

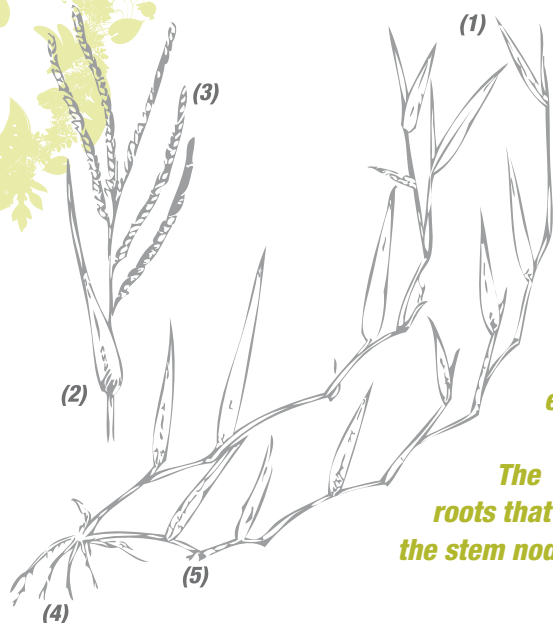
BRACHIARIA DECUMBENS CV. BASILISK

SANITIZING FALLOWS AND IMPROVED SOIL STRUCTURE

Family: Grass (perennial)

Synonym: *Urochloa decumbens* (Stapf) R.D. Webster.

Common names: *Decumbens* (Brazil), *signal grass* (Australia), *Surinam grass* (Germany).



Brachiaria decumbens cv. Basilisk

Brachiaria decumbens cv. Basilisk is a semi-erect to erect grass variety native to Central Africa and widespread throughout the world. It tends to spread and form dense cover. Rachides (1) and spikelets (2) grow in large clumps (1 m high on average) that spread if the plant is not cut. The dark green leaves are smooth or slightly hairy and 25 cm long on average. The inflorescences are panicles (3) consisting of 2-7 relatively long racemes (4-20 cm) bearing smooth elliptical spikelets 4-6 mm long, arranged in double rows.

The root system (4) is composed of many densely bunched roots that may grow to depths of 1.5-1.8 m. Many shoots grow from the stem nodes and develop new roots (5).



12-month old mulch in the Nord-Atlantique region, Martinique - Photo CIRAD

1. AGRICULTURAL BENEFITS

1.1- Nonhost of the main banana parasites

■ Sensitivity tests have shown that *Radopholus similis* and *Pratylenchus coffeae*, the two main banana nematodes, do not propagate on *B. decumbens*.

1.2- Soil fertility remobilizing and soil restructuring ability

■ *B. decumbens*, through its high capacity to extract soil nutrients, has very high biomass production (over 25 t dry matter [DM]/ha for above-ground parts, and 5 t DM/ha for roots). This enables rapid carbon uptake in the surface horizons and directly in deep horizons, thus sustainably enhancing soil fertility and structure.

1.3- Rapid and effective soil cover/anti-erosion function

■ This grass, because of its vigour, rapid growth and ability to multiply vegetatively, can outgrow weeds after 3 months of growth. Once it has grown to over 50 cm in height, stem lodging occurs and a mulch layer forms with live stems and dead leaves. It builds up during cultivation (up to 20 cm thick within 12 months), providing good soil cover and promoting water infiltration.

1.4- Excellent fodder

■ It has a high feed value and palatability, making it excellent fodder.

2. INTEGRATION IN CROPPING SYSTEMS

■ *B. decumbens* is now recommended for sanitizing fallows in old banana plantations. This sanitizing feature is an enhancement over spontaneous fallows:

- ➊ In old banana plantations, chemical control of banana trees by glyphosate injection in pseudostems and, if necessary, glyphosate sprays on the weeds present.
- ➋ Rapid burying of banana residue and plant debris (use of a rototiller or disc plough, etc.).
- ➌ Preparation of a seed bed, if necessary, using a circular spike harrow or disc plough.
- ➍ Row seeding to ensure optimal cover using a mechanical seeder or by broadcast sowing, followed by rolling.
- ➎ Emergence is checked 45 days after sowing, and the cover is checked after 3 months. Mowing to stimulate *B. decumbens* growth and promote optimal coverage without gaps.
- ➏ Mowing of the cover at mid-fallow and then 6-8 weeks before control.
- ➐ Chemical control 4-6 weeks before the planting of micropropagated plantlets, with a second herbicide spray 4-6 weeks later.
- ➑ Hole planting of micropropagated banana plantlets in *B. decumbens* mulch (4-6 weeks after the first herbicide treatment).

3. PLANTING AND MANAGEMENT OF *B. DECUMBENS* COVER (see diagram below)

3.1- When?

■ Tillage and *B. decumbens* sowing should be done before the heaviest rainfall period. It is thus recommended that sowing be carried out between May and July, regardless of the approach used (manual or mechanical). Planting too late increases the erosion risk.

3.2- How?

■ *B. decumbens* seeds are sown by two techniques:

- **Use of a mechanical seeder:** seeds are preferentially sown in rows and then the seeds are lightly covered with soil (1-2 cm depth). The recommended sowing rate is 8 kg/ha.



Sowing and rolling with a mechanical seeder - Photo IT2

- **Broadcast sowing:** the seed quantity is the same (8 kg/ha), which is sufficient to obtain quite uniform grass cover.

Note: for both of these sowing techniques, it is essential to subsequently roll the field in order to bury the seeds just below the surface (1-2 cm). **Some caterpillars may attack young *B. decumbens* shoots (observed in Nord-Atlantique and Centre regions of Martinique).**

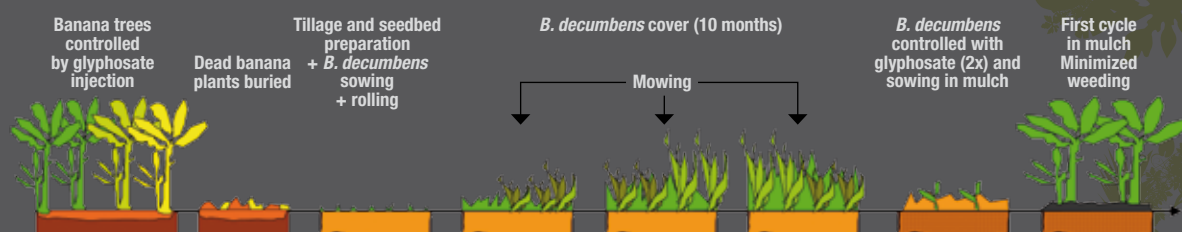


Emergence of *B. decumbens* after mechanical sowing and rolling - Photo IT2

3.3- Cover management

■ Weeds that break through the *B. decumbens* cover in the first months after sowing can be controlled by regular mowing, which in turn stimulates and enhances the *B. decumbens* cover. Urea applications after mowing can also favour *B. decumbens* domination. Persistent weeds will slowly suffocate, especially after a mulch layer forms at the base of the cover.

PLANTING AND MANAGEMENT OF *B. DECUMBENS* COVER





Growth of *B. decumbens* under high weed pressure (3 months).
B. decumbens has greater height and cover
in the presence of weeds - Photo CIRAD

3.4- Seed treatment

■ *B. decumbens* seeds require no insecticide or fungicide treatments. They should be stored under suitable conditions (dry environment and protected from high temperatures).



Weeds emerge at the same time as *B. decumbens*
but are soon smothered - Photo IT2

3.5- Fertilization

■ This species is very well adapted to acidic soils. It can take up soil phosphorus from the soil, so throughout its growth cycle the only other nutrient it essentially requires is nitrogen. This element is supplied by decomposition of buried banana residue. A fertilizer application (50-150 kg/ha) could be carried out during the first months after sowing to promote its coverage.

4. CONTROLLING *B. DECUMBENS* COVER

4.1- When?

■ At least 12 months of cover is necessary to achieve optimal soil remediation. *B. decumbens* cover should be controlled 6-8 weeks after the last mowing and then, if required, after planting micropropagated plantlets.

4.2- How?

■ It is important to mow the cover 6-8 weeks before chemical control, by scything. Then the *B. decumbens* cover is controlled with a glyphosate spray (6-8 l/ha). In case of subsequent regrowth, a second directed grasskiller spray is conducted at 2 l/ha dosage.

Note: the efficacy of Fusilade® (specific grasskiller) in controlling *B. decumbens* has been proven in directed sprays of grass clumps of up to 30 cm height.



B. decumbens cover killed after a 6 l/ha glyphosate spray,
Nord Atlantique region, Martinique - Photo IT2

5. MICROPROPAGATED PLANTLETS PLANTED IN *B. DECUMBENS* MULCH

■ At the end of the fallow, the amount of mulch produced depends on the cover quality, soil fertility and length of the *B. decumbens* growth period (in relation to the establishment period and fallow length). The high quantity of roots produced has a favourable effect on the soil porosity. However, when the root system is in place, it increases soil cohesion, which is problematic for planting micropropagated plantlets. Chemical control of the grass cover prior to planting can lead to partial decomposition of the *B. decumbens* roots. Two strategies can then be used to plant micropropagated plantlets in *B. decumbens* mulch.

● A rototiller or a subsoiler tine may be used to till the soil in the small interrow (but this may upset the mulch smothering effect on weeds). The planting line may also be tilled, but only four blades should be used on the rototiller.



Micropropagated plantlet planted in mulch using a power auger - Photo IT2



Power auger - Photo IT2

• A power auger or hand auger can be used to cut through the *B. decumbens* mulch and bore a hole the size of the micropropagated plantlet block. The plantlets can then be readily planted along the planting lines.

Note: it is strongly advised to start fertilizing once the micropropagated plantlets have been planted. The fertilization conditions are the same as those recommended for standard planting on bare soil after spontaneous fallows.

■ *B. decumbens* is not suitable for a live cover crop association because, when alive, it heavily competes with the banana crop thus substantially reducing crop growth, with delayed banana flowering, even with supplementary fertilization. Moreover, this grass does not tolerate shade, so after a first cycle the *B. decumbens* cover develops gaps and becomes highly degraded and eventually completely disappears. Although there could be some regrowth, this is not problematic in the long term.

Micropropagated plantlets planted in holes bored with a power auger in double rows in *B. decumbens* mulch controlled 5 weeks earlier - Photo IT2

6. INFORMATION AND SUPPLIES

■ Contact IT² or banana producers' groups (BANAMART, BANALLIANCE and LPG) for all inquiries and technical information.

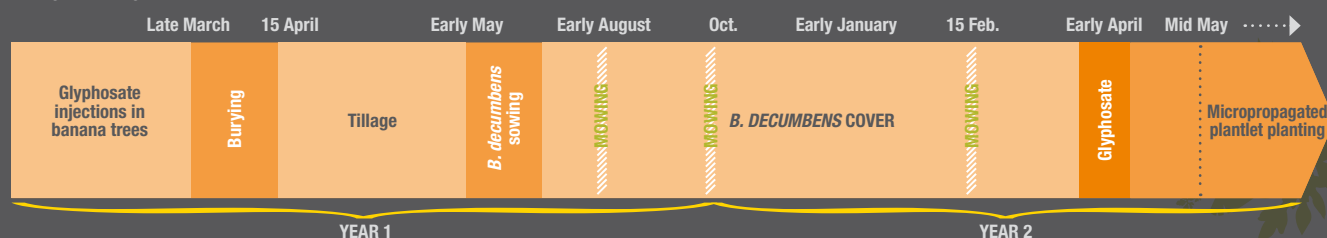
■ Contact seed dealers in Martinique and Guadeloupe for seed supplies. Seeds are generally packed in 25 kg bags. They may be sown immediately or stored at 20-25°C in a dry area.

7. PLANTING SCHEDULE

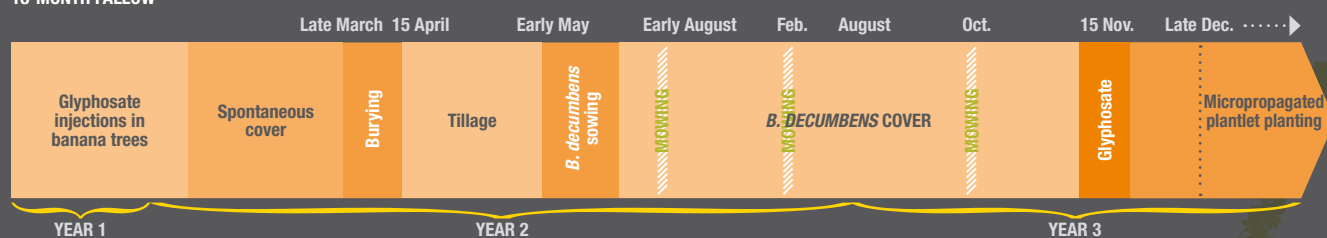
■ Two scenarios are possible for planting *B. decumbens* fallows. Calendars for 12-month and 18-month fallows are illustrated below.

References: Cook B.G., Pengelly B.C., Brown S.D., Donnelly J.L., Eagles D.A., Franco M.A., Hanson J., Mullen B.F., Partridge I.J., Peters M. and Schultze-Kraft R. 2005. Tropical Forages: an interactive selection tool. [CD-ROM], CSIRO, DPI&F(Qld), CIAT and IRLI, Brisbane, Australia. Website: www.tropicalforages.info.
Husson O., Charpentier H., Razanamparany C., Moussa N., Michellon R., Naudin K., Razafintsalama H., Rakotoarinivo C., Rakotondramanana, Seguy L. 2008. Fiches techniques plantes de couverture : Graminées pérennes., CIRAD, TAFA, GSDM, AFD, MAEP, Madagascar. Website: <http://agroecologie.cirad.fr>
Ternisien E., Ganry J. 1990. Rotations culturales en cultures bananières intensives. Fruits, (special issue), 98-102.
Gayalin M., Leimbacher F., Saudubray F., Archimède H., Mahieu M. 2003. Gestion, intérêts et limites des principales espèces fourragères utilisables dans les Antilles., INRA, Cemagref. FAO Grassland website: www.fao.org/ag/AGPC/doc/Gbase/mainmenu.htm.
Tropical Grasslands website: www.tropicalgrasslands.asn.au/pastures/signal.htm.

12-MONTH FALLOW



18-MONTH FALLOW



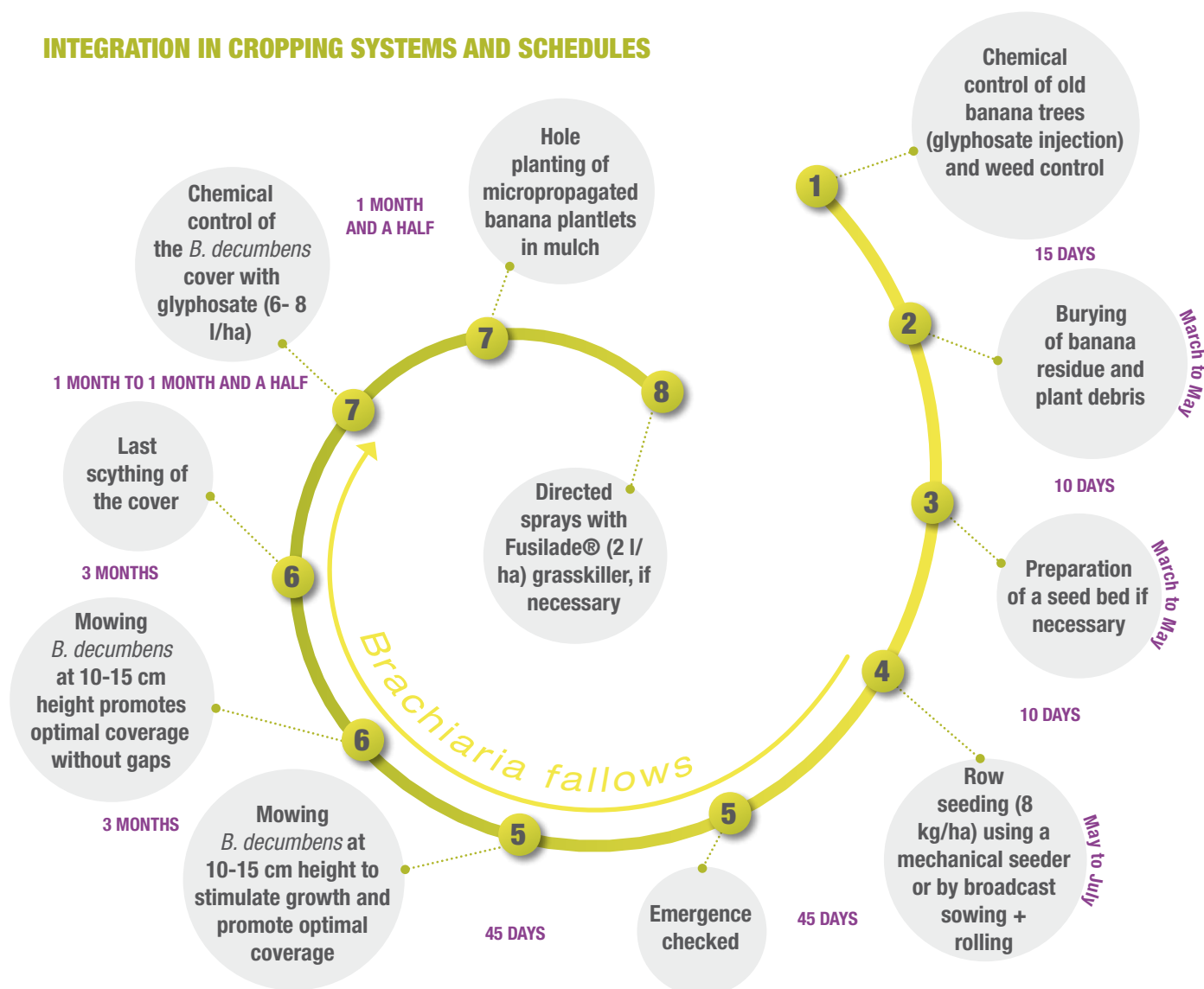
BRACHIARIA DECUMBENS CV. BASILISK

SANITIZING FALLOWS AND IMPROVED SOIL STRUCTURE

AGRICULTURAL BENEFITS

- Nonhost of the main banana parasites
- Soil fertility remobilizing and soil restructuring ability
- Rapid and effective soil cover/anti-erosion function
- Excellent fodder
- Integration in cropping systems and schedules

INTEGRATION IN CROPPING SYSTEMS AND SCHEDULES



INFORMATION AND SUPPLIES

- Contact IT2 or banana producers' groups in Martinique (BANAMART and BANALLIANCE) and Guadeloupe (LPG).
- Contact specialized seed dealers for seed supplies.

