

Weed species Hess et al., 1997

Phenological growth stages and BBCH-identification keys of weed species

D = **D**icotyledons,
G = **G**ramineae,
M = **M**onocotyledons,
P = **P**erennial plants,
V = Development from vegetative parts or propagated organs.

No code letter is used if the description applies to all groups of plants.

Code	Description
Principal growth stage 0: Germination, sprouting, bud development	
00	Dry seed
V	Perennating or reproductive organs during the resting period (tuber, rhizome, bulb, stolon)
P	Winter dormancy or resting period
01	Beginning of seed imbibition
P, V	Beginning of bud swelling
03	Seed imbibition complete
P, V	End of bud swelling
05	Radicle (root) emerged from seed
V	Perennating or reproductive organs forming roots
06	Elongation of radicle, formation of root hairs and/or lateral roots
07	G Coleoptile emerged from caryopsis
D, M	Hypocotyl with cotyledons or shoot breaking through seed coat
P, V	Beginning of sprouting or bud breaking
08	D Hypocotyl with cotyledons or shoot growing towards soil surface
V	Shoot growing towards soil surface
09	G Emergence: Coleoptile breaks through soil surface
D, M	Emergence: Cotyledons break through soil surface (except hypogeal germination);
V	Emergence: Shoot/Leaf breaks through soil surface
P	Buds show green tips

Principal growth stage 1: Leaf development (main shoot)

10	G, M	First true leaf emerged from coleoptile
	D	Cotyledons completely unfolded
	P	First leaves separated
11		First true leaf, leaf pair or whorl unfolded
	P	First leaves unfolded
12		2 true leaves, leaf pairs or whorls unfolded
13		3 true leaves, leaf pairs or whorls unfolded
1 .		Stages continuous till ...
19		9 or more true leaves, leaf pairs or whorls unfolded

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Code	Description
Principal growth stage 2: Formation of side shoots / tillering	
21	First side shoot visible
G	First tiller visible
22	2 side shoots visible
G	2 tillers visible
23	3 side shoots visible
G	3 tillers visible
2 .	Stages continuous till ...
29	9 or more side shoots visible
G	9 or more tillers visible

Principal growth stage 3: Stem elongation /shoot development (main shoot)

30	Beginning of stem elongation
G	Beginning of shooting
31	1 visibly extended internode
G	1 node stage
32	2 visibly extended internode;
G	2 node stage
33	3 visibly extended internode
G	3 node stage
3 .	Stages continuous till ...
39	9 or more visibly extended internodes
G	9 or more nodes

Principal growth stage 4: vegetative propagation / booting (main shoot)

40	V	Vegetative reproductive organs begin to develop (rhizomes, stolons, tubers, runners, bulbs)
41	G	Flag leaf sheath extending
42	V	First young plant visible
43	G	Flag leaf sheath just visibly swollen (mid-boot)
45	G	Flag leaf sheath swollen (late-boot)
47	G	Flag leaf sheath opening
49	V	Constant new development of young plants; vegetative reproductive organs reach final size
	G	First awns visible

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Code	Description
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Principal growth stage 5: Inflorescence emergence (main shoot) / heading

51	Inflorescence or flower buds visible
G	Beginning of heading
55	First individual flowers visible (still closed)
G	Half of inflorescence emerged (middle of heading)
59	First flower petals visible (in petalled forms)
G	Inflorescence fully emerged (end of heading)

Principal growth stage 6: Flowering (main shoot)

60	First flowers open (sporadically)
61	Beginning of flowering: 10% of flowers open
63	30% of flowers open
65	Full flowering: 50% of flowers open, first petals may be fallen
67	Flowering finishing: majority of petals fallen or dry
69	End of flowering: fruit set visible

Principal growth stage 7: Development of fruit

71	Fruits begin to develop
G	Caryopsis watery ripe
79	Nearly all fruits have reached final size normal for the species and location

Principal growth stage 8: Ripening or maturity of fruit and seed

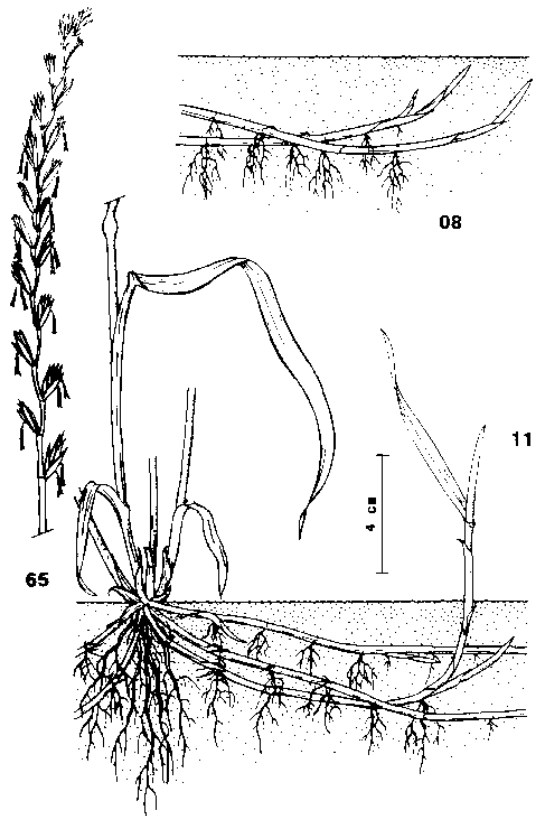
81	Beginning of ripening or fruit coloration
89	Fully ripe

Principal growth stage 9: Senescence, beginning of dormancy

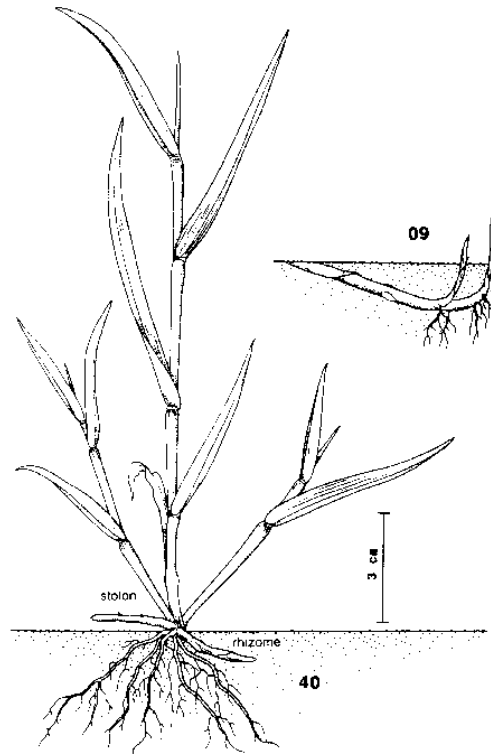
97	End of leaf fall, plants or above ground parts dead or dormant;
P, V	Plant resting or dormant

Weed species

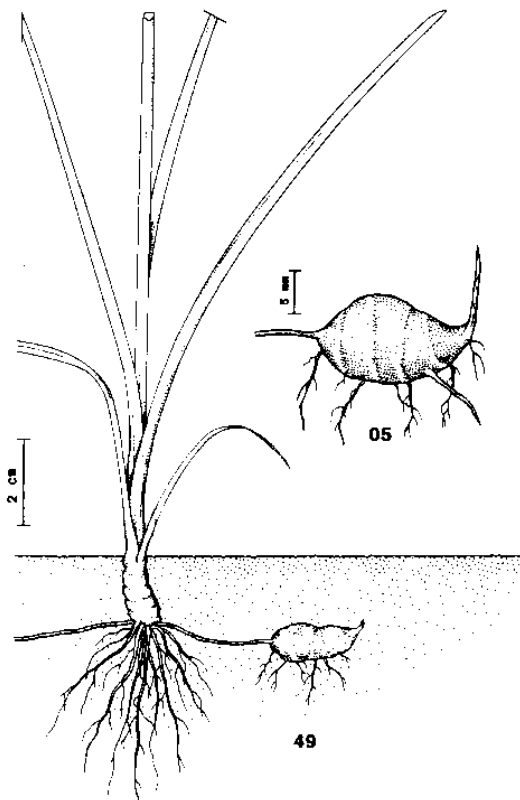
Agropyron repens (L.) P. Beauv.



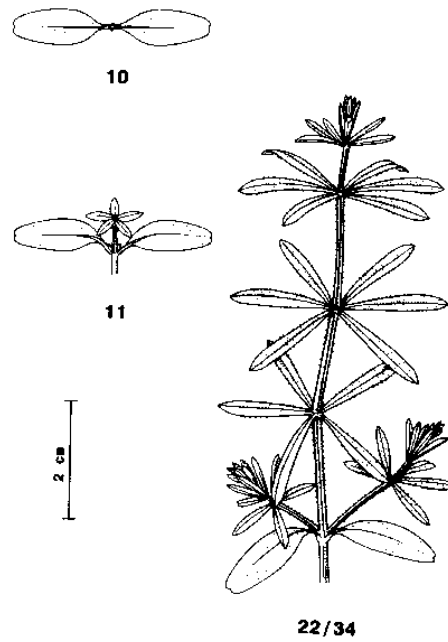
Cynodon dactylon (L.) Pers.



Cyperus rotundus L.

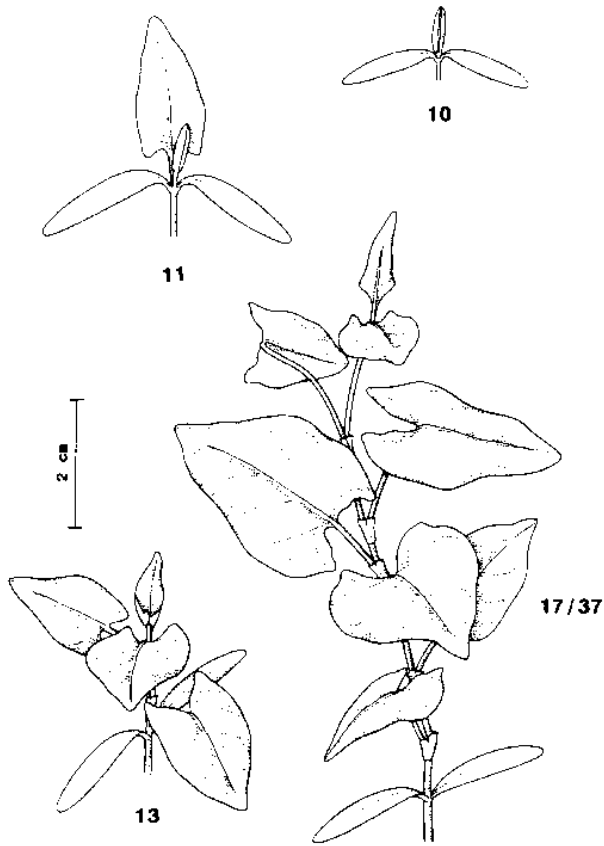


Galium aparine L.

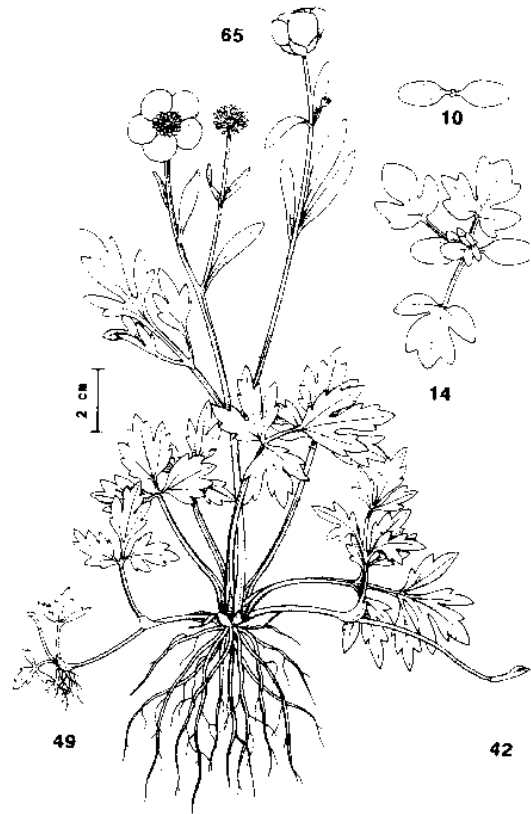


Weed species

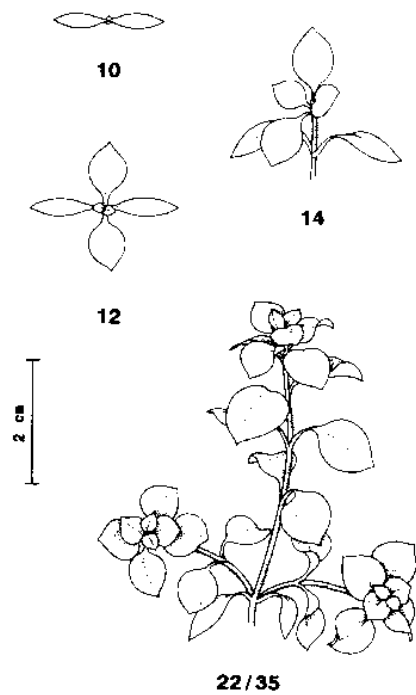
Polygonum convolvulus L.



Ranunculus repens L.

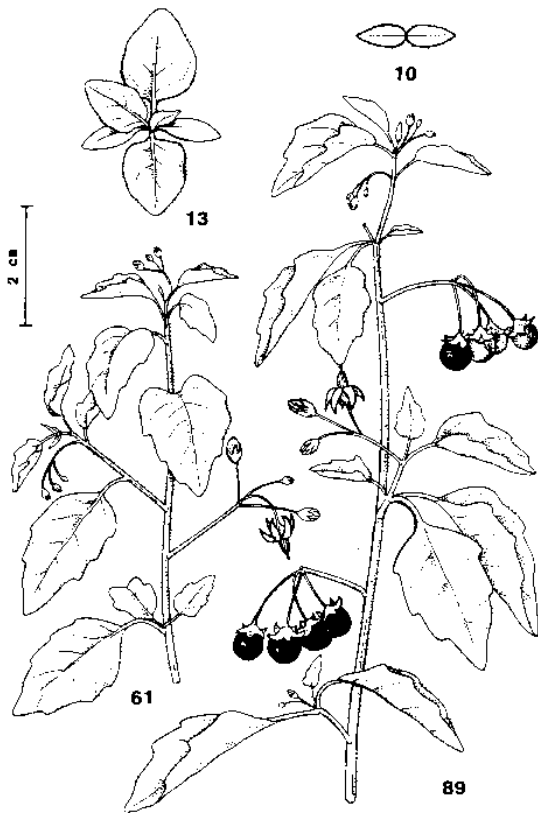


Stellaria media (L.) Vill.

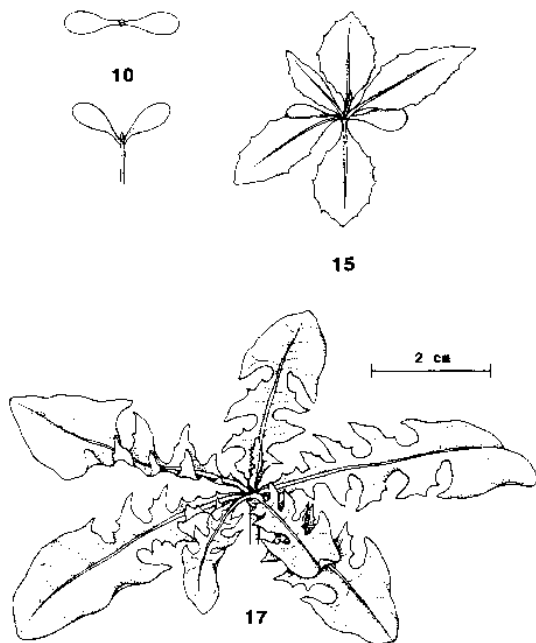


Weed species

Solanum nigrum L.



Taraxacum officinale Wiggers



Veronica hederifolia L.

