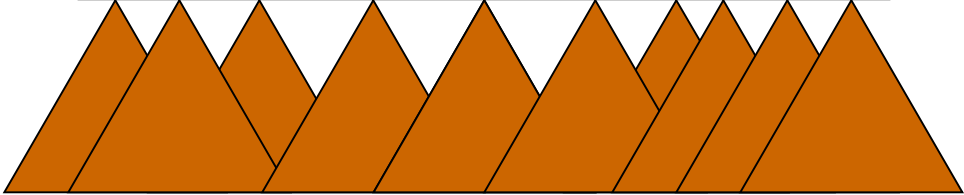


IDENTICAL
POLLINATION

NORTHERN
POPULATION

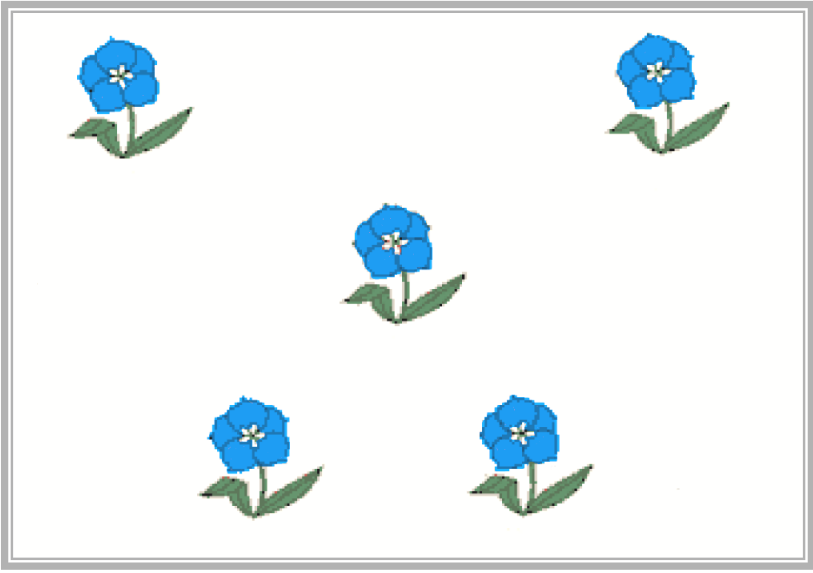


TIME

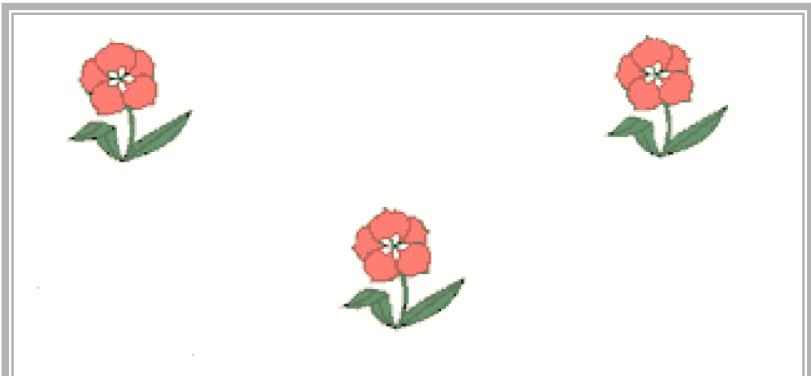


TIME

SOUTHERN
POPULATION

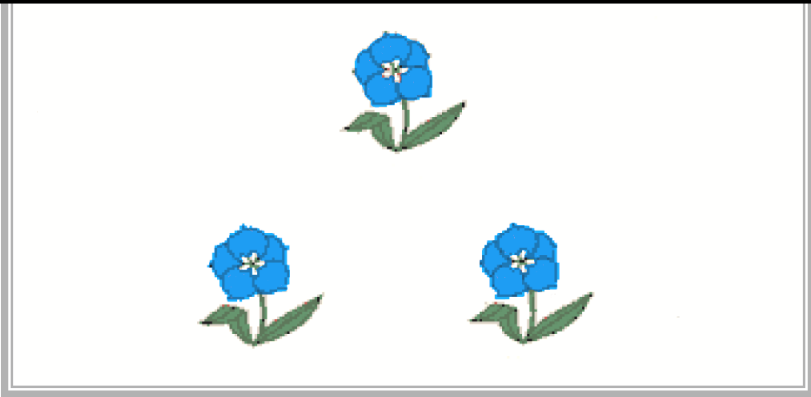


NORTHERN
POPULATION

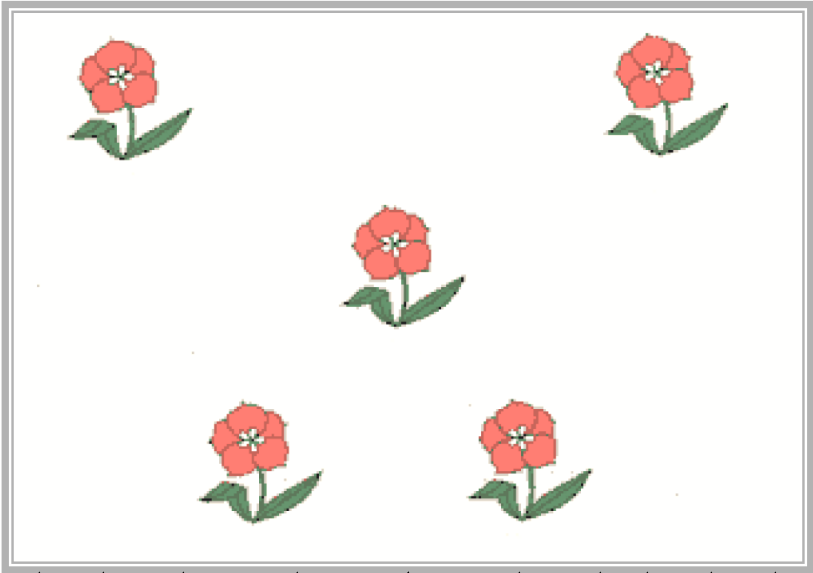


**POPULATIONS
REMAIN
REPRODUCTIVELY
VIABLE**

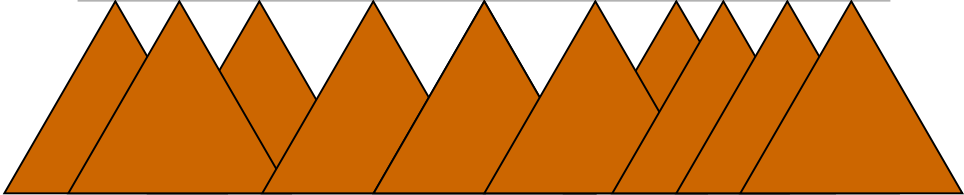
SOUTHERN
POPULATION



NORTHERN
POPULATION

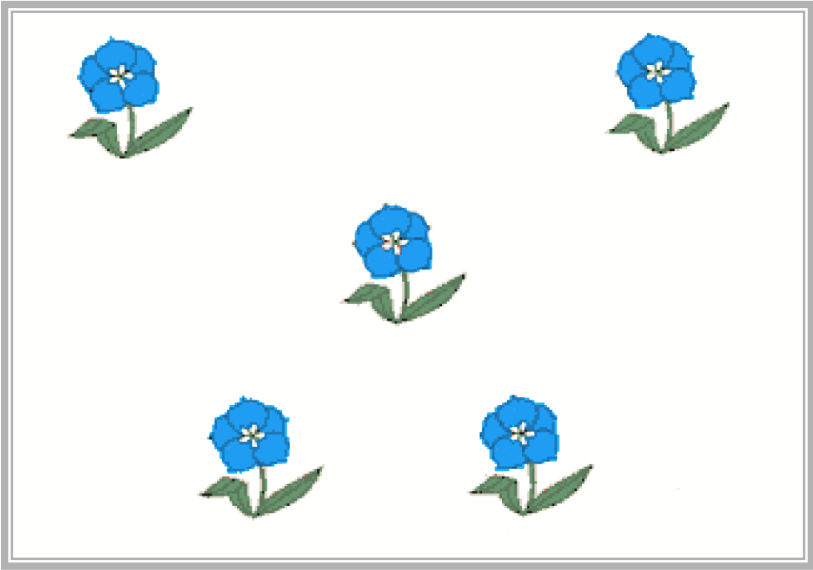


TIME

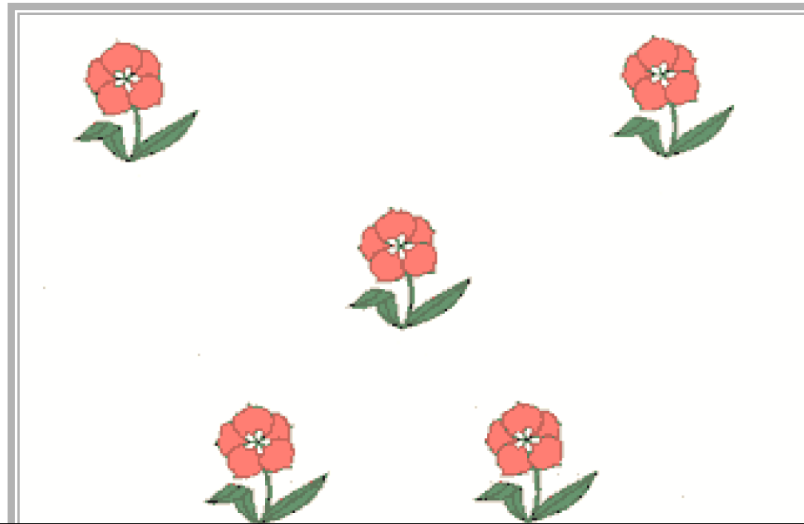


TIME

SOUTHERN
POPULATION

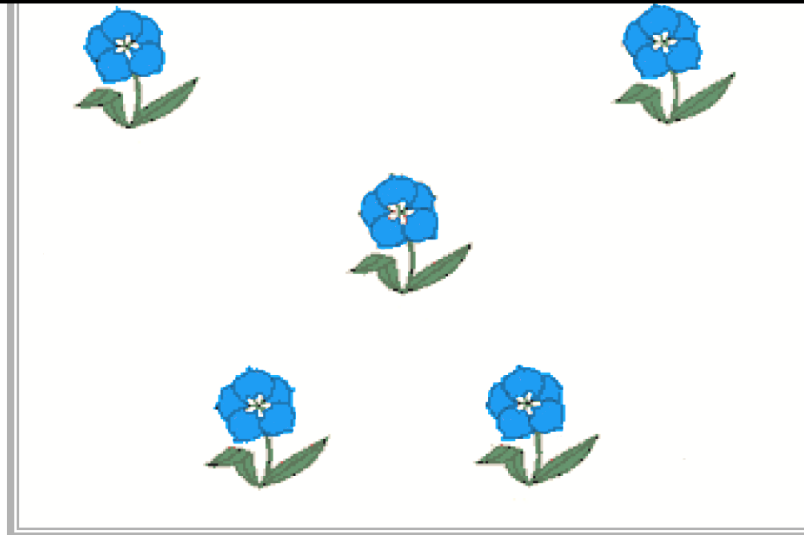


NORTHERN
POPULATION

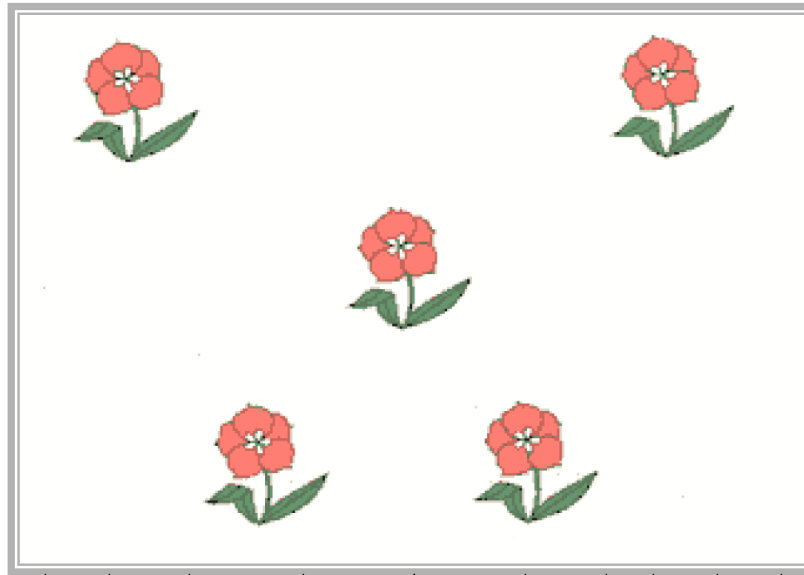


**GEOLOGIC BARRIER
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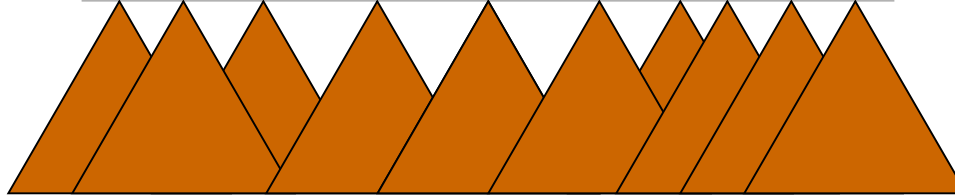
SOUTHERN
POPULATION



**NORTHERN
POPULATION**

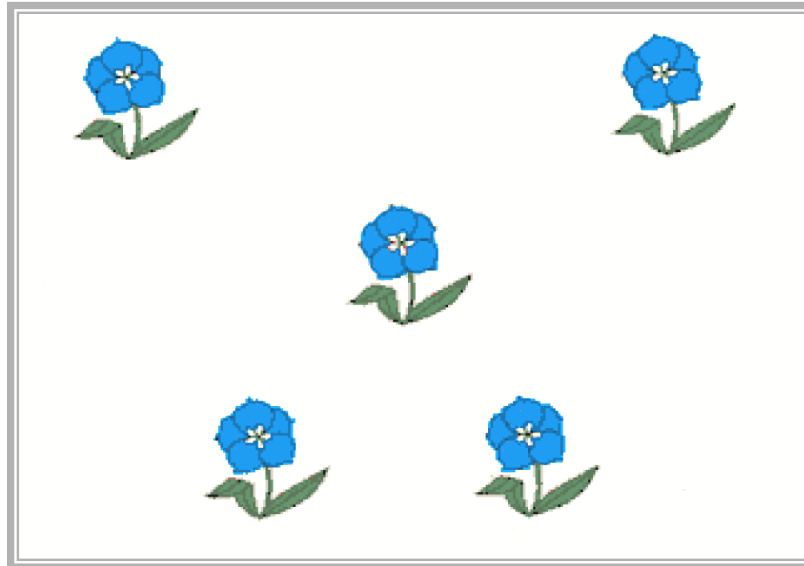


**MOUNTAIN
RANGE
ERODES**

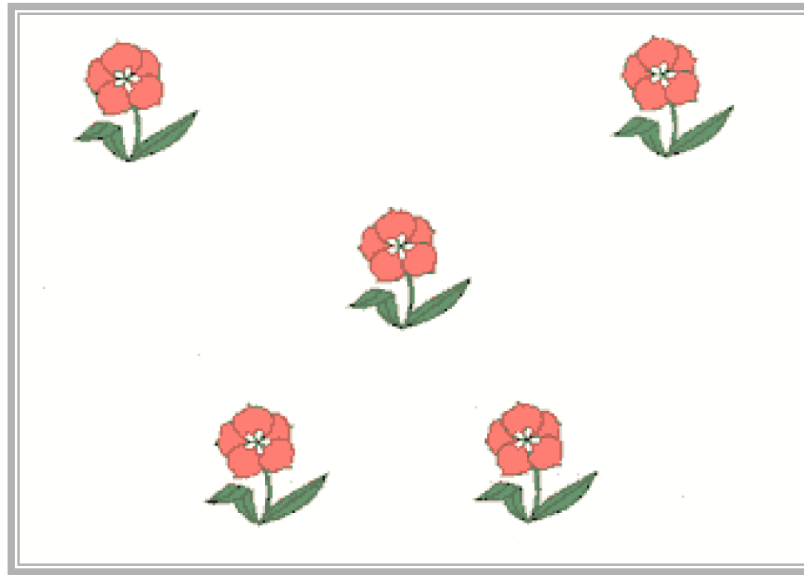


**MOUNTAIN
RANGE
ERODES**

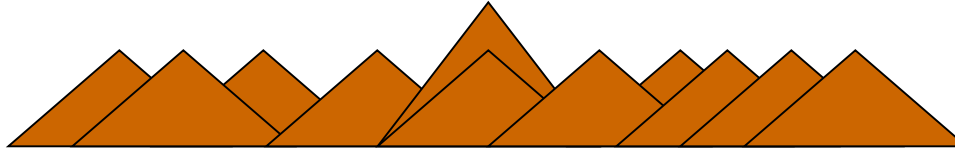
**SOUTHERN
POPULATION**



**NORTHERN
POPULATION**

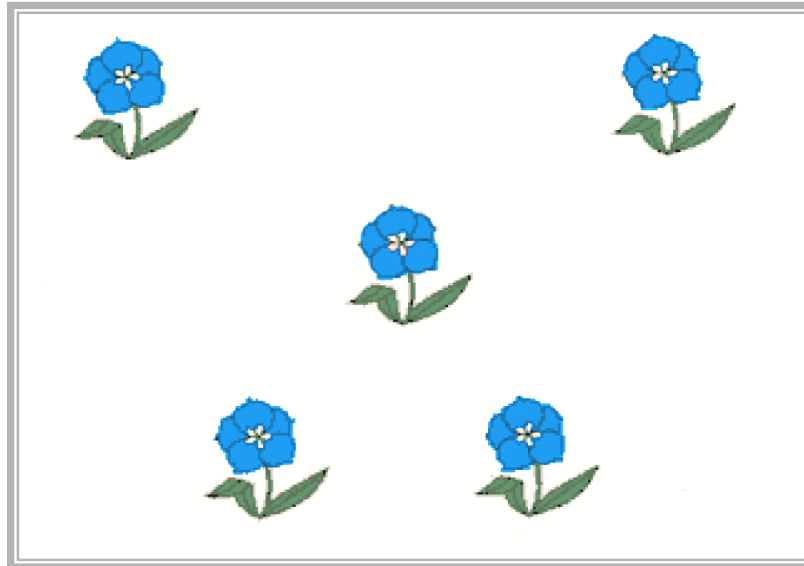


**MOUNTAIN
RANGE
ERODES**

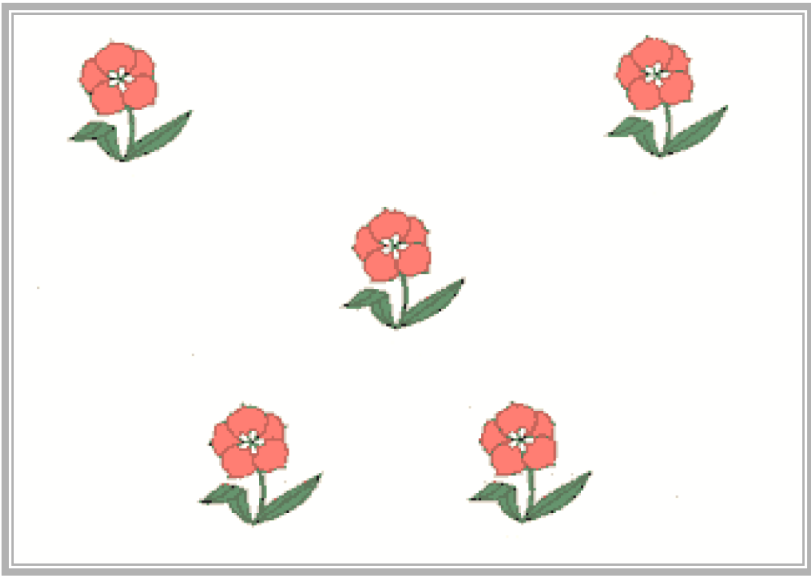


**MOUNTAIN
RANGE
ERODES**

**SOUTHERN
POPULATION**



NORTHERN
POPULATION

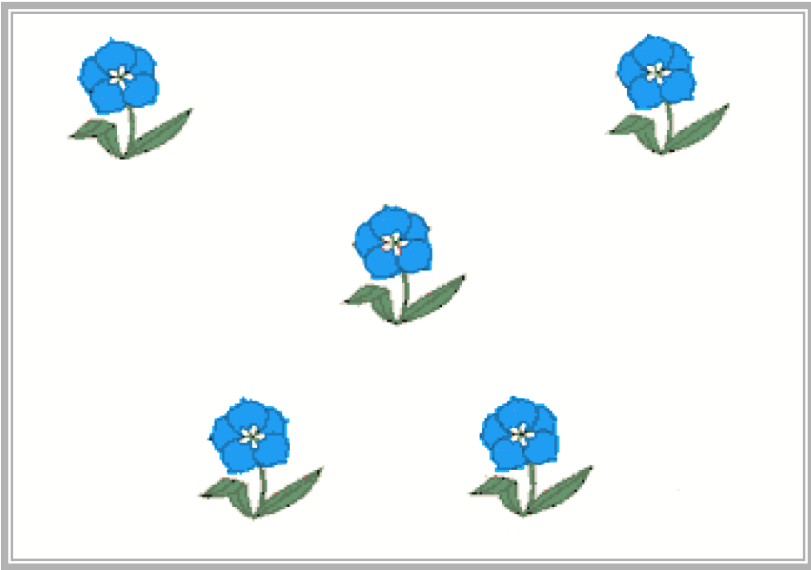


MOUNTAIN
RANGE
ERODES

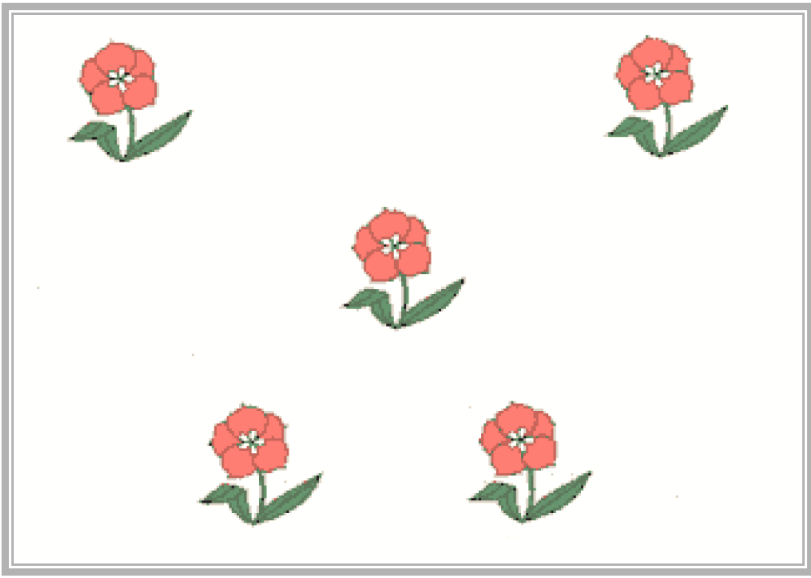


MOUNTAIN
RANGE
ERODES

SOUTHERN
POPULATION



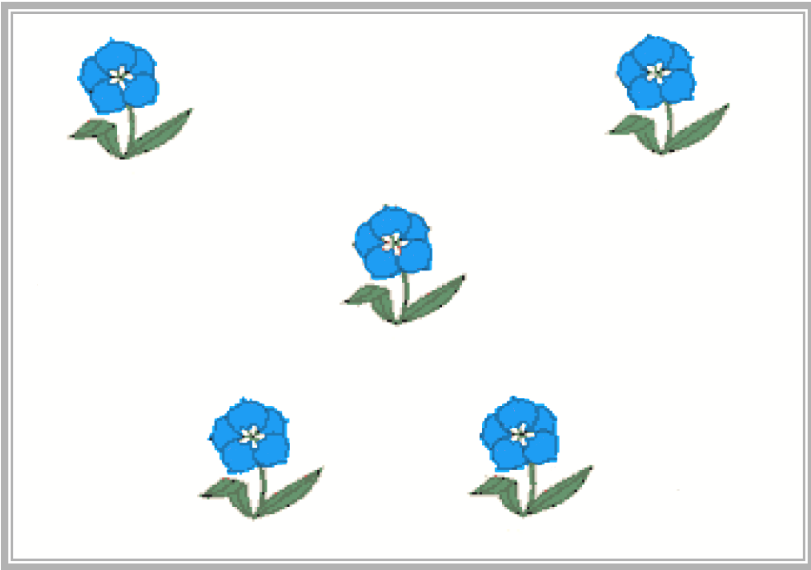
**NORTHERN
POPULATION**



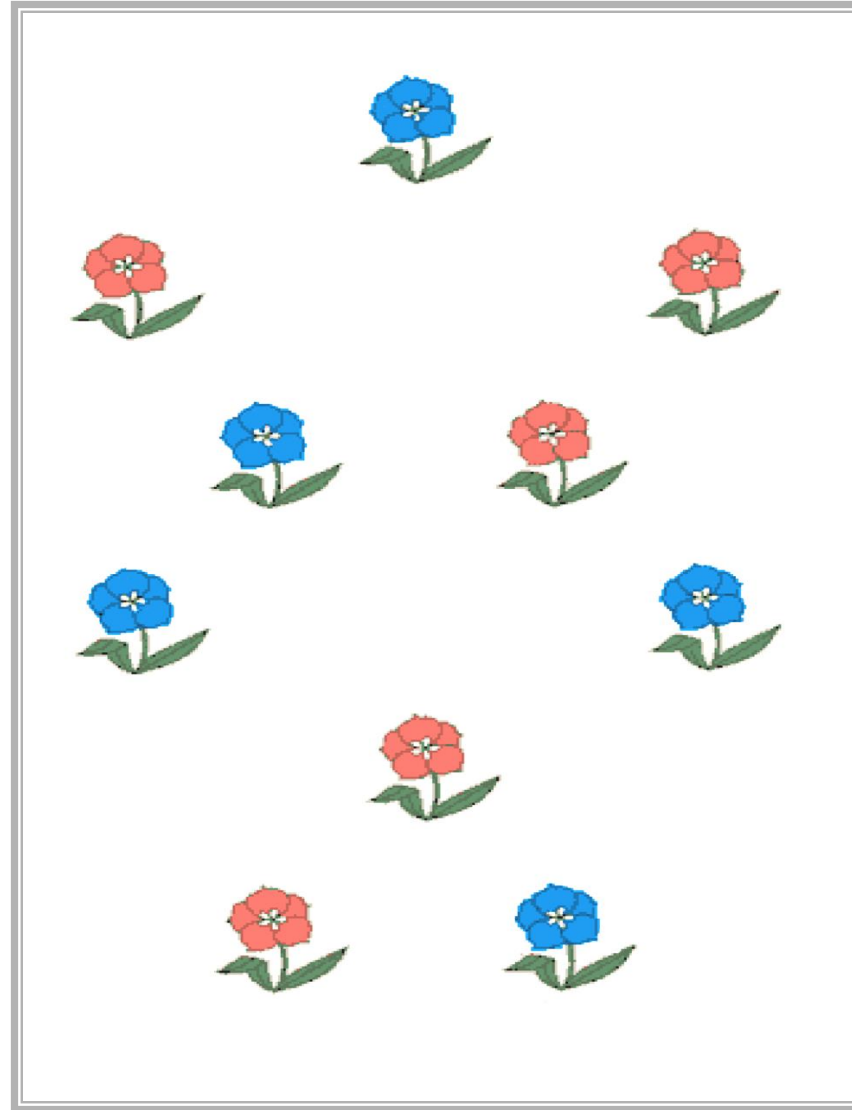
**MOUNTAIN
RANGE
ERODES**

**MOUNTAIN
RANGE
ERODES**

**SOUTHERN
POPULATION**



HYBRID-SWARM SPECIES

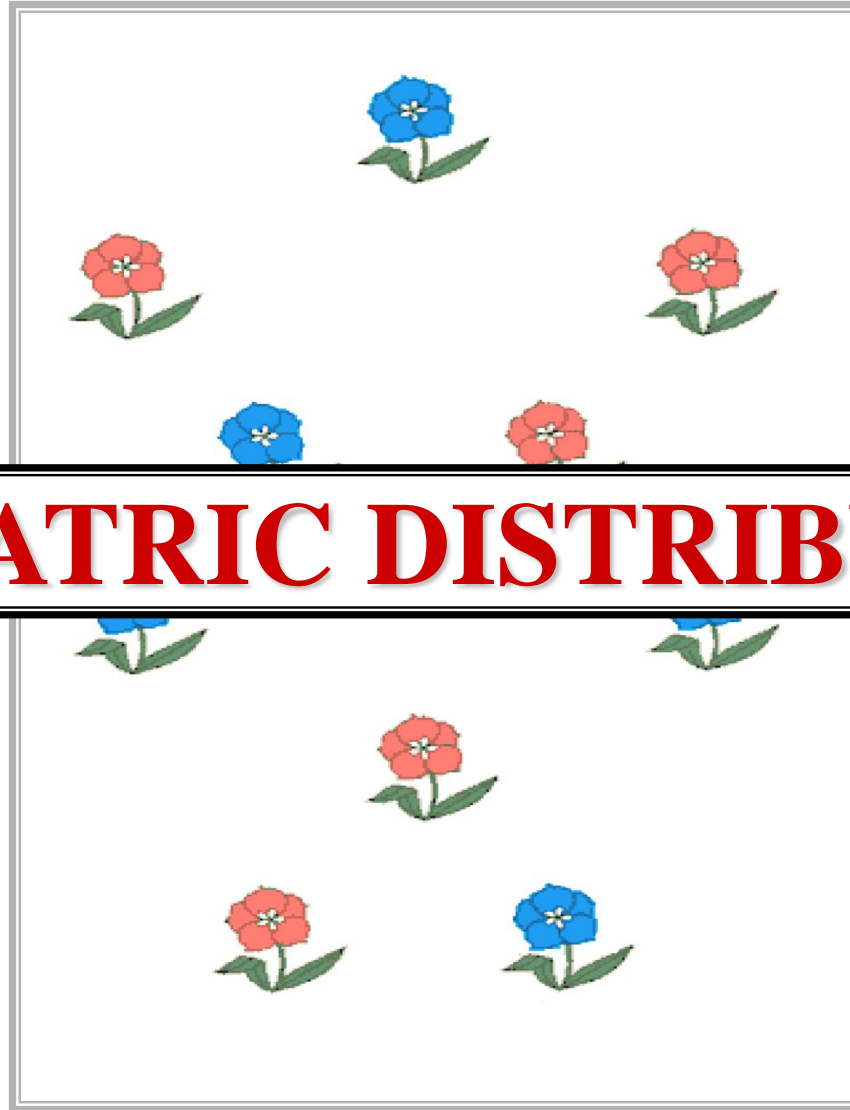


**SAME
GEOGRAPHIC
AREA**

**SAME
GEOGRAPHIC
AREA**

HYBRID-SWARM SPECIES

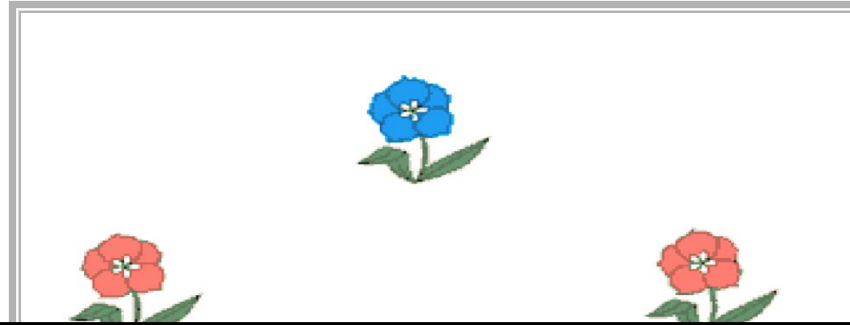
HYBRID-SWARM SPECIES



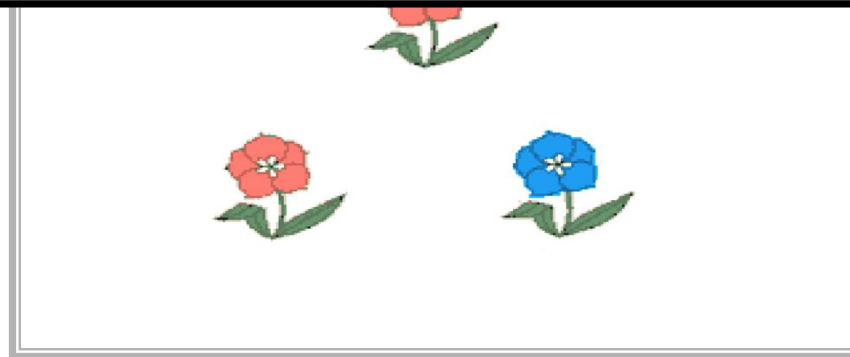
SYMPATRIC DISTRIBUTION

HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES

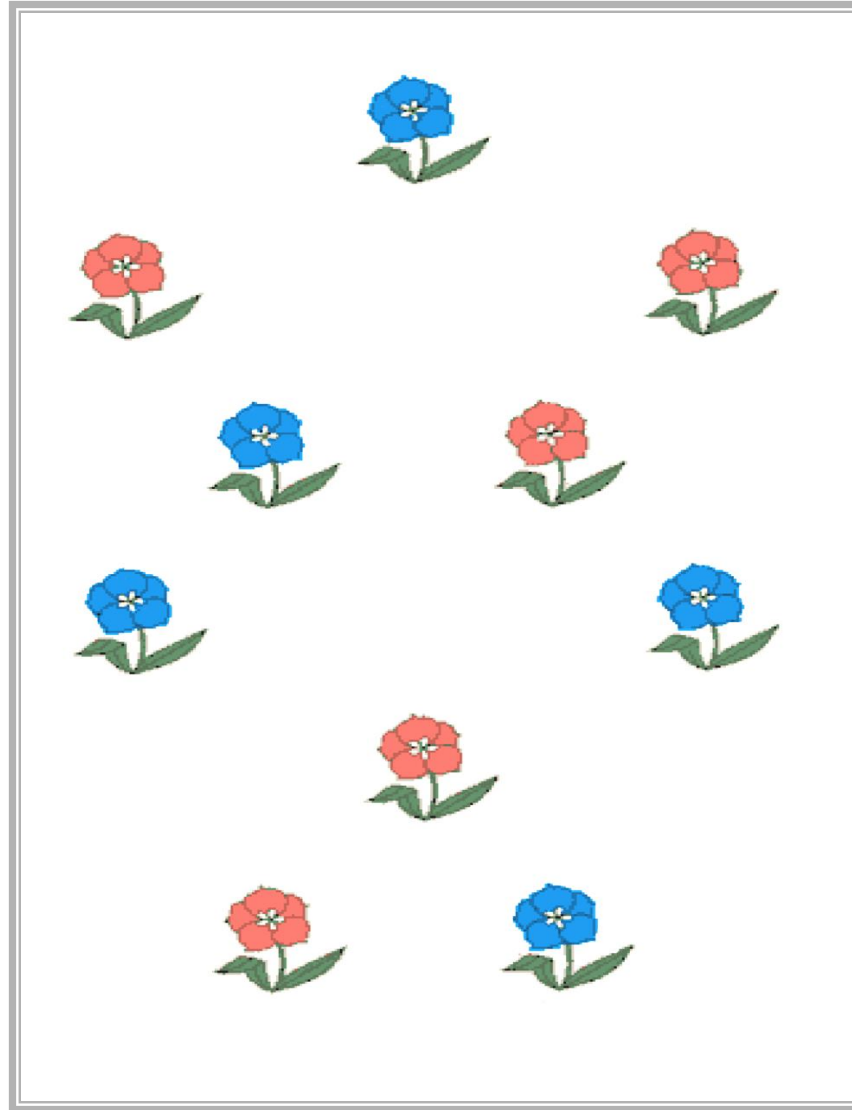


**POPULATIONS
REPRODUCTIVELY
VIABLE OR NON-VIABLE?**



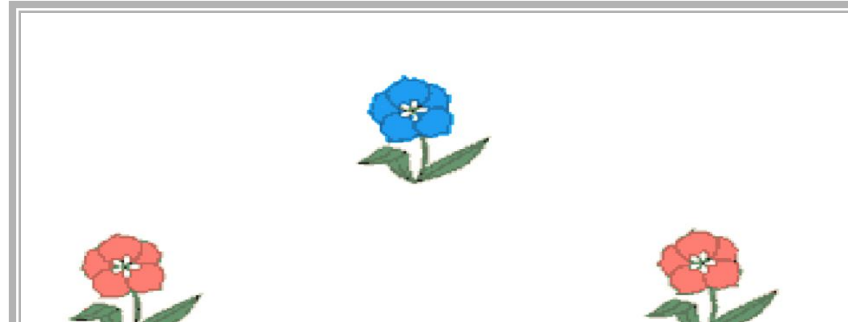
HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES

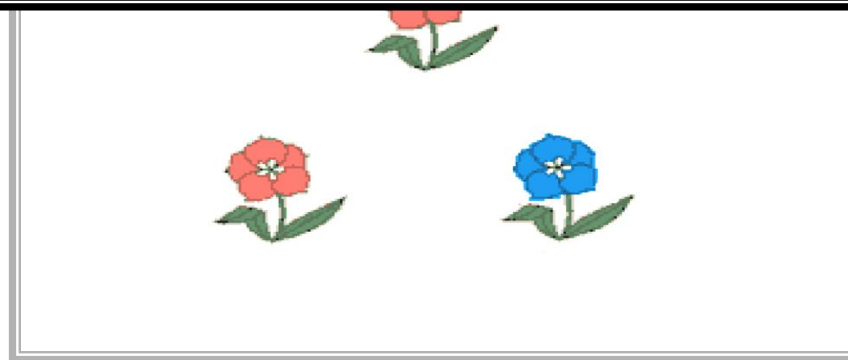


HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES



**POPULATIONS
REPRODUCTIVELY
VIABLE**

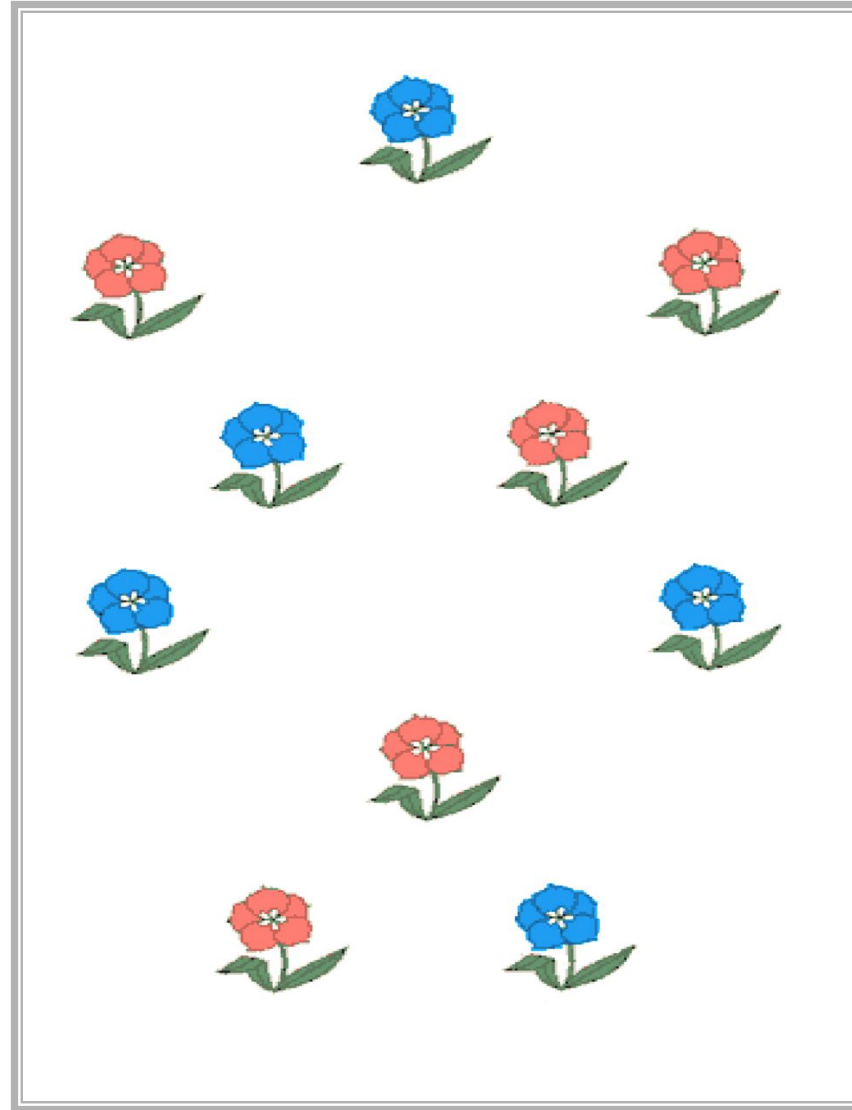


HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES

HY

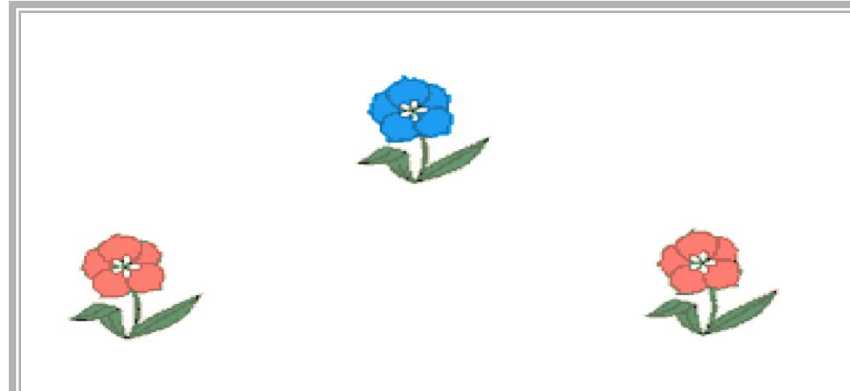
TIME



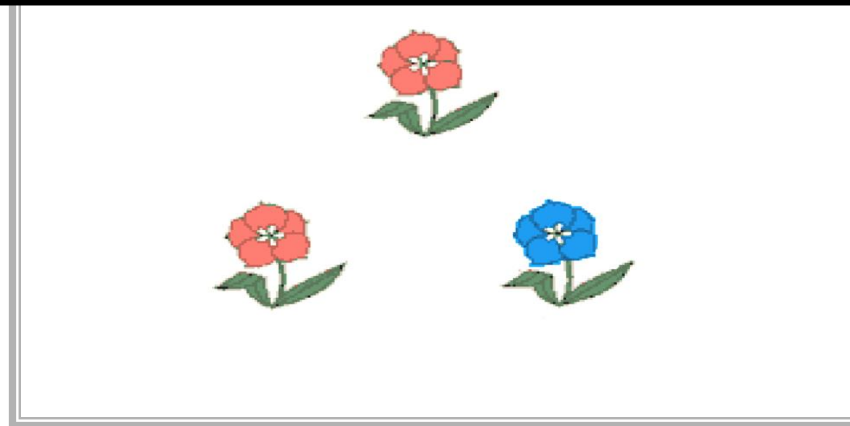
TIME

HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES

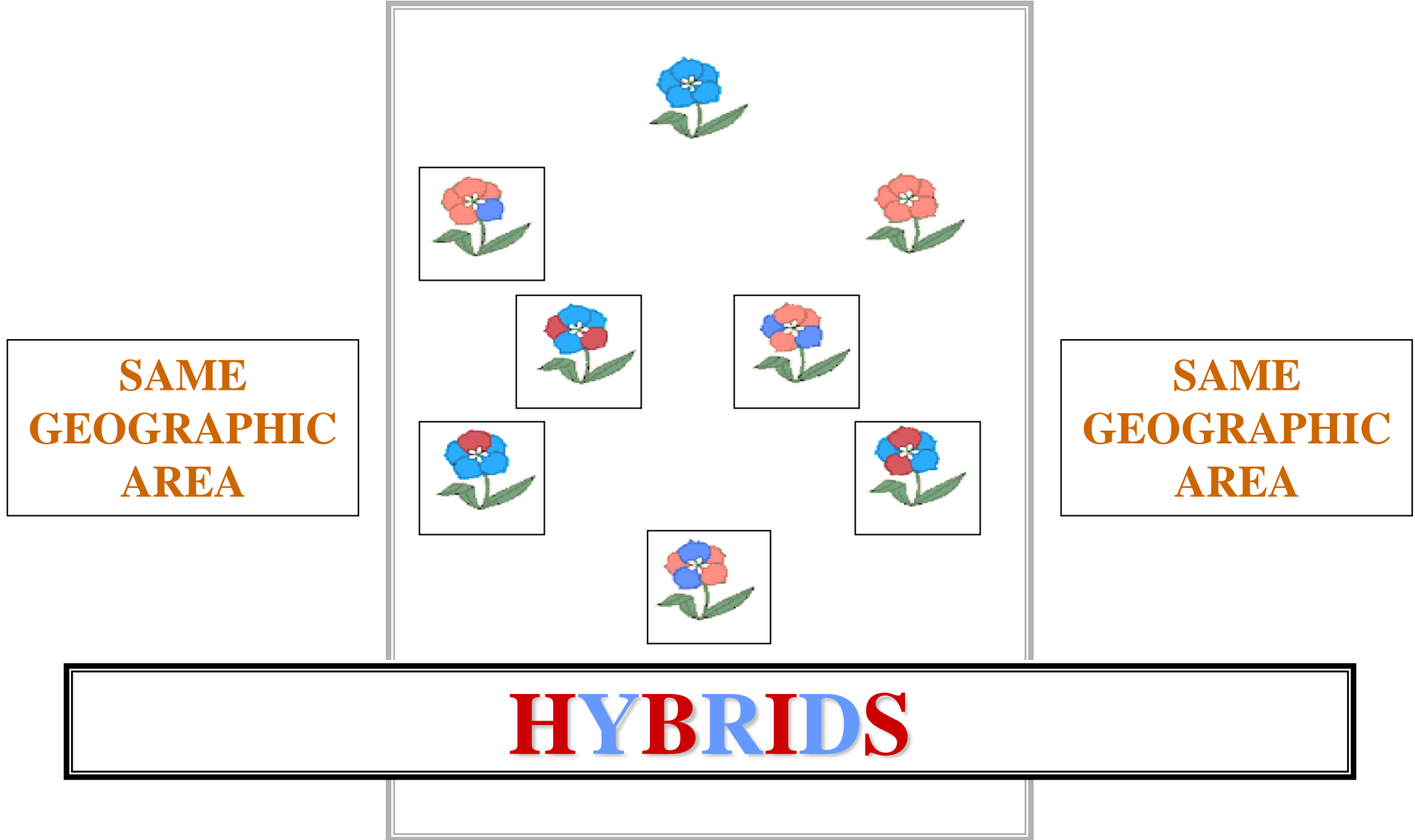


**SYMPATRIC POPULATIONS
HYBRIDIZE**



HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES

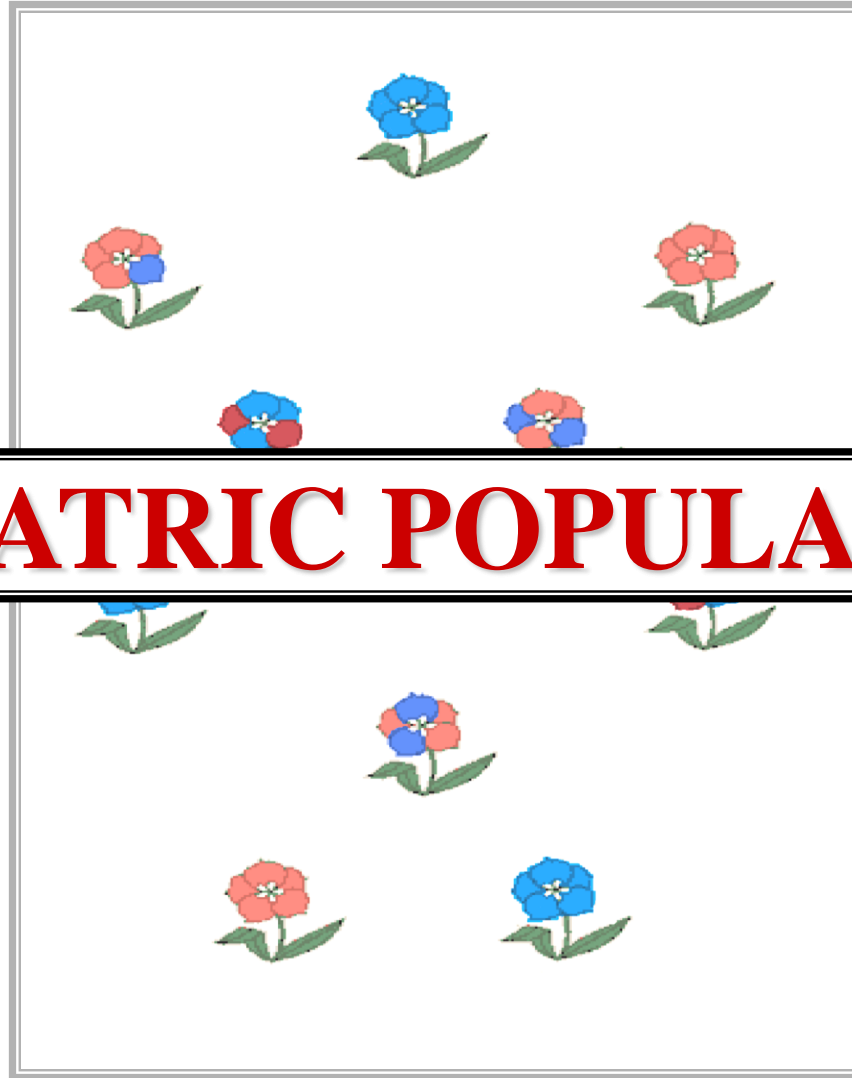


HYBRID-SWARM SPECIES



HYBRID-SWARM SPECIES OUTCOME

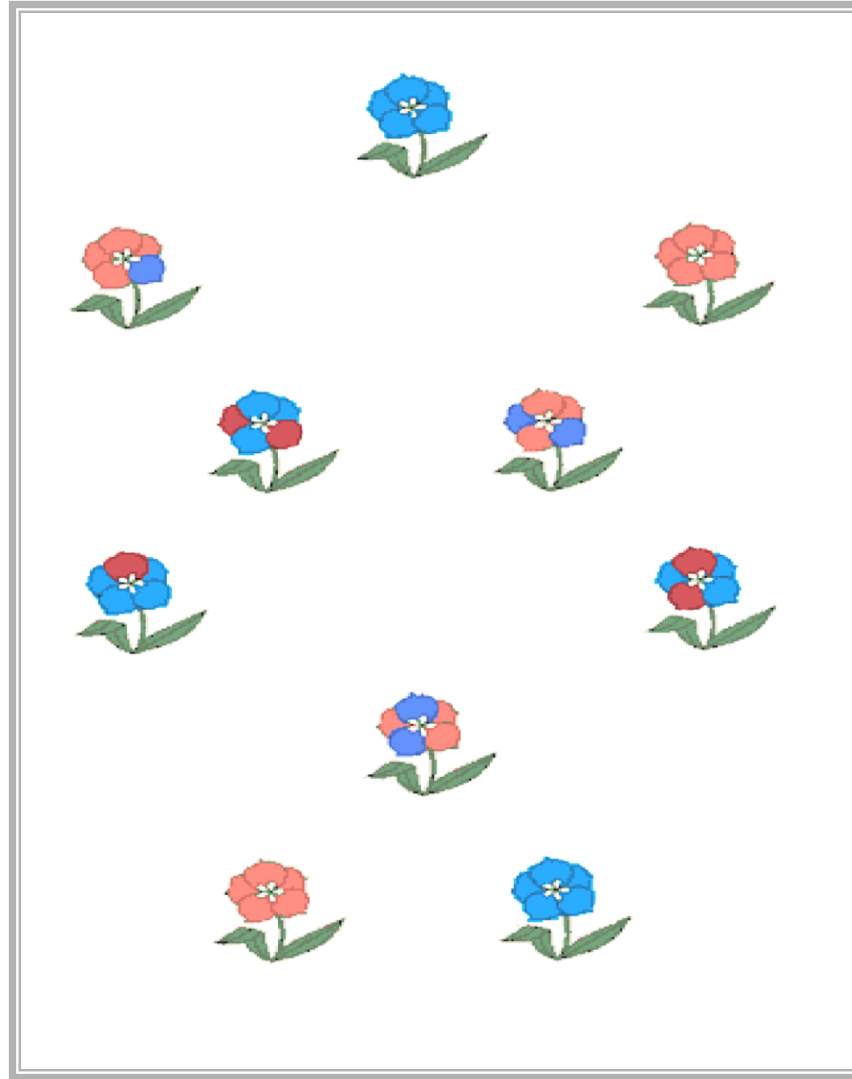
HYBRID-SWARM SPECIES



SYMPATRIC POPULATIONS

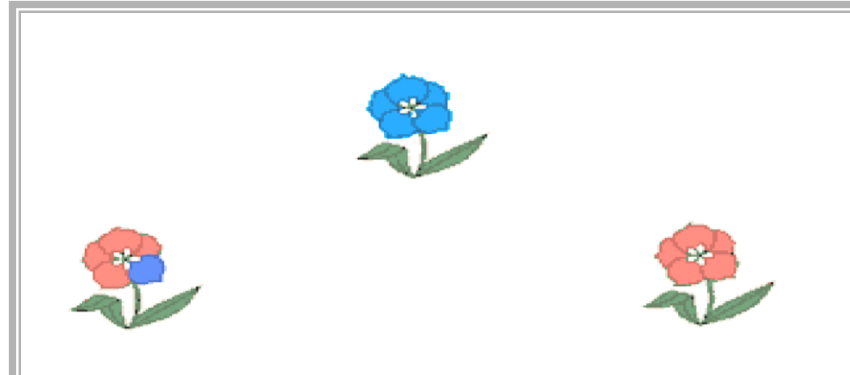
HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES

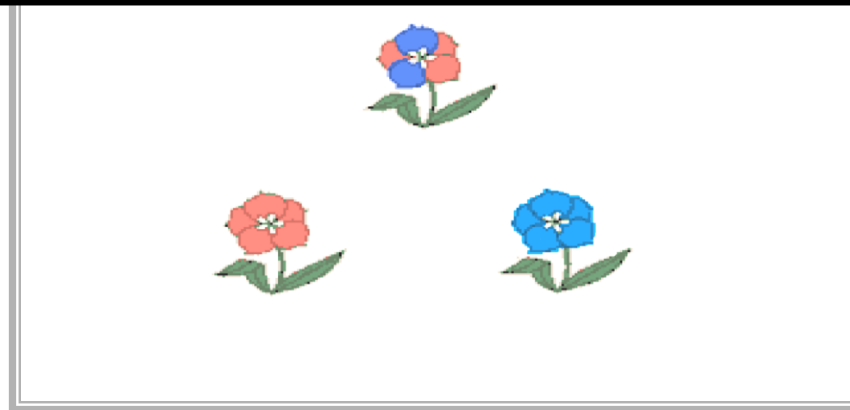


HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES

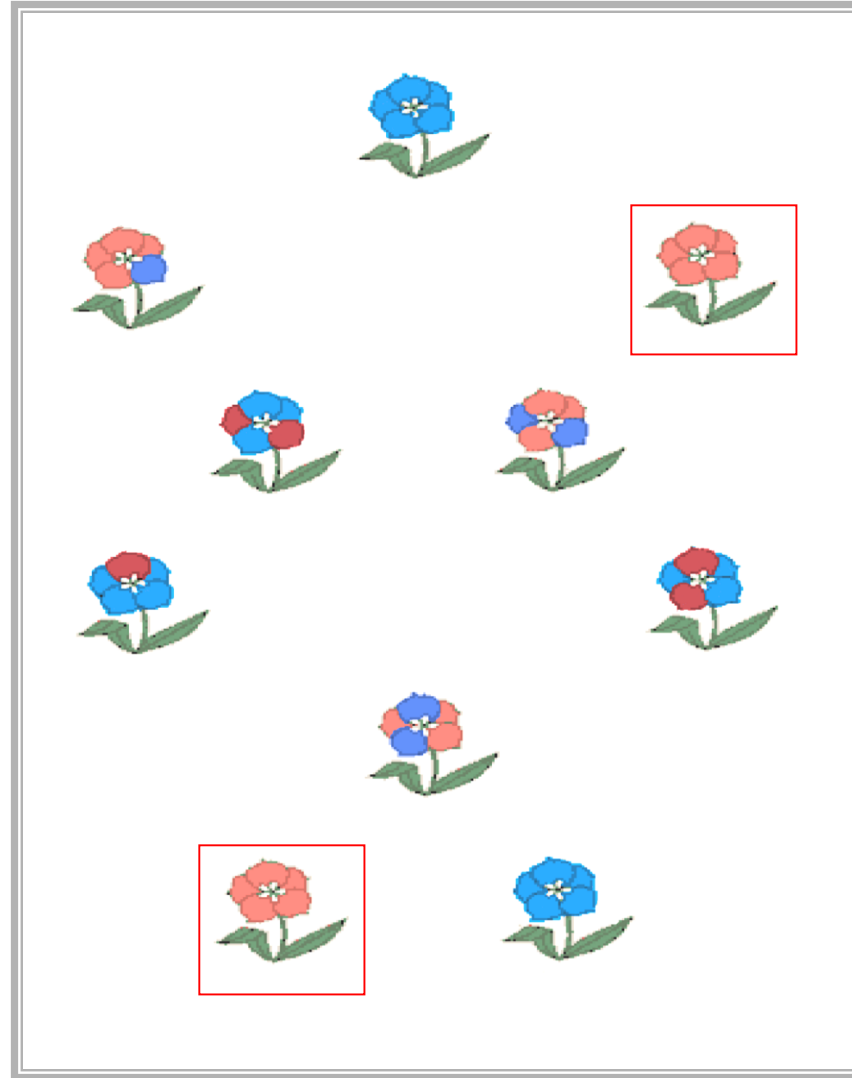


**MORPHOLOGICALLY
DISTINCT**



HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES

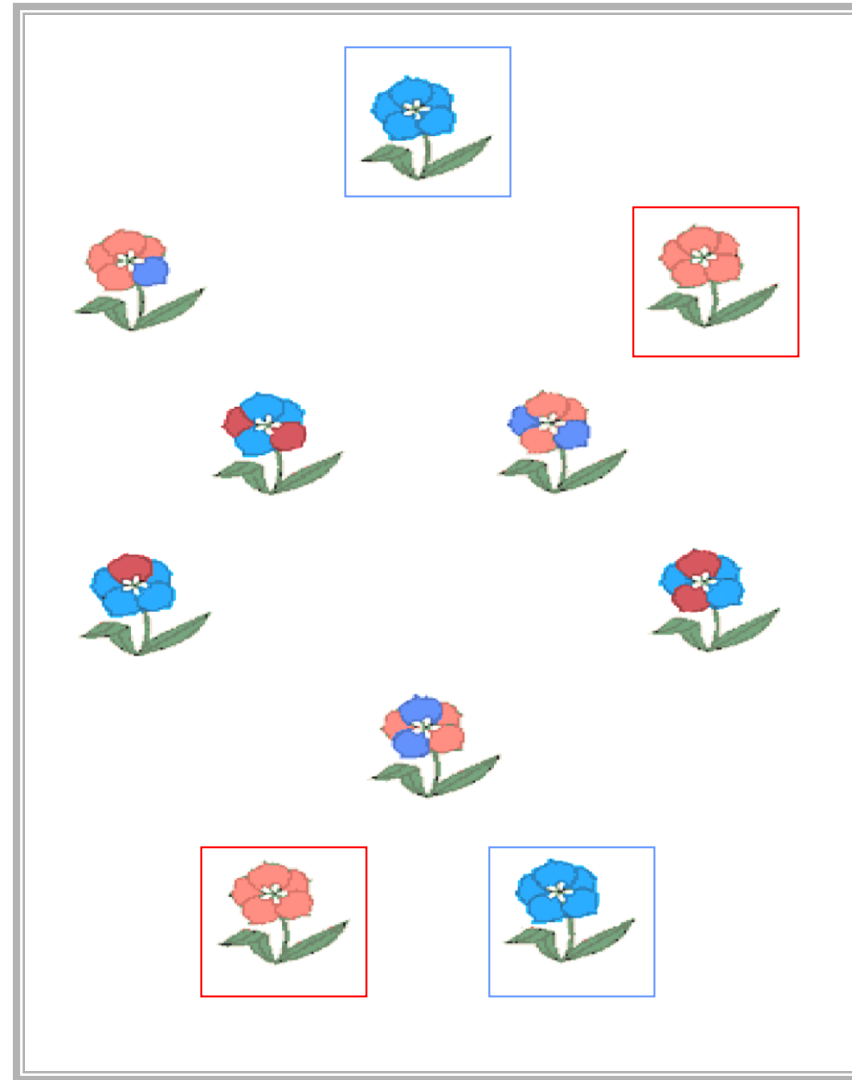


**SAME
GEOGRAPHIC
AREA**

**SAME
GEOGRAPHIC
AREA**

HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES



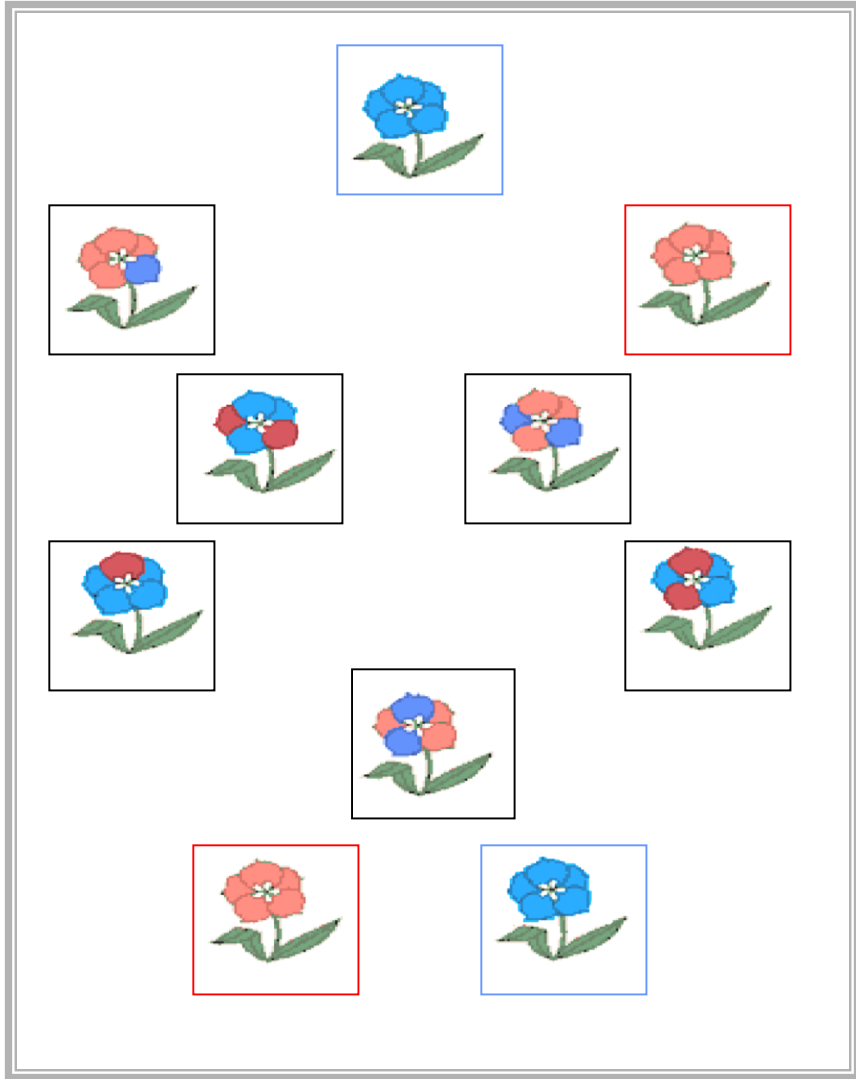
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GEOGRAPHIC
AREA**

**SAME
GEOGRAPHIC
AREA**

HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES

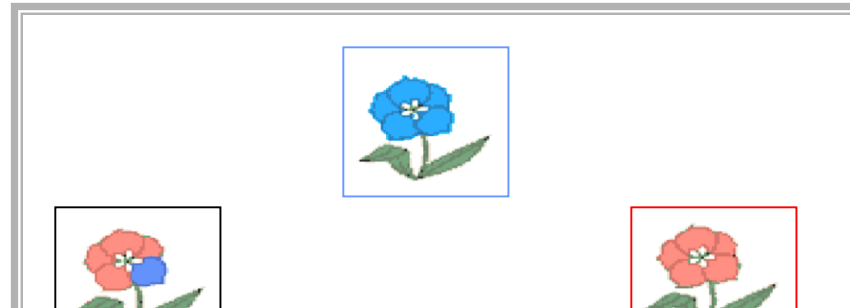
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AREA



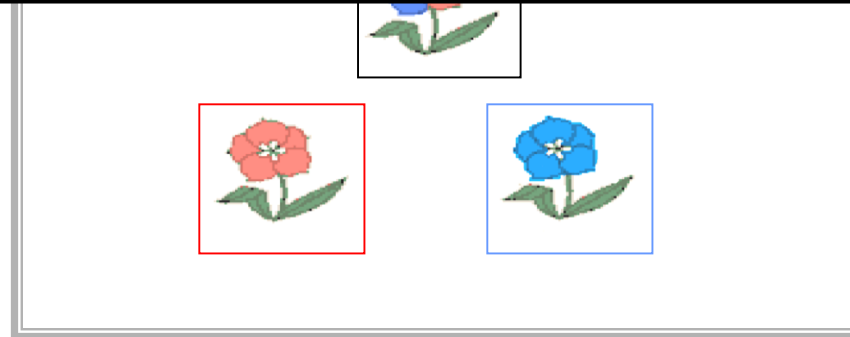
SAME
GEOGRAPHIC
AREA

HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES

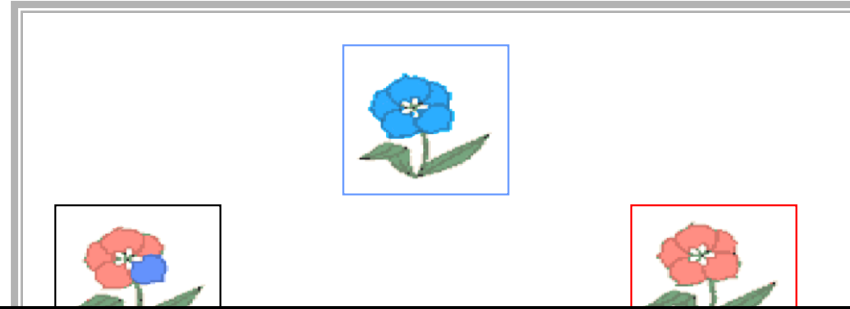


**POPULATIONS
REPRODUCTIVELY
VIABLE OR NON-VIABLE?**

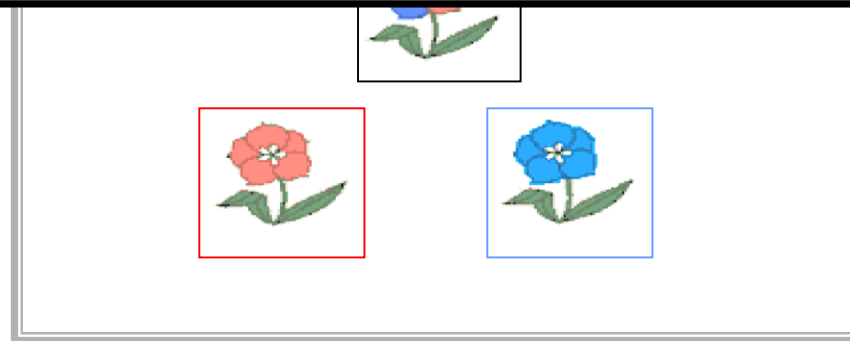


HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES

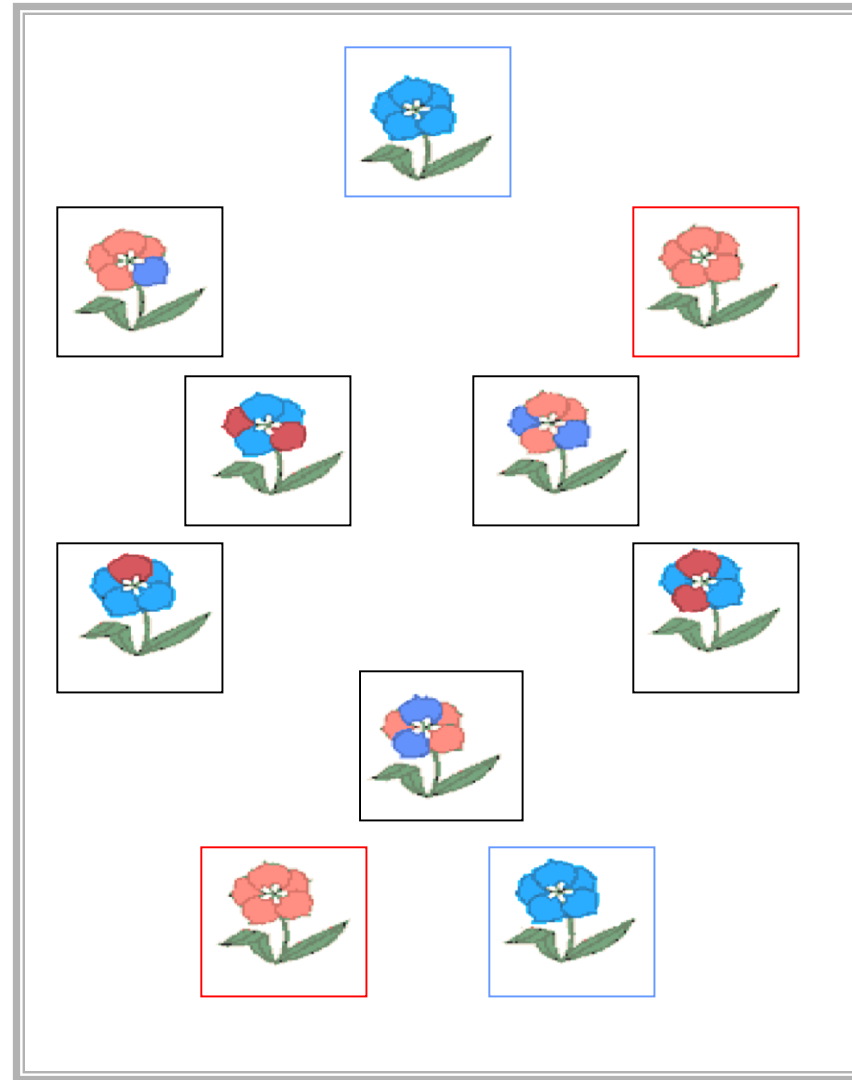


**POPULATIONS
REPRODUCTIVELY
VIABLE**



HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES

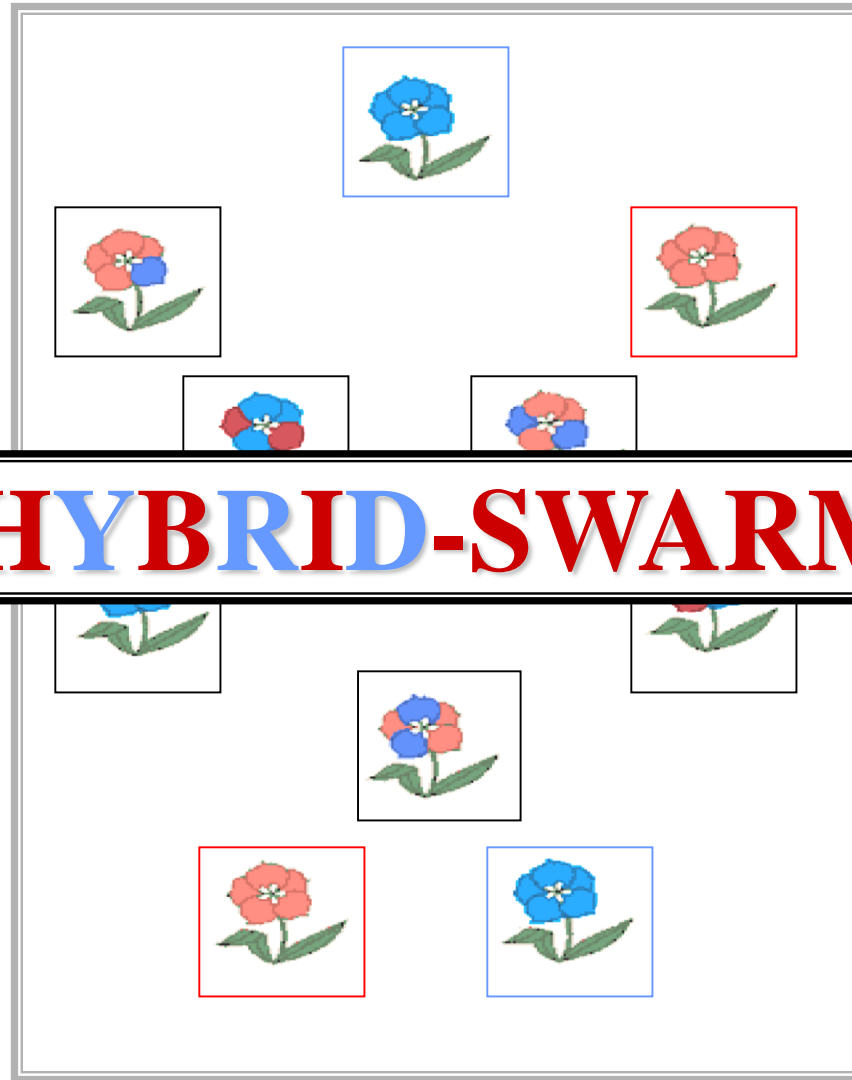


SAME
GEOGRAPHIC
AREA

SAME
GEOGRAPHIC
AREA

HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES



HYBRID-SWARM

HYBRID-SWARM SPECIES



HYBRID-SWARM TAXONOMIC QUESTIONS

QUESTION

**HOW MANY SPECIES
SHOULD BE
RECOGNIZED?**

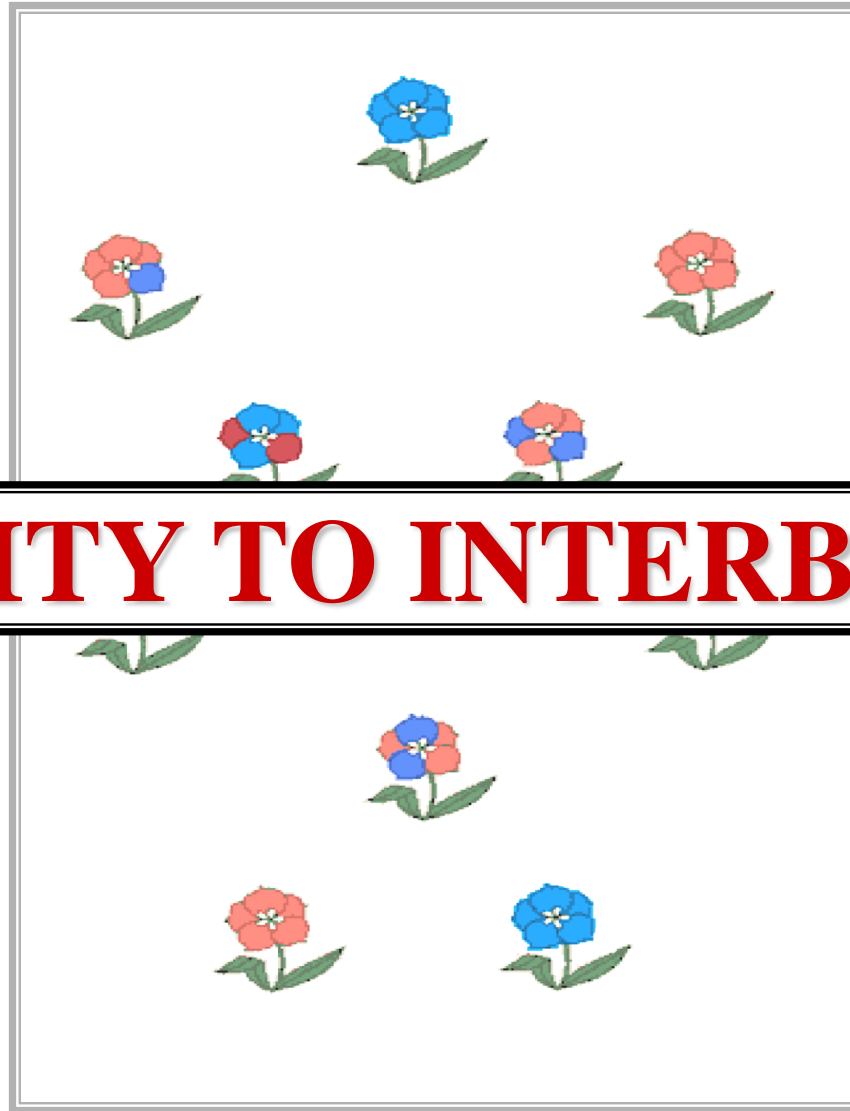
QUESTION

ANSWER
DEPENDS
ON
BOTANIST
ANSWER



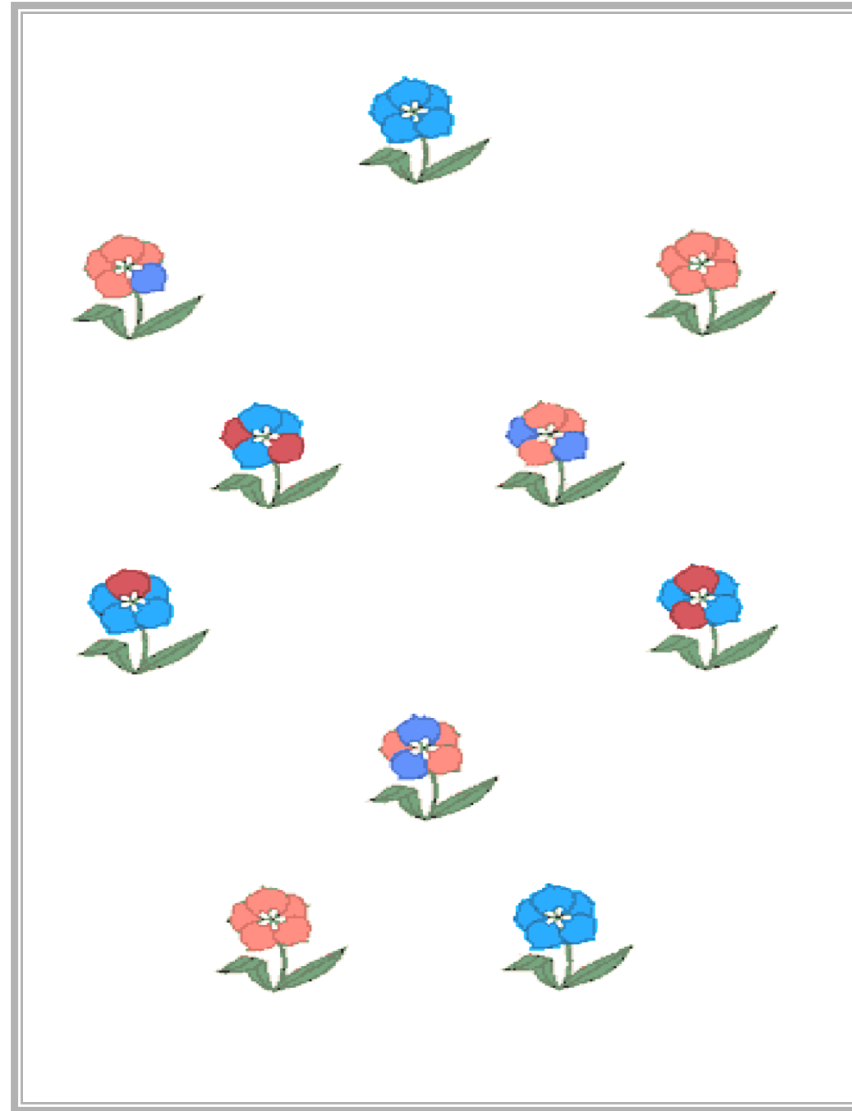
BIOLOGICAL SPECIES CONCEPT

HYBRID-SWARM SPECIES



HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES



**SAME
GEOGRAPHIC
AREA**

**SAME
GEOGRAPHIC
AREA**

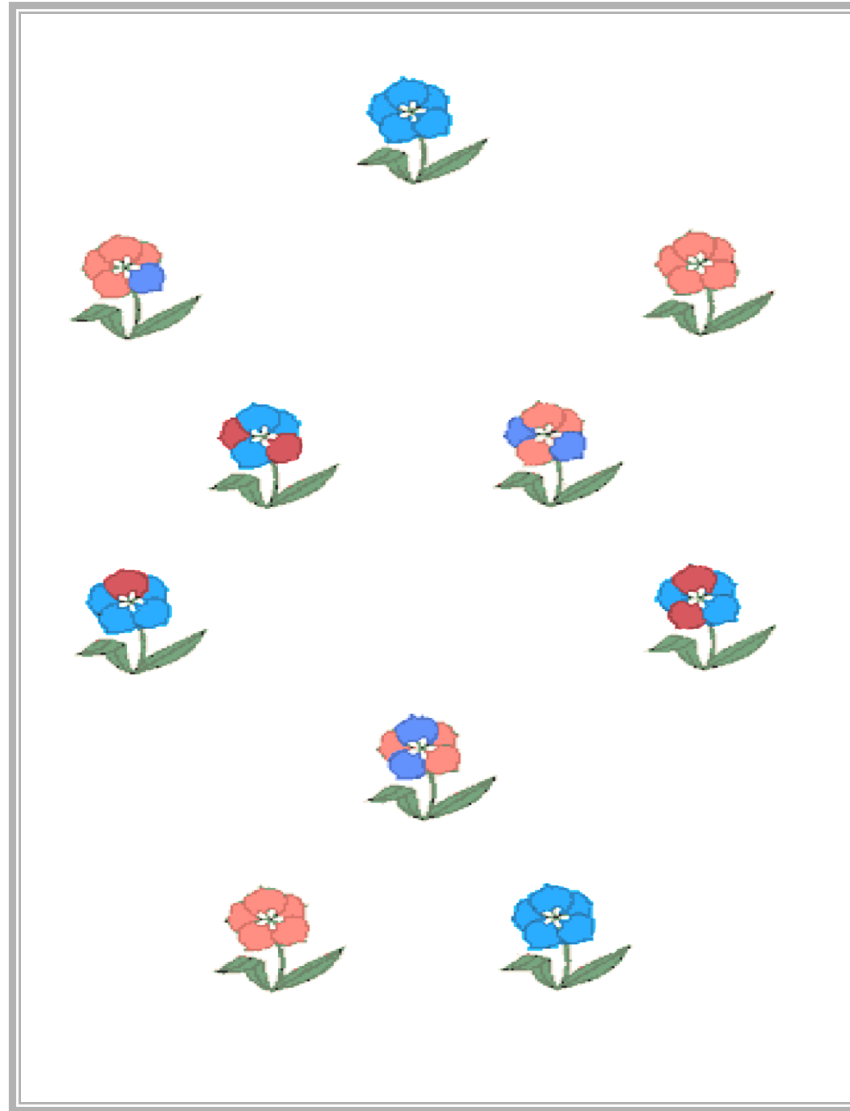
HYBRID-SWARM SPECIES

QUESTION

**HOW MANY SPECIES
SHOULD BE
RECOGNIZED?**

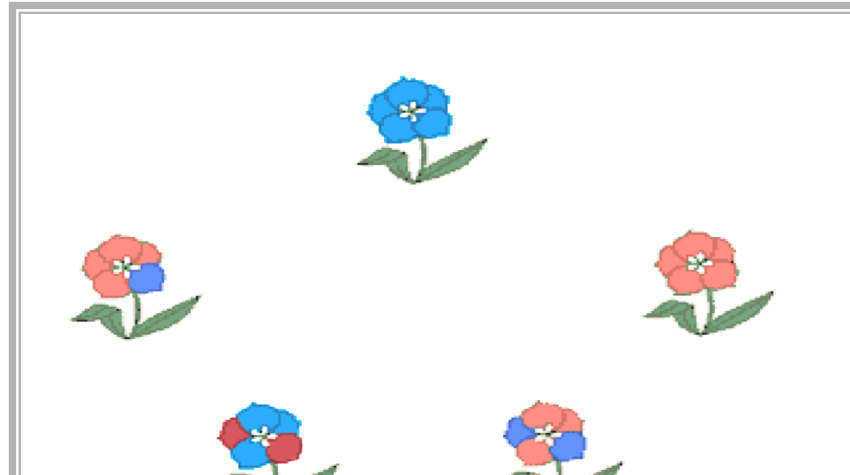
QUESTION

HYBRID-SWARM SPECIES

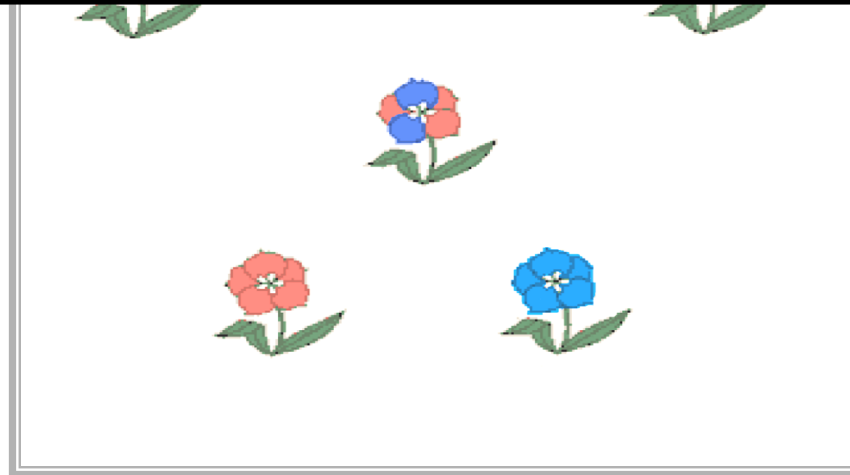


HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES



1 SPECIES

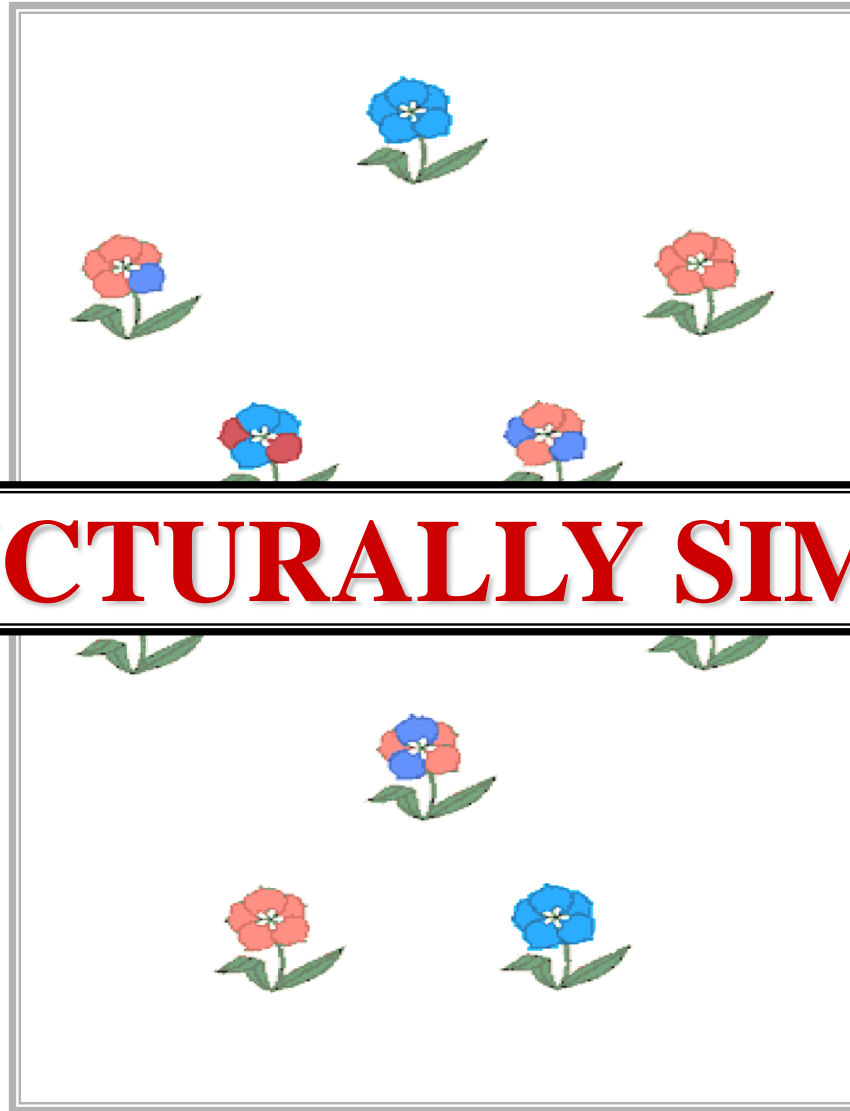


HYBRID-SWARM SPECIES



MORPHOLOGICAL SPECIES CONCEPT

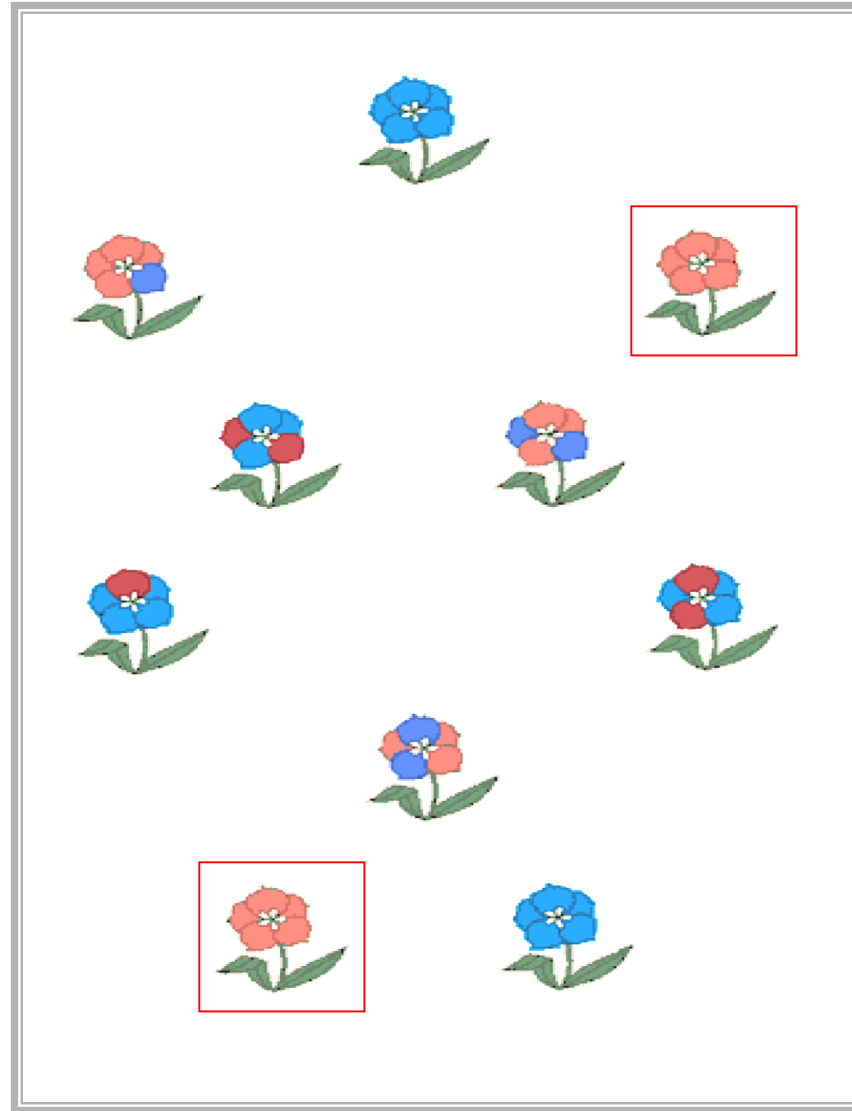
HYBRID-SWARM SPECIES



STRUCTURALLY SIMILAR

HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES

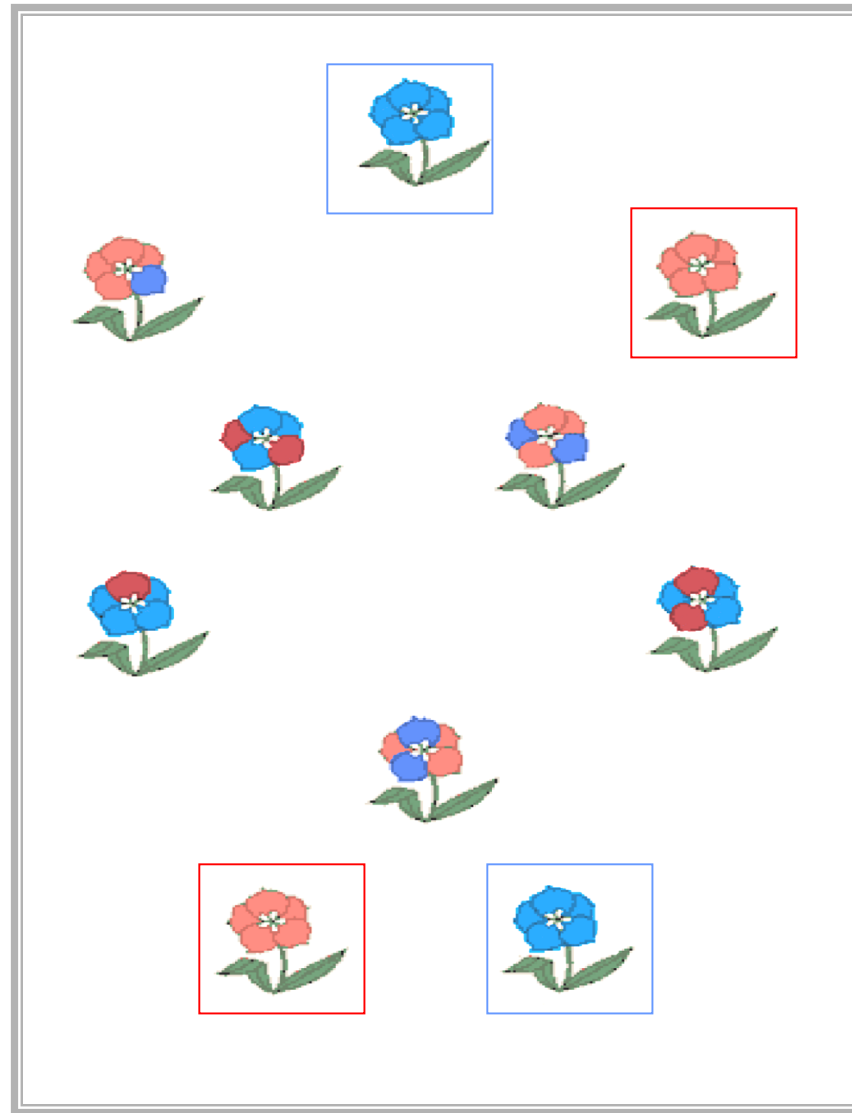


**SAME
GEOGRAPHIC
AREA**

**SAME
GEOGRAPHIC
AREA**

HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES

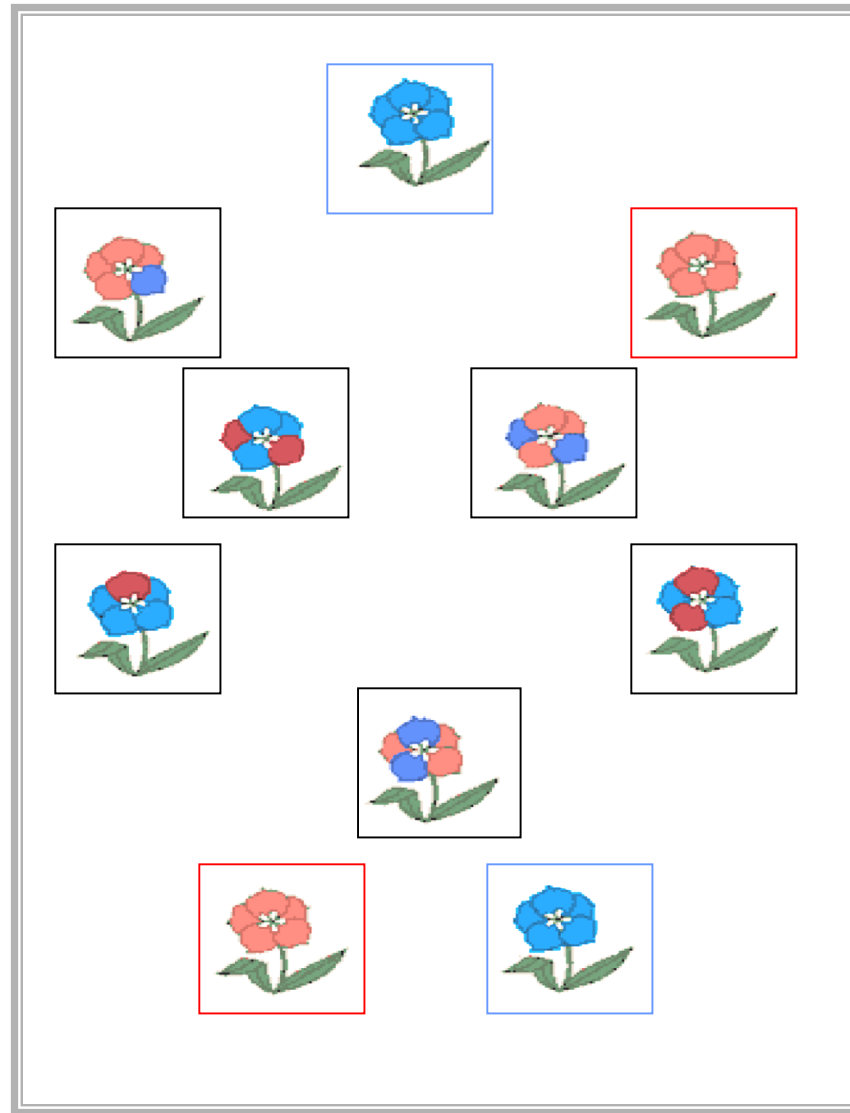


**SAME
GEOGRAPHIC
AREA**

**SAME
GEOGRAPHIC
AREA**

HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES



**SAME
GEOGRAPHIC
AREA**

**SAME
GEOGRAPHIC
AREA**

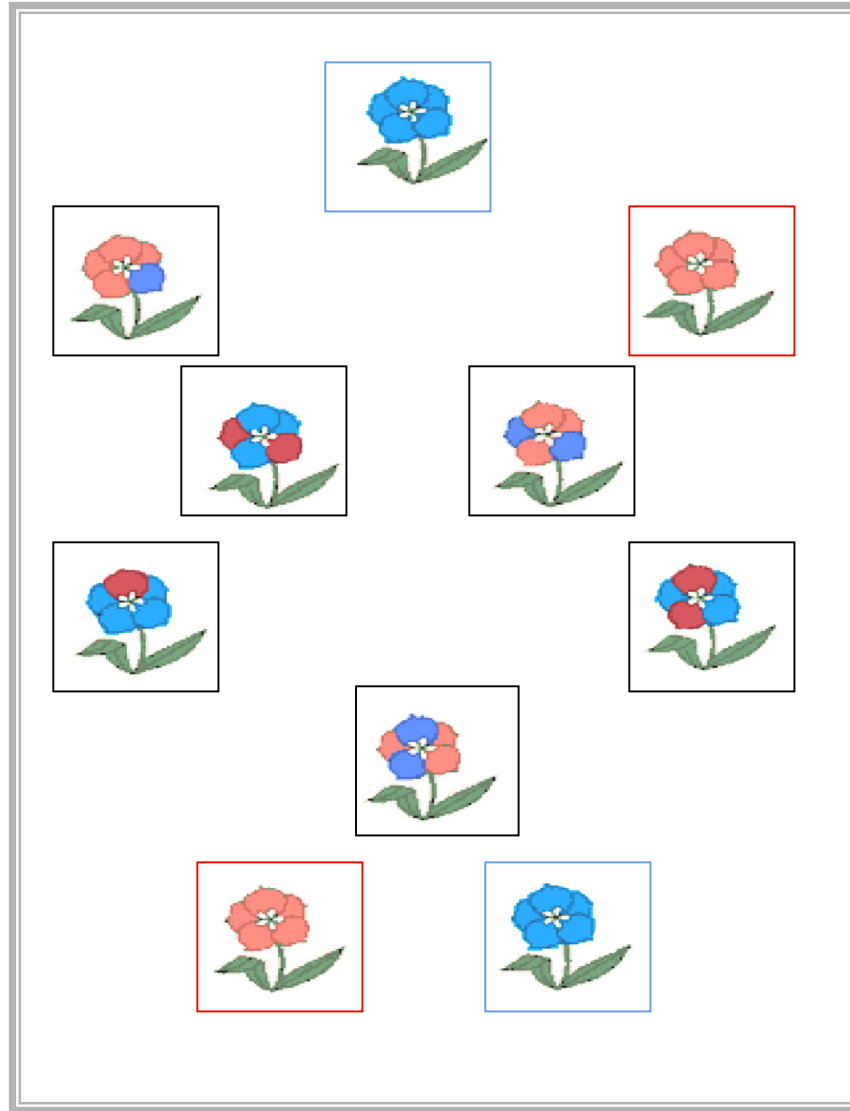
HYBRID-SWARM SPECIES

QUESTION

**HOW MANY SPECIES
SHOULD BE
RECOGNIZED?**

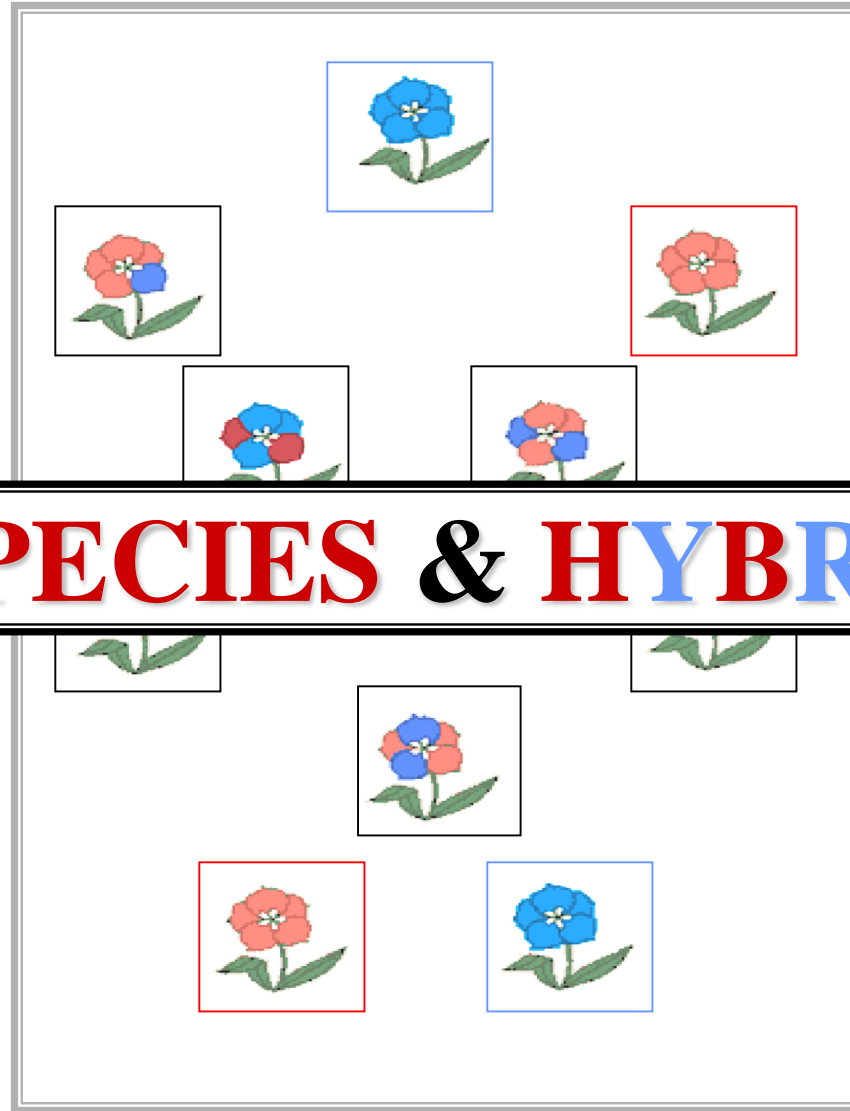
QUESTION

HYBRID-SWARM SPECIES



HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES



2 SPECIES & HYBRIDS

HYBRID-SWARM SPECIES



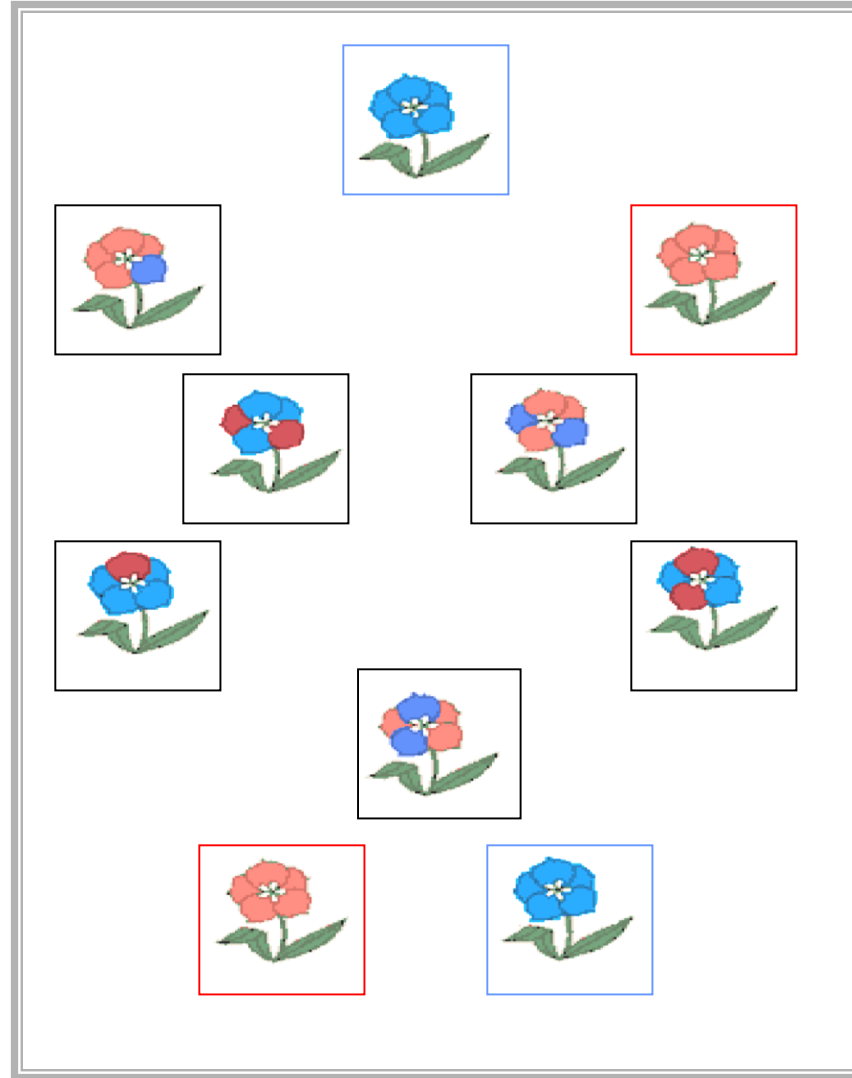
QUESTION

**WHICH SPECIES
CONCEPT IS MORE
PRACTICAL?**

QUESTION

HYBRID-SWARM SPECIES

SAME
GEOGRAPHIC
AREA



SAME
GEOGRAPHIC
AREA

HYBRID-SWARM SPECIES



ANSWER

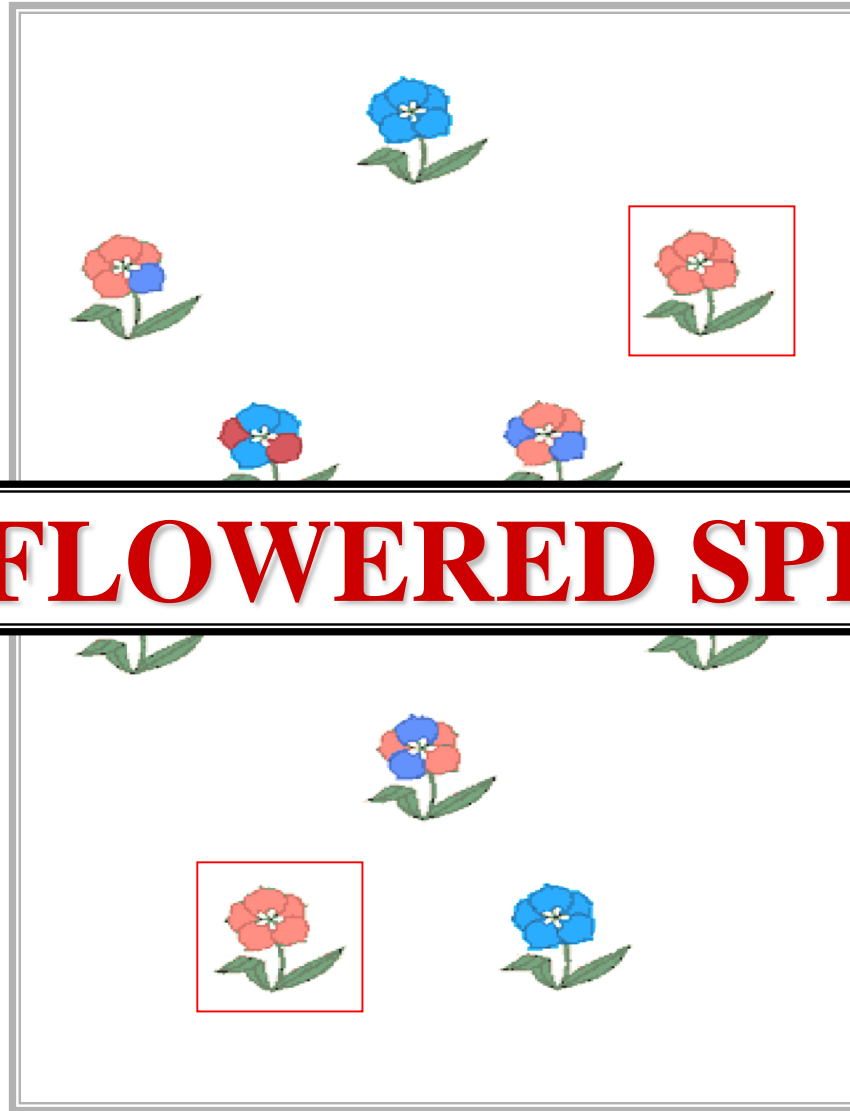
MORPHOLOGICAL

SPECIES

CONCEPT

ANSWER

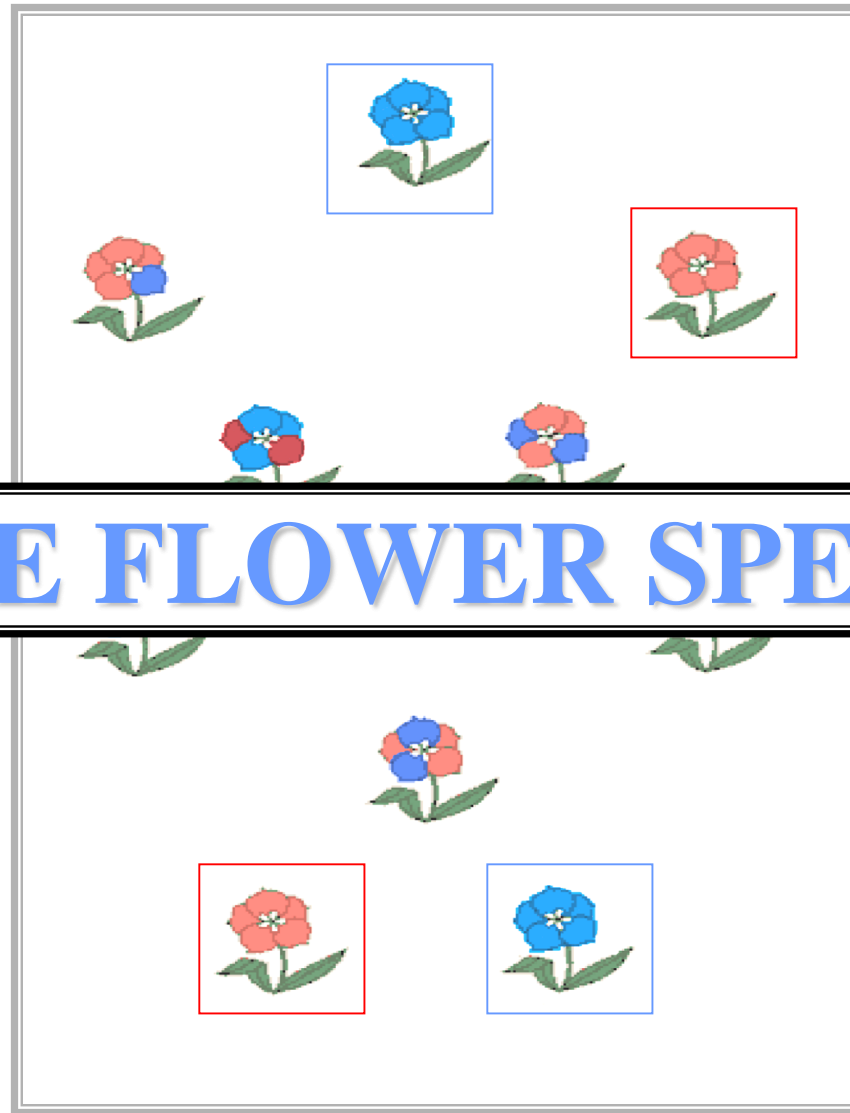
HYBRID-SWARM SPECIES



RED FLOWERED SPECIES

HYBRID-SWARM SPECIES

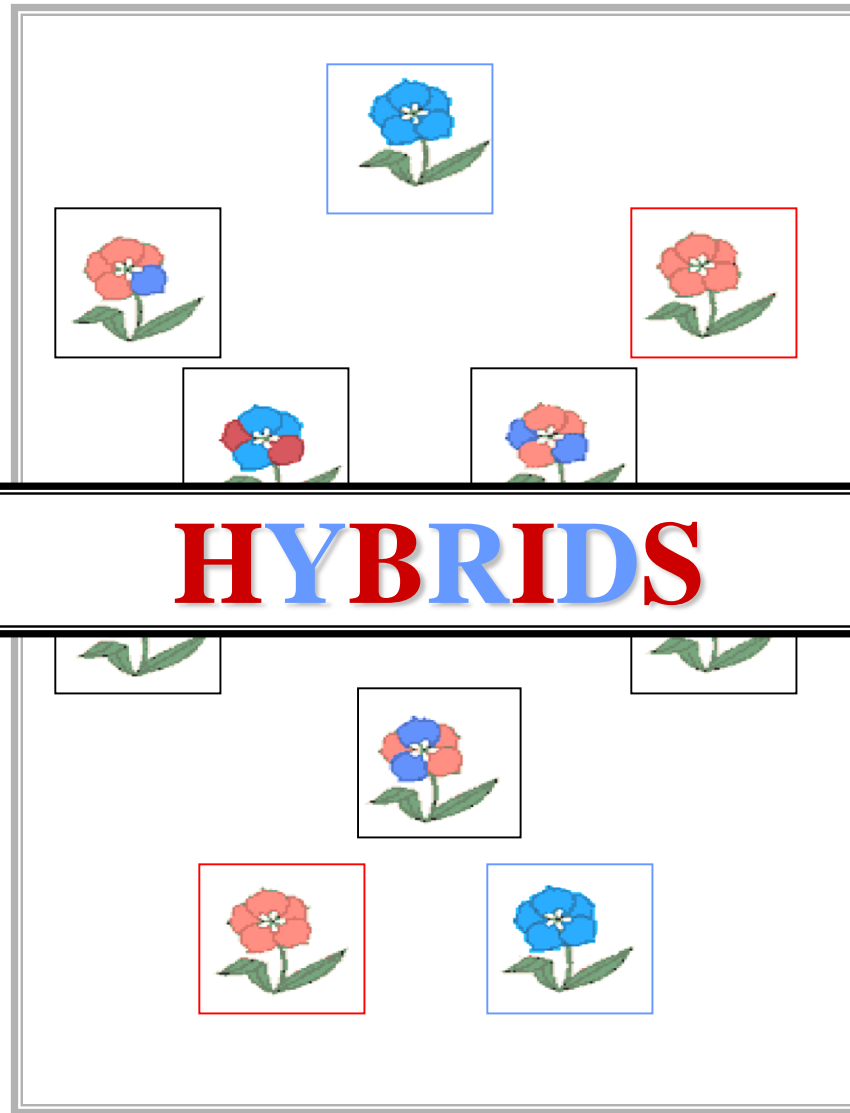
HYBRID-SWARM SPECIES



BLUE FLOWER SPECIES

HYBRID-SWARM SPECIES

HYBRID-SWARM SPECIES



HYBRID-SWARM SPECIES

NON-IDEAL SPECIES

CRYPTIC SPECIES

**NON-IDEAL
SPECIES**

CRYPTIC SPECIES



CRYPTIC SPECIES

SYMPATRIC POPULATIONS

CRYPTIC SPECIES



CRYPTIC SPECIES

SYMPATRIC POPULATIONS

MORPHOLOGICALLY IDENTICAL

CRYPTIC SPECIES