Ecological site R042BE052NM
Loamy, Cool Desert Grassland

Accessed: 05/03/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Classification relationships

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This upland site is relatively level to gently rolling alluvial fans, fan piedmont or fan remnants. With an occasional drainageway. Slopes are from 1 to 8 percent. Elevations are from 4,500 feet above sea level to 5,500 feet.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Fan piedmont (3) Fan remnant
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	None to occasional
Ponding frequency	None
Elevation	1,402–1,524 m
Slope	1–8%
Water table depth	51–203 cm
Aspect	Aspect is not a significant factor

Climatic features

This site has an arid climate with distinct seasonal temperature variations and large annual and diurnal temperature changes characteristic of a continental climate.

Precipitation averages 8 to 10 inches annually. Deviations of 4 inches or more from the average are quite common. Fifty percent of the precipitation is received from July to November, which is the dominant growing season of native

plants. Summer precipitation is characterized by high-intensity, short-duration rainstorms. Winter precipitation averages less than one-half inch per month,
usually in the form of rain. There are occasional snowstorms of short duration.

Temperatures vary from a mean monthly average of 77 F in July to 34 F in January, with a maximum of 104 F and a minimum of -10 F. The average last killing frost in spring is April 15 and the average first killing frost in fall is October 28. Frost-free season averages 185 days. Temperatures are conducive to native grass and forb growth from March through November.

Spring winds of 15 to 40 miles per hour are common from February to June. These winds
increase transpiration rates of native plants and rapidly dry the surface soil. Small soil particles are often displaced by the wind near the soil surface. This results in structural damage to native plants, especially young seedlings.

Table 3. Representative climatic features

Frost-free period (average)	165 days
Freeze-free period (average)	213 days
Precipitation total (average)	254 mm

Influencing water features

This site is not influenced by water from wetland or stream. Some of the soils do have a seasonal high water table due to irrigation.

Soil features

These soils are deep and well drained. The surface textures are fine sandy loam, very fine sandy loam, silty clay loam, clay loam or loam. Subsoils textures are calcareous loam, sandy loam, light sandy clay or light sandy clay loams, except for Tres Hermanos, which is a thin light clay loam subsoil. Substrata include calcareous loam, sandy clay loam, sandy loam, fine sandy loam, very fine sandy loam, and a few areas with gravelly and very gravelly sandy loam or loam.

Minimum and maximum values listed below represent the characteristic soils for this site.

Characteristic soils:
Vinton
Turney
Tres Hermanos
Tome
Pajarito
Madurez
Adelino
Agustin

Table 4. Representative soil features

Surface texture	(1) Loamy sand (2) Loamy fine sand (3) Fine sand
Family particle size	(1) Loamy
Drainage class	Poorly drained to somewhat excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	152–183 cm

Surface fragment cover <=3"	0–15%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	12.19–24.38 cm
Calcium carbonate equivalent (0-101.6cm)	1–7%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	7.9–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–20%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

MLRA-42, SD-1: Loamy

Overview

The loamy site occurs largely on relatively level, lower portions of piedmont slopes. Soils classified as loamy vary continuously in texture and soil moisture regime such that different potential communities occupy different soil series and different landscape positions within soil series. Loamy soils intergrade with sandy soils and clayey soils.

The historic community type is usually dominated by black grama (*Bouteloua eriopoda*). In lower positions and depressions blue grama (*Bouteloua gracilis*) may dominate. Dropseeds (*Sporobolus cryptandrus*), galleta (*Pleuraphis jamesii*), and burrograss (*Scleropogon brevifolius*) are commonly subdominant. Continuous heavy grazing leads to reductions of black grama. If black grama cover is reduced to trace levels, it may not recover leaving a galleta-dominated state. Continued poor grazing management may eliminate most galleta and dropseeds, leaving a burrograss-dominated state. On soils where blue grama is common, it may also be driven to a burrograss state. Although soil-sealing may occur in some loamy soils (especially in the burrograss state), shrub invasion is not usually observed.

Catalog of states and community pathways

State Containing Historic Plant Community

Grama Grassland: Black grama, followed by galleta, and dropseeds, was likely to have dominated most areas included within this site. In slight depressions and shallow swales (Turney loam) or areas near to mountain footslopes (e.g., Latene loam) that receive more rainfall, blue grama may have been co-dominant or dominant. On the ungrazed (for 35 yr) Sevilleta NWR, soils where blue grama was dominant within areas mapped as Turney loam or loamy sand were more heavy textured than where black grama occurred5. Shifts between black and blue grama dominance may also occur through time on some soils due to variation in the seasonality of soil moisture6. Blue grama tends to recover more quickly from disturbances such as grazing and fire and may be favored by disturbance4. Where blue grama does not occur, galleta and dropseeds increase in representation as black grama declines with heavy grazing pressure. With prolonged heavy grazing, burrograss may become dominant.

Diagnosis: Grass cover is uniform with bare patches typically > 30 cm in width. Black grama and/or blue grama is dominant. Litter covers much of interspaces such that raindrop impact on the soil surface is low.

Additional States:

Galleta-dominated: Black grama abundance is persistently depressed or eliminated, leaving galleta, dropseeds, and burrograss as dominants. Blue grama may also be present. Burrograss tends to increase with grazing pressure. Overall grass cover may be somewhat reduced, but galleta and other grass growth may compensate black grama's absence. This state is not frequently observed.

Diagnosis: Black grama is very rare or absent. Galleta, dropseeds, or burrograss are dominant. Bare ground patches up to 1 m across may be observed, with patchy evidence of soil sealing on some soils.

Transition to Galleta-dominated (1a) Loss of black grama grass cover due to continuous heavy grazing through drought periods causes the transition. Once most plants are eliminated, recovery of black grama cover via stolons would require periods of high summer rainfall, and be very slow even with grazing rest. Establishment by seed appears to be limited.

Key indicators of approach to transition:
? Overutilization, decadence, and mortality of black grama.
? Absence of stolons
? Increasing size of bare ground patches

Transition back to Grama Grassland (1b) The recolonization of black grama may be facilitated by prescribed grazing and seeding in SD-1, although establishment rates are low.

Burrograss fluctuates from 15-28%cover or 5-14% without other species colonizing

Bare ground returns slowly to burrograss in extreme cases (35-40 yrs)

Burrograss-Dominated: Burrograss is dominant and interspaces between plants are sealed. Erosion may have stripped away surface soils. Galleta, dropseeds, and other perennial grasses are rare or absent. Burrograss seeds are well adapted to establishment in soils that have developed physical crusts due to raindrop impact1,3. These plants also reproduce by stolons. Long-term monitoring within the Sevilleta NWR indicates that the burrograss-dominated state may be quite stable. Over 20 years in ungrazed conditions on the Turney loam map unit, burrograss canopy cover fluctuated between 15-28% in one transect and 5-14% in another, with very little or no recruitment of other species 5, 6. Burrograss cover may decline to very low levels with drought and continuous grazing and take decades to recover. Burrograss is relatively tolerant of drought3.

Diagnosis: Burrograss is dominant, other grasses are usually rare, and soil sealing in exposed soil is extensive.

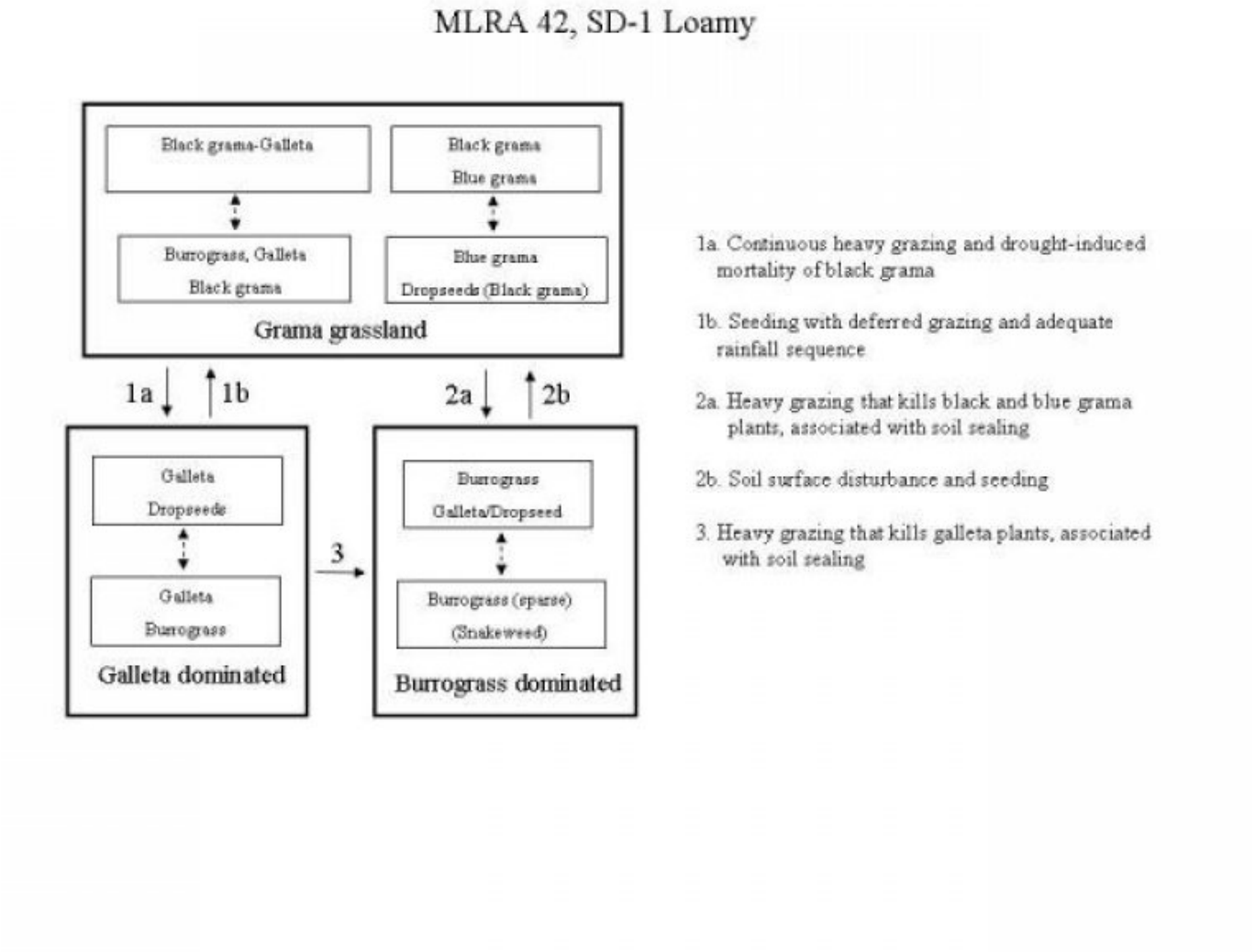
Transition to Burrograss state (2a, 3) Intense, continuous heavy grazing, possibly with drought, drives blue grama, galleta and other grasses to low overall cover. Exposed soils (loam and sandy clay loam surface) seal due to raindrop impact or surface horizons are eroded away during this low-cover period. Persisting burrograss recovers over time and other species do not.

Key indicators of approach to transition:
? Overutilization, decadence, and mortality of perennial grasses
? Increase in size and frequency of bare patches
? Evidence of soil physical crusts, lack of cryptobiotic crust.

Transition back to Grama Grassland (2b) Seeding with grazing deferment and soil-surface disturbance would be necessary. If erosion has stripped away part or all of the A horizon, then soil addition would be necessary.

Contributors. Data and ideas were provided by Darrel Reasner, Gary Garrison, George Chavez, Elizabeth Wright, Will Hooper, and David Trujillo.

State and transition model



State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

The aspect and biomass of vegetation on this site is predominately grassland characterized by short grasses. Perennial shrubs, half-shrubs, and forbs comprise a minor component of the plant community. Annual forbs are present in relatively large amounts during spring and summer in years of above-average plant-growing conditions. When the plant community deteriorates, there is a marked increase in amounts of half-shrubs, forbs, and cacti. Other grasses that could appear on this site include: fluff grass, ring muhly, and six-weeks grama. Other woody plants include wolfberry and broom baccaris. Other forbs include: fiddleneck, verbena, fleabane, desertsenna, wolly groundsel, locoweed, mentzelia, globemallow, pricklypoppy, hoffmanseggia, and yerba-de-pasmo.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	359	538	717
Forb	67	101	135
Shrub/Vine	22	34	45
Total	**448**	**673**	**897**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	3%
Grass/grasslike foliar cover	20%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	10%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	70%

Figure 5. Plant community growth curve (percent production by month). NM2211, R042XA052NM-Loamy-Warm Season-HCPC. SD-1 Loamy HCPC Warm Season Plant Community.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	5	10	10	25	30	12	5	0	0

Figure 6. Plant community growth curve (percent production by month). NM2212, R042XA052NM-Loamy-Cool Season-HCPC. SD-1 Loamy HCPC Cool Season Plant Community.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	15	5	5	5	5	10	15	15	0

State 2
Galleta dominated

State 3
Burrograss dominated

Community 3.1
Burrograss - Galleta/Dropseed

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Community 3.2
Burrograss (sparse) - (Snakeweed)

Figure 7. Burrograss (sparse) - (Snakeweed)

The aspect and biomass of vegetation on this site is predominately grassland characterized by short grasses. Perennial shrubs, half-shrubs, and forbs comprise a minor component of the plant community. Annual forbs are present in relatively large amounts during spring and summer in years of above-average plant-growing conditions. When the plant community deteriorates, there is a marked increase in amounts of half-shrubs, forbs, and cacti. Other grasses that could appear on this site include: fluff grass, ring muhly, and six-weeks grama. Other woody plants include wolfberry and broom baccaris. Other forbs include: fiddleneck, verbena, fleabane, desertsenna, wolly groundsel, locoweed, mentzelia, globemallow, pricklypoppy, hoffmanseggia, and yerba-de-pasmo.

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Warm Season**			202–269	
	black grama	BOER4	*Bouteloua eriopoda*	202–269	–
2	**Warm Season**			67–135	
	bush muhly	MUPO2	*Muhlenbergia porteri*	67–135	–
3	**Warm Season**			67–135	
	James' galleta	PLJA	*Pleuraphis jamesii*	67–135	–
4	**Cool Season**			13–67	
	squirreltail	ELEL5	*Elymus elymoides*	13–67	–
5	**Warm Season**			13–67	
	threeawn	ARIST	*Aristida*	13–67	–
6	**Cool Season**			34–67	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	34–67	–
7	**Warm Season**			34–67	
	blue grama	BOGR2	*Bouteloua gracilis*	34–67	–
8	**Warm Season**			7–34	
	spike dropseed	SPCO4	*Sporobolus contractus*	7–34	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	7–34	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	7–34	–
9	**Warm Season**			7–34	
	silver bluestem	BOSA	*Bothriochloa saccharoides*	7–34	–
10	**Warm Season**			7–34	

	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	7–34	–
Shrub/Vine					
11	**Shrub**			0–34	
	fourwing saltbush	ATCA2	*Atriplex canescens*	0–34	–
12	**Shrub**			13–34	
	winterfat	KRLA2	*Krascheninnikovia lanata*	13–34	–
13	**Shrub**			7–20	
	mormon tea	EPVI	*Ephedra viridis*	7–20	–
14	**Shrub**			13–34	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	13–34	–
15	**Shrub**			13–20	
	plains pricklypear	OPPO	*Opuntia polyacantha*	13–20	–
16	**Shrub**			13–20	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	13–20	–
Forb					
17	**Forb**			7–34	
	buckwheat	ERIOG	*Eriogonum*	7–34	–
18	**Forb**			7–20	
	Russian thistle	SAKA	*Salsola kali*	7–20	–
19	**Forb**			7–20	
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	7–20	–
20	**Forb**			7–34	
21	**Forb**			7–20	
	herb sophia	DESO2	*Descurainia sophia*	7–20	–
22	**Forb**			7–20	
	Forb (herbaceous, not grass nor grass-like)	2FORB	*Forb (herbaceous, not grass nor grass-like)*	7–20	–

Animal community

This ecological site provides habitats which support a resident animal community that is characterized by coyote, black-tailed jackrabbit, desert cottontail, white-tailed antelope squirrel, Botta’s pocket gopher, banner-tailed kangaroo rat, southern plains woodrat, burrowing owl, scaled quail, meadowlark, and brown towhee.
These sites may be utilized by wintering flocks of chipping, rufous-crowned, and black-chinned sparrows.

Hydrological functions

The runoff curve numbers are determined by field investigations using hydraulic cover conditions and hydrologic soil groups.

Hydrologic Interpretations
Soil Series Hydrologic Group
Vinton B
Turney B
Tres Hermanos B
Tome B
Pajarito B
Madurez B
Adelino B

Agustin B

Recreational uses

This site has limited potential for recreational use.

Wood products

This site has no potential for wood products in its potential plant community.

Other products

This site is well suited for year-long grazing use by cattle, sheep, horses, antelope, deer, and burros.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month
Similarity Index-----Ac/AUM
100 - 76----------3.2 – 4.2
75 – 51----------4.1 – 6.4
50 – 26----------6.3 – 12.7
25 – 0----------12.7 +

Other references

Other References:
Data collection for this site was done in conjunction with the progressive soil surveys within the Southern Desertic Basins, Plains and Mountains, Major Land Resource Area 42, of New Mexico. This site has been mapped and correlated with soils in the following soil surveys: Valencia, Socorro and Bernalillo.

References

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of**

values):

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**
