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## The seed output of scarlet pimpernel (*Anagallis arvensis*)

Alan Esler

The life of annual plants is mostly short and sweet. They are opportunists that seemed to have evolved to ensure that there are no vacuums in nature. Their body building efforts are not great because their frame has to last only long enough to produce a good crop of seeds. When an adverse season approaches they duck for cover as seeds wrapped in a weatherproof blanket until the worst has passed. Some species duck when a cold season comes along; others thrive in the winter but cannot face the rigours of summer heat and drought. The brave scarlet pimpernel just slows down a bit in winter.

The key to success in annuals is in the seed. A plant must produce enough of them for replacement plus a lot more to cope with the contingencies in habitats that may last only a few weeks. Their story is wonderfully told in E J Salisbury's *Weeds and aliens* (1961) He was the most energetic and meticulous of plant recorders in the field over several decades from the 1920s.

The seed output of many annuals is phenomenal considering the brevity of life. Salisbury recorded many instances of thousands of seed per plant. Counting seeds is a tedious business so it is not surprising that there are not many records. There are plenty of challenges in weed science. Of scarlet pimpernel Salisbury said "The total seed production averages about 900 but larger plants may yield 12,000 seeds". The challenge for me was to see how many seeds an exceptionally large plant produced.

The opportunity presented itself on finding such a plant to uproot and take home for analysis. While botanising around Grey Lynn with son Wilson on 5 Jan

2005 we came on a monster fully 75cm across luxuriating on the poorest of clay with no competitors. Scarlet pimpernel is quite a smart plant that misses few opportunities to make seeds. At almost every node there are two capsules, and often three (rarely four) at more distal nodes. Here and there it has to concede a capsule if a message within the plant dictates that this is the right place for growing a branch at a particular node. I concluded that each capsule contained on average 18 seeds, as did Salisbury. The task was then to count the capsules and multiply by 18. There were 2028 nodes, 3674 capsules, thus 65,646 seeds on this plant at this time. The oldest capsules had remained unopened, and on the tips were flowers producing more capsules that could not be counted. In fact, the potential was much more than the 65,646 seeds calculated. On a time scale it is possible that the plant was producing three seed in every hour of its life.

Geoffrey Grigson (1975) was a poet, critic and editor, not a botanist but had an interest in plants, particularly their herbal properties and their local names. In his book he listed 45 common names for scarlet pimpernel and their geographical derivation, including adder's eye, drops-of-blood, old man, little Jane, shepherd's clock and weather flower – many reflecting its sensitivity to temperature and moisture. Also he included a poem in Middle English written about 1400:

*Al day ageyn undern and non  
He wyl hym spredyn and on-don,  
And ageyne the ewene-tyde  
He lokyth hym-self be every syde;  
He growyth be the erthe lowe,  
Nyh every man wyl hym knowe.*

Who ever said weeds are not interesting?

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