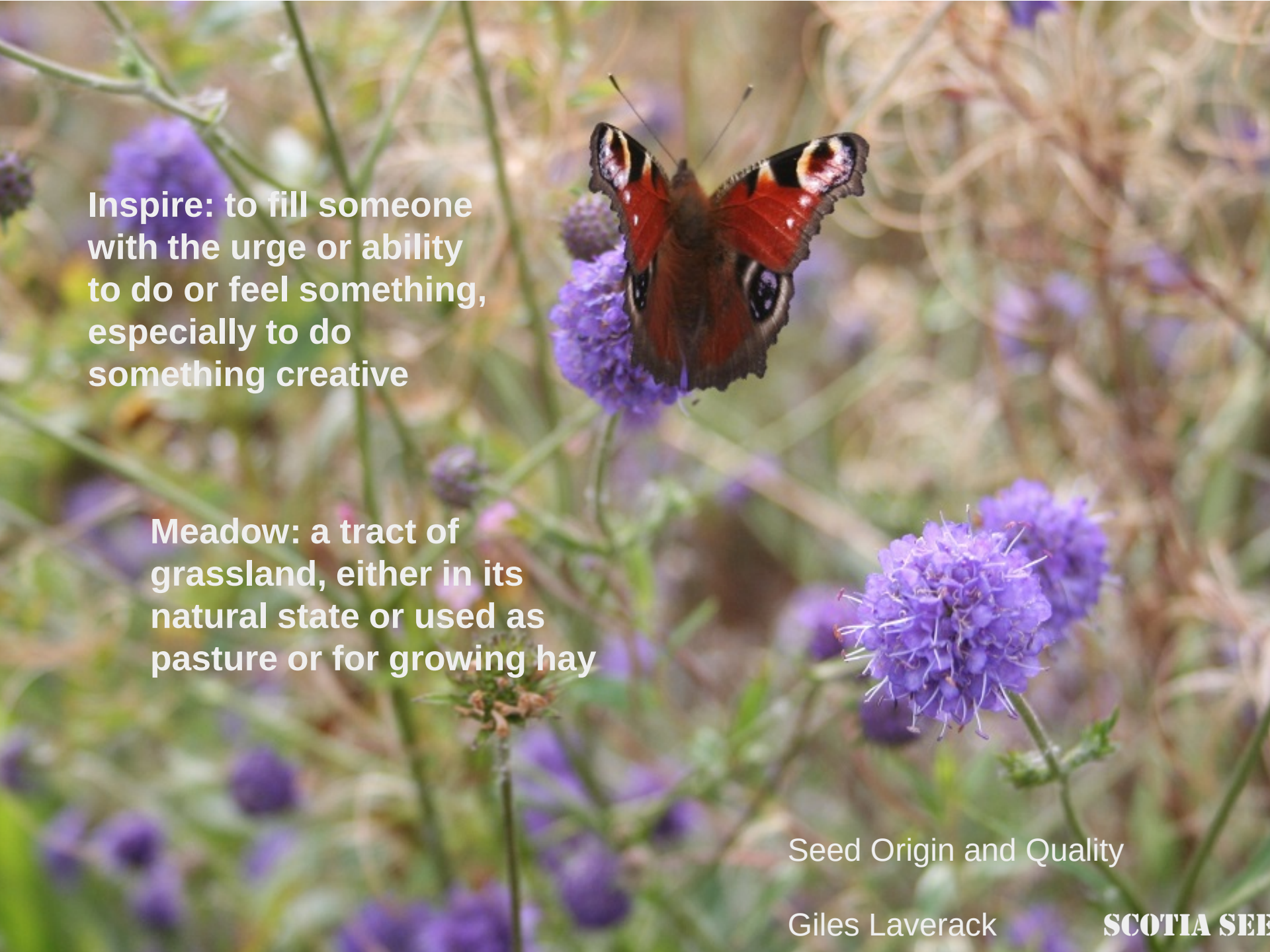
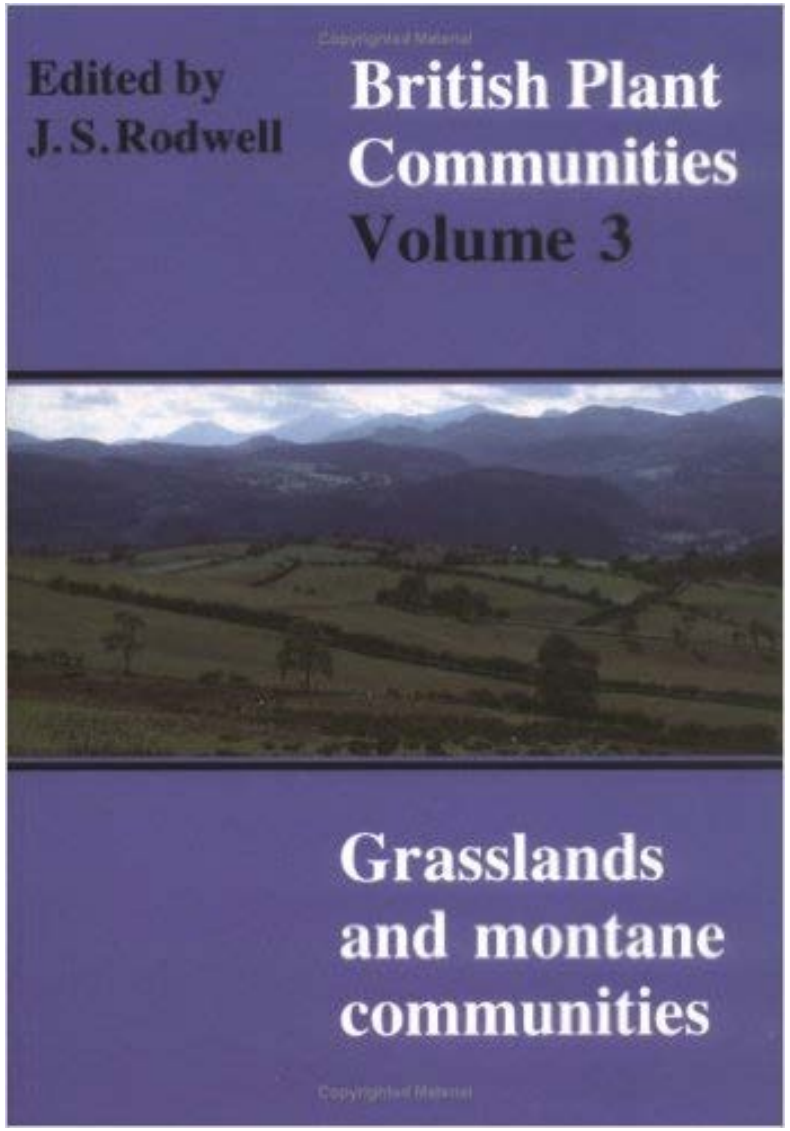



Seed Origin and Quality

Giles Laverack

SCOTIA SEE

# John Rodwell and ‘The Tyranny of Typologies’






Eire by Braun-Blanquet & Tüxen (1952) and later, in greater detail, by O'Sullivan (1965). Phytosociological accounts have been provided from British localities by Birks (1973) and Shimwell (1968*a*, *b*). These descriptions all clearly correspond with the community as defined here although the status of the various subdivisions erected in the Irish accounts differs somewhat in the above. No equivalent vegetation type has been described from the Continent.

**Floristic table MG5**

| | a | b | c | 5 |
|---|---|---|---|---|
| *Festuca rubra* | V (1–8) | V (2–8) | V (2–7) | V (1–8) |
| *Cynosurus cristatus* | V (1–8) | V (1–7) | V (1–7) | V (1–8) |
| *Lotus corniculatus* | V (1–7) | V (1–5) | V (2–4) | V (1–7) |
| *Plantago lanceolata* | V (1–7) | V (1–5) | IV (1–4) | V (1–7) |
| *Holcus lanatus* | IV (1–6) | IV (1–6) | V (1–5) | IV (1–6) |
| *Dactylis glomerata* | IV (1–7) | IV (1–6) | V (1–6) | IV (1–7) |
| *Trifolium repens* | IV (1–9) | IV (1–6) | V (1–4) | IV (1–9) |
| *Centaurea nigra* | IV (1–5) | IV (1–4) | V (2–4) | IV (1–5) |
| *Agrostis capillaris* | IV (1–7) | IV (1–7) | V (3–8) | IV (1–8) |
| *Anthoxanthum odoratum* | IV (1–7) | IV (1–8) | V (1–4) | IV (1–8) |
| *Trifolium pratense* | IV (1–5) | IV (1–4) | IV (1–3) | IV (1–5) |
| *Lolium perenne* | IV (1–8) | III (1–7) | I (2–3) | III (1–8) |
| *Bellis perennis* | III (1–7) | II (1–7) | I (4) | II (1–7) |
| *Lathyrus pratensis* | III (1–5) | I (1–3) | I (1) | II (1–5) |
| *Leucanthemum vulgare* | III (1–3) | I (1–3) | II (1–3) | II (1–3) |
| *Festuca pratensis* | II (1–5) | I (2–5) | I (1) | I (1–5) |
| *Knautia arvensis* | I (4) | | | I (4) |
| *Juncus inflexus* | I (3–5) | | | I (3–5) |
| *Galium verum* | I (1–6) | V (1–6) | | II (1–6) |
| *Trisetum flavescens* | II (1–4) | IV (1–6) | II (1–3) | III (1–6) |
| *Achillea millefolium* | III (1–6) | V (1–4) | III (1–4) | III (1–6) |
| *Carex flacca* | I (1–4) | II (1–4) | I (1) | I (1–4) |
| *Sanguisorba minor* | I (4) | II (3–5) | | I (3–5) |
| *Koeleria macrantha* | I (1) | II (1–6) | | I (1–6) |
| *Agrostis stolonifera* | I (1–7) | II (1–6) | I (6) | I (1–7) |
| *Festuca ovina* | | II (1–6) | | I (1–6) |
| *Prunella vulgaris* | III (1–4) | III (1–4) | IV (1–3) | III (1–4) |
| *Leontodon autumnalis* | II (1–5) | II (1–3) | IV (1–4) | III (1–5) |
| *Luzula campestris* | II (1–4) | II (1–6) | IV (1–4) | III (1–6) |
| *Danthonia decumbens* | I (2–5) | I (1–3) | V (2–5) | I (1–5) |
| *Potentilla erecta* | I (1–4) | I (3) | V (1–4) | I (1–4) |
| *Succisa pratensis* | I (1–4) | I (1–5) | V (1–4) | I (1–5) |
| *Pimpinella saxifraga* | I (1–4) | I (1–4) | III (1–4) | I (1–4) |
| *Stachys betonica* | I (1–5) | I (1–4) | III (1–4) | I (1–5) |
| *Carex caryophyllea* | I (1–4) | I (1–3) | II (1–2) | I (1–4) |
| *Conopodium majus* | I (1–4) | I (1–5) | II (2–3) | I (1–5) |
| *Ranunculus acris* | IV (1–4) | II (1–4) | IV (2–4) | III (1–4) |
| *Rumex acetosa* | III (1–4) | III (1–4) | III (1–3) | III (1–4) |
| *Hypochoeris radicata* | III (1–5) | II (2–4) | III (1–4) | III (1–5) |
| *Ranunculus bulbosus* | III (1–7) | II (1–5) | III (1–2) | III (1–7) |
| *Taraxacum officinale* agg. | III (1–4) | III (1–4) | III (1–3) | III (1–4) |

# Some new objectives in meadow management

- Create attractive areas for the public
- Increase biodiversity
- Reduce $CO_2$ emissions
- Reduce cost

for example, converting amenity grassland (average 16 cuts/year)
to meadow (1 cut and removal/year)

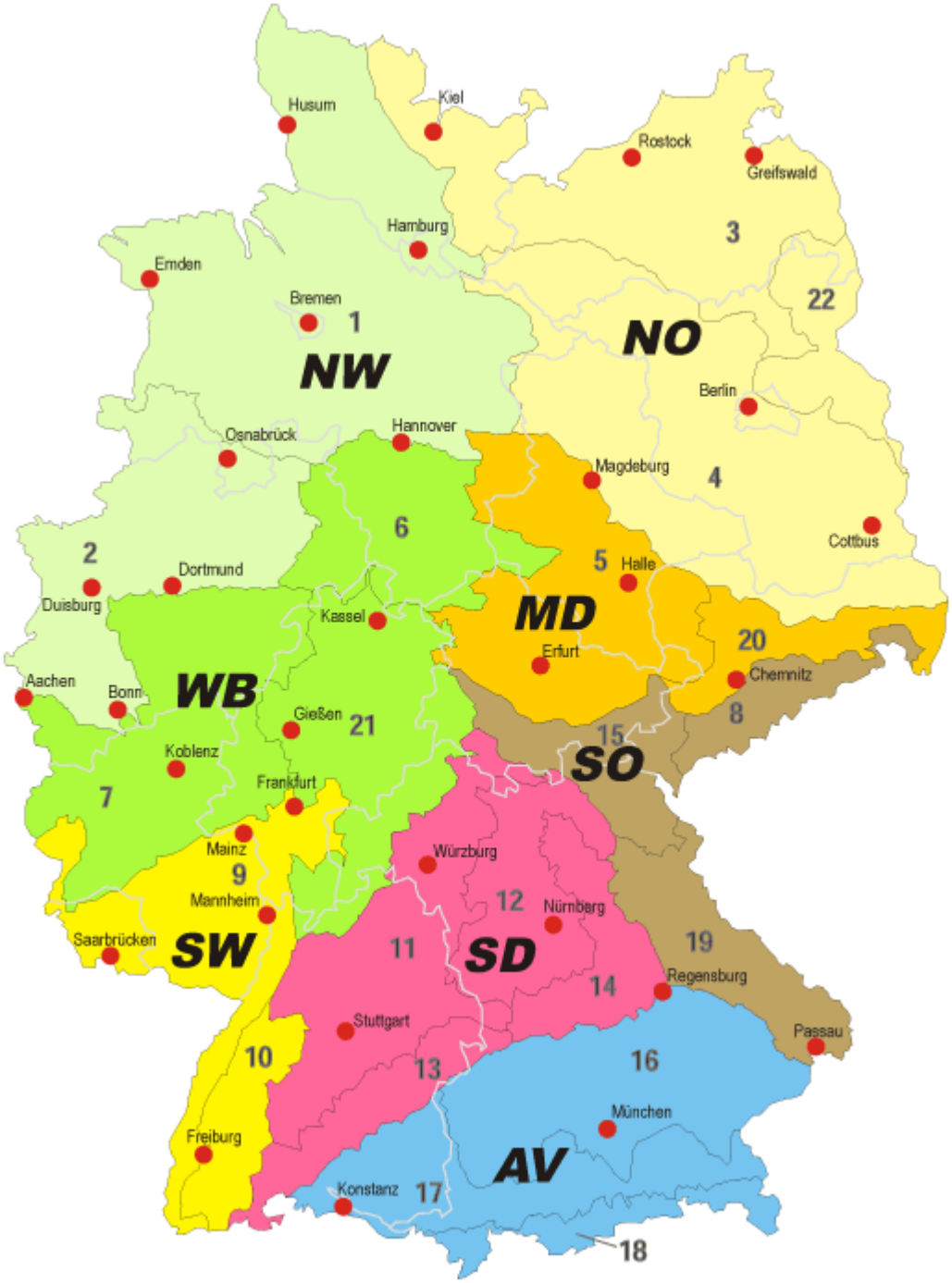
costs £6500/ha
savings £2200 /ha annually
break even time 3 years

# Edinburgh Meadow Mix 2015

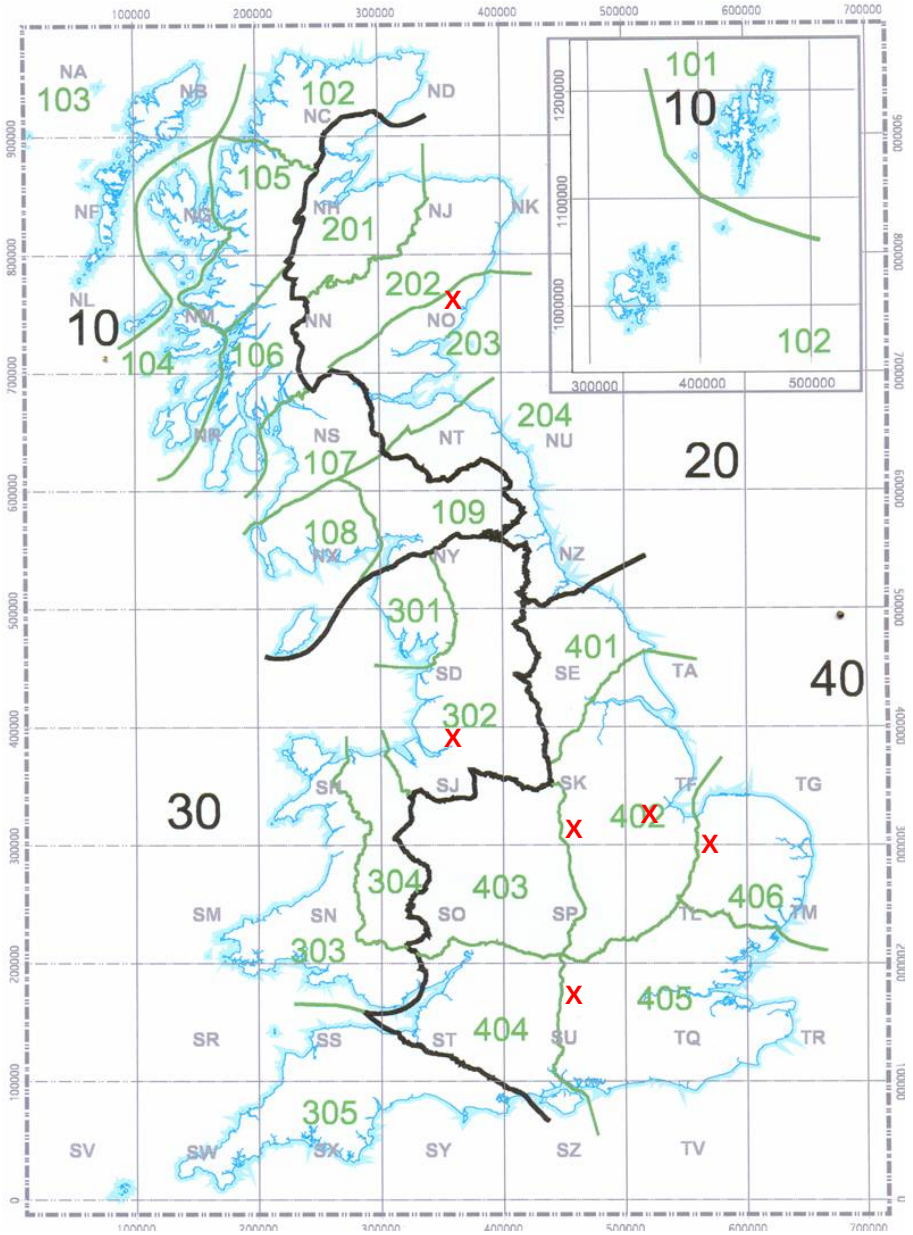
| Species | Common name | Origin | % |
|---|---|---|---|
| Wildflowers 20% | | | |
| Achillea millefolium | Yarrow | Fife | 0.5 |
| Centaurea cyanus | Cornflower | British | 1.0 |
| Centaurea nigra | Common Knapweed | Fife | 1.0 |
| Daucus carota | Wild Carrot | Angus | 1.0 |
| Digitalis purpurea | Foxglove | Fife | 1.0 |
| Echium vulgare | Vipers Bugloss | Fife | 1.0 |
| Glebionis segetum | Corn Marigold | Fife | 1.0 |
| Hyacinthoides non-scripta | Bluebell | Fife | 0.5 |
| Hypochaeris radicata | Cats Ear | Inverness-shire | 0.5 |
| Knautia arvensis | Field Scabious | Fife | 2.0 |
| Lamium album | White Deadnettle | Berwickshire | 0.5 |
| Leontodon hispidus | Rough Hawkbit | East Lothian | 1.0 |
| Leucanthemum vulgare | Ox-eye Daisy | Fife | 1.0 |
| Papaver rhoeas | Corn Poppy | British | 1.0 |
| Primula veris | Cowslip | Fife | 0.2 |
| Primula vulgaris | Primrose | Fife | 0.2 |
| Prunella vulgaris | Selfheal | Fife | 1.0 |
| Ranunculus acris | Meadow Buttercup | Fife | 1.0 |
| Rhinanthus minor | Yellow Rattle | Inverness-shire | 1.0 |
| Stachys sylvatica | Hedge Woundwort | Fife | 0.5 |
| Succisa pratensis | Devils-bit Scabious | Inverness-shire | 1.0 |
| Triplospermum inodorum | Mayweed | Angus | 1.0 |
| Vicia cracca | Tufted Vetch | Fife | 1.0 |
| Viola riviniana | Common Dog Violet | Angus | 0.1 |
| Grasses 80% | | | |
| Agrostis capillaris | Common Bent | Cultivated | 8.0 |
| Alopecurus pratensis | Meadow Foxtail | Fife | 3.0 |
| Anthoxanthum odoratum | Sweet Vernal Grass | Fife | 5.0 |
| Cynosurus cristatus | Crested Dog's Tail | Fife | 12.0 |
| Festuca rubra ssp.commutata | Chewings Fescue | Cultivated | 35.0 |
| Poa pratensis | Smooth-stalked Meadow Grass | Cultivated | 17.0 |
| | | | 100.0 |

Small Heath (Alan Spellman)

German seed zones



Seed imports
NORWAY
Oulu
Umeå
FINLAND
Lake Onega
Trondheim
Tórshavn
Faroe Islands
(DENMARK)
SWEDEN
Gulf of Bothnia
Tampere
Lake Ladoga
SHETLAND ISLANDS
Gävle
Turku
Helsinki
St. Petersburg
Gulf of Finland
Bergen
Oslo
Stockholm
ALAND ISLANDS
Tallinn
ESTONIA
RUSSIA
Rockall
(U.K.)
ORKNEY ISLANDS
HEBRIDES
Stavanger
Moscow
North Atlantic Ocean
Aberdeen
Göteborg
Gotland
Riga
LATVIA
Glasgow
Edinburgh
North Sea
Skagerrak
Kattegat
Baltic Sea
Öland
LITHUANIA
Vilnius
Vitsyebsk
Smolensk
UNITED
DENMARK
Belfast
Copenhagen
Malmö
Kaliningrad
RUSSIA
Mahilyow
Minsk
Isle of Man (U.K.)
Dublin
Irish Sea
Bornholm
BELARUS
Gdańsk
Hrodna
Homyel'
Leeds
Manchester
Liverpool
IRELAND
Hamburg
KINGDOM
NETH.
Bremen
Berlin
Poznań
Warsaw
Brest
Birmingham
Amsterdam
Cardiff
Rotterdam
POLAND
Kiev
Łódź
Rivne
Celtic Sea
London
Essen
Leipzig
Wroclaw
Cologne
Brussels
Lille
BEL.
Bonn
GERMANY
Prague
UKRAINE
English Channel
Guernsey (U.K.)
Jersey (U.K.)
Frankfurt am Main
Kraków
L'viv
Luxembourg
CZECH REPUBLIC
Brno
SLOVAKIA
Chernivtsi
Mykolayiv
Paris
LUX.
Stuttgart
Bratislava
Chisinau
Strasbourg
Munich
Budapest
Cluj-Napoca
Iaşi
MOLDOVA
Odesa
Nantes
Vienna
LIECH.
AUSTRIA
HUNGARY
ROMANIA
Zürich
Bern
Vaduz
SWITZ.
Geneva
FRANCE
Ljubljana
Bucharest
Constanța
Bay of Biscay
MASSIF CENTRAL
Lyon
Milan
Venice
SLOVENIA
Zagreb
Black Sea
Bordeaux
Turin
Belgrade
Varna
BOSNIA AND HERZEGOVINA
CROATIA
Bilbao
Genoa
SAN MARINO
Toulouse
MONACO
SERBIA AND MONTENEGRO
Sarajevo
BULGARIA
Andorra la Vella
Ligurian Sea
Florence
Marseille
Sofia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102
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1100000
1000000
300000
400000
500000

Quality survey germination test results %

| Company source | Species | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Campanula glomerata* | *Cyanus segetum* | *Centaurea nigra* | *Knautia arvensis* | *Papaver rhoeas* | *Pimpinella saxifraga* | *Primula vulgaris* | *Prunella vulgaris* | *Rhinanthus minor* | *Silene vulgaris* | *Stachys palustris* | *Valeriana officinalis* |
| A | 81 | 65 | 85 | 5 | 61.5 | - | 65.5 | 51 | 0.5 | 56.5 | - | 0 |
| B | - | - | - | - | - | - | - | - | 91.5 | - | - | - |
| C | - | - | - | - | - | - | - | - | 3 | - | - | - |
| D | - | 70 | 63 | 9.5 | 66 | 0.5 | 27.5 | 87 | 9.5 | 83 | - | 61 |
| E | - | 54 | 60.5 | 25 | 67.5 | - | - | 76.5 | 58 | - | - | - |
| F | - | 83.5 | 63 | 6.5 | 69 | - | - | 27.5 | 0 | 15.5 | - | - |
| G | - | - | - | - | - | - | - | - | 94.5 | - | - | - |
| H | - | 46 | 52.5 | 9 | 71 | - | - | - | 87 | - | - | - |
| I | - | - | - | - | - | - | - | - | 37 | - | - | - |
| J | - | - | - | - | - | - | - | - | 81 | - | - | - |
| K | - | 76 | 76.5 | 13 | 78.5 | - | - | 92 | 93 | - | - | - |
| L | - | - | - | - | - | - | - | - | 0 | - | - | - |
| M | 71 | 56 | 45 | - | 86 | - | 26.67 | 17 | 0 | 93 | - | 38 |
| N | 0 | 85 | 56 | 0 | 60.5 | - | 26.5 | 98 | 81 | 98 | 0 | - |
| O | 87 | 69 | 37.5 | 56.5 | 72.5 | 57.5 | 79 | 55 | 97 | 98.5 | 88 | 32.5 |
| P | - | - | 47.5 | 36.5 | 76 | 0 | - | - | 1 | 0 | - | 0 |
| Q | 89 | 26.5 | 37 | 58.5 | 72.5 | 10 | - | 77.5 | 63.5 | 82.5 | 75 | 63 |
| R | 44.5 | 72 | - | 29.5 | 61.5 | - | - | 86 | - | 98.5 | - | 18.5 |
| S | - | 50 | - | - | - | - | - | - | - | - | - | 45 |
| T | - | 90.5 | - | 16.5 | 96 | 64 | - | 92.5 | - | 95 | - | 71 |
| U | - | 57.5 | - | - | 40 | - | - | 96 | - | 95.5 | - | 53.5 |
| V | - | 86 | - | - | 79.5 | - | - | - | - | 97 | - | - |
| W | - | 65.5 | - | - | 77.5 | - | - | 90 | - | 69 | - | - |
| X | 91.5 | 80.5 | - | 55.5 | 86 | 63 | - | 97 | - | 93 | 10.5 | 12 |

Quality survey germination test results %

| Company source | Species | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Campanula glomerata* | *Cyanus segetum* | *Centaurea nigra* | *Knautia arvensis* | *Papaver rhoeas* | *Pimpinella saxifraga* | *Primula vulgaris* | *Prunella vulgaris* | *Rhinanthus minor* | *Silene vulgaris* | *Stachys palustris* | *Valeriana officinalis* |
| A | 81 | 65 | 85 | 5 | 61.5 | - | 65.5 | 51 | 0.5 | 56.5 | - | 0 |
| B | - | - | - | - | - | - | - | - | 91.5 | - | - | - |
| C | - | - | - | - | - | - | - | - | 3 | - | - | - |
| D | - | 70 | 63 | 9.5 | 66 | 0.5 | 27.5 | 87 | 9.5 | 83 | - | 61 |
| E | - | 54 | 60.5 | 25 | 67.5 | - | - | 76.5 | 58 | - | - | - |
| F | - | 83.5 | 63 | 6.5 | 69 | - | - | 27.5 | 0 | 15.5 | - | - |
| G | - | - | - | - | - | - | - | - | 94.5 | - | - | - |
| H | - | 46 | 52.5 | 9 | 71 | - | - | - | 87 | - | - | - |
| I | - | - | - | - | - | - | - | - | 37 | - | - | - |
| J | - | - | - | - | - | - | - | - | 81 | - | - | - |
| K | - | 76 | 76.5 | 13 | 78.5 | - | - | 92 | 93 | - | - | - |
| L | - | - | - | - | - | - | - | - | 0 | - | - | - |
| M | 71 | 56 | 45 | - | 86 | - | 26.67 | 17 | 0 | 93 | - | 38 |
| N | 0 | 85 | 56 | 0 | 60.5 | - | 26.5 | 98 | 81 | 98 | 0 | - |
| O | 87 | 69 | 37.5 | 56.5 | 72.5 | 57.5 | 79 | 55 | 97 | 98.5 | 88 | 32.5 |
| P | - | - | 47.5 | 36.5 | 76 | 0 | - | - | 1 | 0 | - | 0 |
| Q | 89 | 26.5 | 37 | 58.5 | 72.5 | 10 | - | 77.5 | 63.5 | 82.5 | 75 | 63 |
| R | 44.5 | 72 | - | 29.5 | 61.5 | - | - | 86 | - | 98.5 | - | 18.5 |
| S | - | 50 | - | - | - | - | - | - | - | - | - | 45 |
| T | - | 90.5 | - | 16.5 | 96 | 64 | - | 92.5 | - | 95 | - | 71 |
| U | - | 57.5 | - | - | 40 | - | - | 96 | - | 95.5 | - | 53.5 |
| V | - | 86 | - | - | 79.5 | - | - | - | - | 97 | - | - |
| W | - | 65.5 | - | - | 77.5 | - | - | 90 | - | 69 | - | - |
| X | 91.5 | 80.5 | - | 55.5 | 86 | 63 | - | 97 | - | 93 | 10.5 | 12 |

Quality survey germination test results %

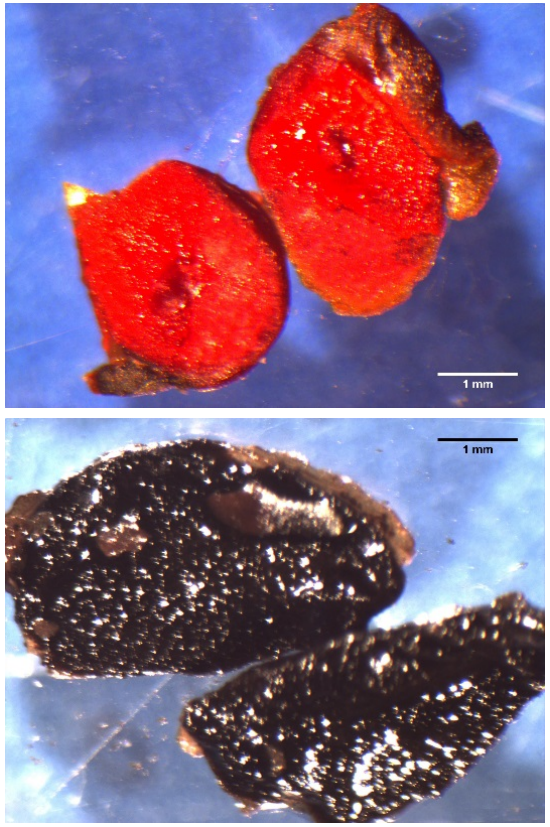
| Company source | Species | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Campanula glomerata* | *Cyanus segetum* | *Centaurea nigra* | *Knautia arvensis* | *Papaver rhoeas* | *Pimpinella saxifraga* | *Primula vulgaris* | *Prunella vulgaris* | *Rhinanthus minor* | *Silene vulgaris* | *Stachys palustris* | *Valeriana officinalis* |
| A | 81 | 65 | 85 | 5 | 61.5 | - | 65.5 | 51 | 0.5 | 56.5 | - | 0 |
| B | - | - | - | - | - | - | - | - | 91.5 | - | - | - |
| C | - | - | - | - | - | - | - | - | 3 | - | - | - |
| D | - | 70 | 63 | 9.5 | 66 | 0.5 | 27.5 | 87 | 9.5 | 83 | - | 61 |
| E | - | 54 | 60.5 | 25 | 67.5 | - | - | 76.5 | 58 | - | - | - |
| F | - | 83.5 | 63 | 6.5 | 69 | - | - | 27.5 | 0 | 15.5 | - | - |
| G | - | - | - | - | - | - | - | - | 94.5 | - | - | - |
| H | - | 46 | 52.5 | 9 | 71 | - | - | - | 87 | - | - | - |
| I | - | - | - | - | - | - | - | - | 37 | - | - | - |
| J | - | - | - | - | - | - | - | - | 81 | - | - | - |
| K | - | 76 | 76.5 | 13 | 78.5 | - | - | 92 | 93 | - | - | - |
| L | - | - | - | - | - | - | - | - | 0 | - | - | - |
| M | 71 | 56 | 45 | - | 86 | - | 26.67 | 17 | 0 | 93 | - | 38 |
| N | 0 | 85 | 56 | 0 | 60.5 | - | 26.5 | 98 | 81 | 98 | 0 | - |
| O | 87 | 69 | 37.5 | 56.5 | 72.5 | 57.5 | 79 | 55 | 97 | 98.5 | 88 | 32.5 |
| P | - | - | 47.5 | 36.5 | 76 | 0 | - | - | 1 | 0 | - | 0 |
| Q | 89 | 26.5 | 37 | 58.5 | 72.5 | 10 | - | 77.5 | 63.5 | 82.5 | 75 | 63 |
| R | 44.5 | 72 | - | 29.5 | 61.5 | - | - | 86 | - | 98.5 | - | 18.5 |
| S | - | 50 | - | - | - | - | - | - | - | - | - | 45 |
| T | - | 90.5 | - | 16.5 | 96 | 64 | - | 92.5 | - | 95 | - | 71 |
| U | - | 57.5 | - | - | 40 | - | - | 96 | - | 95.5 | - | 53.5 |
| V | - | 86 | - | - | 79.5 | - | - | - | - | 97 | - | - |
| W | - | 65.5 | - | - | 77.5 | - | - | 90 | - | 69 | - | - |
| X | 91.5 | 80.5 | - | 55.5 | 86 | 63 | - | 97 | - | 93 | 10.5 | 12 |

## Germination test

*Rhinanthus minor:* 30 weeks

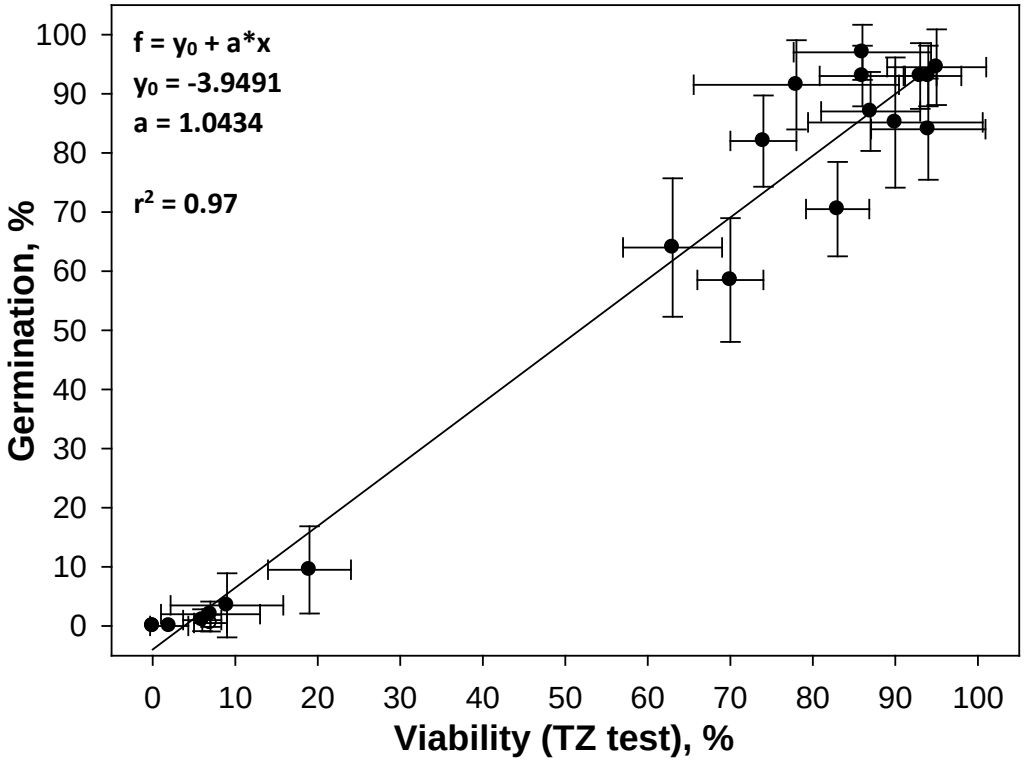
## Tetrazolium Test

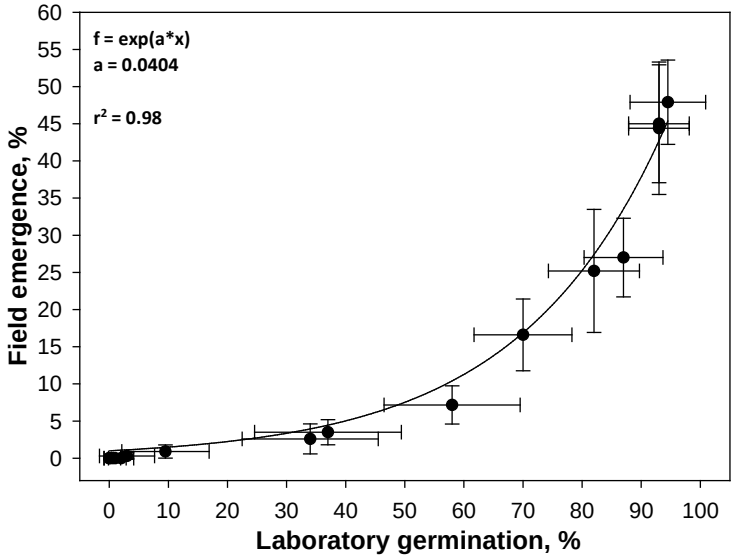
*Rhinanthus minor:* 48 hours.




Tetrazolium test performed on *R. minor* seeds: viable seed – embryo and endosperm tissue completely stained (a); non-viable – unstained (necrotic) tissue (b).

## *Rhinanthus minor*



Dormancy breaking in Meadow Cranesbill *Geranium pratense*